THE EFFECTS OF PHONOLOGICAL CYCLES TREATMENT

ON THE OCCURRENCE OF PHONOLOGICAL PATTERNS

by

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A Thesis for the Degree of

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Chapter I
Introduction

A phonological disorder is characterized by deficits in how speech sounds are stored and represented in the mental lexicon (Gierut, 1998). Children who present with phonological disorders produce systematic, rule-governed errors. For example, a child may not represent sounds in the final position of words; therefore representing a pattern of error instead of one that is phoneme specific (Prezas & Hodson, 2007). Approximately eight to nine percent of young children exhibit a phonological disorder, with five percent continuing to have a noticeable disorder by the time they reach first grade (NIDCD, 2014). Preschool-aged children with phonological disorders are also at greater risk for later literacy deficits, which can have a negative impact on academic success (Peterson, Pennington, Shriberg, & Bota, 2009).

Although the prevalence and impact of a phonological disorder is significant, limited options are available for remediation. One approach that is widely used to treat phonological disorders is the Cycles Phonological Remediation Approach (CPRA; Hodson 2010; Hodson & Paden, 1991). However, the research supporting CPRA has been primarily descriptive, lacking quantitative data. Furthermore, there is inconsistency in the implementation or insufficient details of phonological awareness procedures within the CPRA. Inconsistent and insufficient details limit researchers' ability to generalize results across studies. Therefore, the purpose of this study was to examine the effects of a modified Cycles Phonological Remediation Approach on the phonological pattern errors and phonemic awareness skills of a preschool child with a moderate phonological disorder. The CPRA was considered modified because specific changes to the phonological awareness procedures were implemented.

Chapter II
Review of Literature

Cycles Phonological Remediation Approach

The CPRA, widely implemented to treat children with highly unintelligible speech, is based on the hypothesis that treatment is most effective when treating patterns of errors across multiple sounds in a cyclical structure. Additionally, focused auditory bombardment, experiential play, and phonological awareness are incorporated to facilitate improvement of a child's phonological knowledge to facilitate correct phonological production (Hodson 2010, Hodson & Paden, 1991; Rudolph & Wendt, 2014).

Much of the research on CPRA has deviated from the key concepts outlined by Barbara Hodson and colleagues and no two published studies have implemented the same procedure (Rudolph & Wendt, 2014). Almost and Rosenbaum (1998) found significant effects on preschoolers' use of phonological pattern errors after modifying the CPRA by including minimal pair words (i.e., words that differ by one phoneme) and phoneme practice at the word, sentence, and conversational levels. Tyler, Edwards, and Saxman (1987) also found significant effects of a modified CPRA among preschool children with moderate to severe phonological disorders. Tyler, et al.'s (1987) modifications included practice at the word and sentence levels and auditory bombardment without amplification. Rudolph and Wendt (2014) is the only study to date that examined the CPRA approach with limited modifications using a single subject design. Three preschool aged children with moderate-severe phonological disorders characterized by three or more phonological patterns were included in the study (Rudolph & Wendt, 2014). Phonological pattern errors treated were selected based on the results of the Hodson Assessment of Phonological Patterns-Third Edition (HAPP-3; Hodson, 2004). Two sounds per phonological error were taught during the treatment. The activities, as outlined by Hodson and colleagues (2010), included amplified auditory bombardment, stimulability practice, production practice, phonological awareness, and home practice. Two children attained significant improvement when comparing baseline phase and cycle II, and all three children showed significant improvement between the baseline and follow-up phases of the study.

Although these studies provide significant quantitative treatment effects, specific information about the phonological awareness procedures were not provided. Phonological

awareness is a broad construct that includes many skills. Providing details of the phonological awareness procedures will help practitioners replicate the procedures found to be effective.

Phonological Awareness among Children with Phonological Disorders

Phonological awareness refers to a child's awareness of the sound structure of spoken language (Gillon, 2000). A variety of skills are associated with phonological awareness such as rhyming, syllable segmentation and blending, and phoneme segmentation and blending (Gillon, 2000). Hodson (2010) recommends selecting a phonological awareness procedure based on the students' phonological awareness ability. Limited amount of research is available to determine whether treating phonological skills at the syllable-level or phoneme-level is more effective for children who have phonological disorders. Gillon (2000) investigated the effects of a phonological awareness intervention on the phonological skills of 91 children with and without speech and language impairments. She found that the children with speech and language impairments who received training in phonological awareness, which consisted of rhyming and phoneme manipulation, identification, blending, and segmenting significantly improved their speech production. Specifically, children reduced their percentage of occurrence velar fronting to less than 20%.

Carson, Gillon, and Boustead, (2013) compared the effects of a phonological awareness training focused at the phoneme level (i.e., phonemic awareness) to regular whole language classroom instruction on the literacy development of children with and without language disorders. The phonemic awareness treatment consisted of phoneme analysis, phoneme identification, phoneme segmentation, and phoneme blending. Overall, children who received the phonemic awareness instruction significantly scored higher on phonemic awareness and word-level reading and spelling tasks than children who received regular classroom instruction. Children with language disorders also made significant gains on phonemic awareness and literacy tasks. Children with language disorders increased their word-level reading and spelling skills comparable to children with typical skills who did not receive the phonemic awareness treatment. These results suggest that it is possible to increase literacy skills of children with language disorders to an average range. Further, Shakeri, Soleymani, Zarifian, and Kamali (2014) found a relation between children's poor phonological awareness skills at the phoneme level and their use of atypical phonological patterns.

These findings suggest that phonemic awareness is effective in increasing literacy skills of children with language disorders. It is unknown whether incorporating phonemic awareness in a phonological disorder treatment will increase the phonological awareness of children with phonological disorders. Children with phonological disorders have deficits in phonological awareness, which can consequently have a negative impact on academic success in the future (Rvachew, Ohberg, Grawburg, & Heyding, 2003; Hodson, 2010; Rvachew, 2007). This may be due to an impaired ability to access the correct phonological representation and failure to understand the correct grapheme-phoneme representation (Gillon, 2000). Although the CPRA incorporates phonological awareness, researchers and practitioners treat a variety of phonological awareness skills. Therefore, the purpose of this study was to investigate the effectiveness of a modified CPRA with phonemic awareness intervention on the phonological pattern errors and phonemic awareness skills of a preschool child with a moderate phonological disorder.

Research Questions

1. Will CPRA with phonemic awareness training increase the percent consonant correct of a child with highly unintelligible speech?
2. Will CPRA with phonemic awareness training decrease the occurrence of phonological patterns of a child with highly unintelligible speech?
3. Will the CPRA plus phonemic awareness training increase the phonemic awareness of a child with highly unintelligible speech?

Research Hypothesis

Based on results from previous research, it is expected that phonological patterns will be reduced after implementation of the modified CPRA as measured by the HAPP-3 (Almost & Rosenbaum, 1998; Rudolph & Wendt 2014; Tyler, Edwards, & Saxman 1987, Hodson, 2004). Additionally, previous research supports the effectiveness of phonemic awareness to improve literacy abilities for children with language disorders (Carson, Gillon, & Boustead, 2013). Thus, it is hypothesized that incorporating a phonemic awareness activity into the CPRA approach will lead to reduced use of phonological error patterns and improved phonological awareness skills of a child with a phonological disorder.

Chapter III
Method

Participant

One male, six-year-old child, named Brad for the purpose of this study, was recruited from the local university speech and hearing clinic. The child exhibited a moderate phonological disorder characterized by use of four phonological patterns 40% of the time or higher on the Hodson's Assessment of Phonological Processes (HAPP; Hodson, 2004). The child was a monolingual English speaker and scored at or above one standard deviation above the mean on the Clinical Evaluation of Language Fundamentals Preschool-2 (CELF-2; Semel, Wiig, & Secord, 2004) and the Primary Test of Nonverbal Intelligence (Ehrler & McGhee, 2008). Brad presented with normal hearing performance measured through a conditioned response to 25 dB HL pure tones at 500, 1000, 2000, and 4000 Hz. Brad previously received speech therapy, but no additional speech and language intervention was provided at the time of this study. See Table 1 for descriptive scores of initial testing.

<Insert Table 1>

Assessments

Phonological Patterns

The Hodson Assessment of Phonological Patterns-3 (HAPP-3) was administered to Brad at pretest and posttest to identify the phonological pattern errors that he produced (Hodson & Paden, 1991). The HAPP-3 has a high test-retest reliability of .99. The HAPP-3 requires children to produce fifty nouns by labeling toys and pictures to identify present phonological patterns. Productions are transcribed and analyzed following production to identify present deficiencies and patterns. The results of the HAPP-3 at pretest revealed that the child presented with gliding, fronting and /s/ cluster reduction with more than 40% of occurrence.

Based on the results of the HAPP-3, a 30-word high frequency list was created to measure treatment progress at pretest and posttest and across individual treatment sessions. The 30-word high frequency list included ten words per phonological pattern error produced by Brad. All words were deemed high frequency based on the Phonotactic Probability Calculator developed by Vitevitch and colleagues (Vitevitch & Luce, 2004). The child was presented with picture representations of the 30 words and asked to name the picture to obtain an unmodeled child production of the word. If the child used the incorrect word, the examiner cued the child to produce the correct word with various questions and prompts (e.g., "What color is this? It's the

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color of a heart". Red.) If the child could not produce the correct word, the examiner said the word and the child was required to imitate the word. Lastly, the examiner said the words on the word-list and had the child imitate the word to obtain a modeled child production. The child's production of the words obtained from the word list task was transcribed and analyzed by calculating an accuracy score of individual phonemes (i.e., percent consonant correct).

Phonological Awareness

The Phonological Awareness Test- 2 (Roberston & Salter, 1991) was administered pre- and post-treatment to determine whether the modified CPRA approach improved the child's phonological awareness ability. The segmentation, isolation, and blending subtests were administered. All subtests had a high test-retest reliability exceeding .90. The segmenting subtest required Brad to segment orally presented words into syllables and phonemes. For example, Brad was presented with the word "pizza" and was required to segment "pizza" into separate syllables (i.e., "pi-zza"). The isolation subtest required Brad to identify individual phonemes in the initial, medial, and final position of various words. For example, the clinician told Brad "I'm going to say a word, and I want you to tell me the beginning sound of that word "Cat". Brad was required to name /k/. This was completed for words varying in length and position of the word. The blending subtest required Brad to blend orally presented segmented syllables and individual phonemes to create words. For example, the clinician would verbally present the word window as "win-dow" at the syllable level, or the word sit as "s-i-t" at the phoneme level. Brad was required to say "window" and "sit". Each item was scored as right or wrong and the raw scores were converted to standard scores and percentile ranks for each subtest administered.

Inter-rater Reliability

The primary researcher and two undergraduate clinicians analyzed data from each session to establish reliability of results. The primary researchers trained the undergraduate to score Brad's responses from the thirty-word list. Scoring agreements and disagreements were tallied and calculated by dividing the number of agreements by the total number of responses. The inter-rater reliability was 95.3%.

Experimental Design

Single subject, multiple baseline across behaviors design was implemented to analyze the effects of the CPRA with phonemic awareness training on the percent consonant correct of a child with highly-unintelligible speech. Three phonological pattern errors served as behaviors. In

multiple baseline design, experimental control is established when the child's percent consonant correct of the target words improved while the remaining words on the 30-word list remained stable. The CPRA requires that a phonological pattern error be targeted for a certain period of time instead of reaching a set criterion; therefore a different phonological pattern error was targeted every few weeks when the cycle began again. While one phonological pattern error was being treated, the other phonological error patterns were considered in the baseline phase.

All data were entered into Excel and line graphs for each analysis for each behavior. Visual analysis of the data was implemented to compare the performance of the child's baseline performance to treatment performance for each phonological pattern. Horner, et al. (2005) described visual analysis as involving the interpretation of level, trend, and variability performance during both baseline and treatment conditions. Level refers to the phase (i.e., baseline versus treatment phases), trend refers to the rate of increase or decrease of the data during the treatment phase, and variability refers to the variability of the data during the treatment phase (i.e., steady or fluctuating) (Horner, et. al., 2005). To answer the second and third research questions, a pre- and post-treatment comparison on the child's scores obtained from the HAPP-3 and PAT-2 were analyzed (Table 3). A clinically relevant change was determined when the child's post-treatment scores on the HAPP-3 and PAT-2 were higher than pre-treatment scores which resulted in a lower severity categorization.

Treatment Procedure

Brad attended three, forty-five minute sessions per week at a local university clinic. Each session began with administration of the 30-word high frequency word list to monitor the child's accuracy from sessions to session. The schedule of activities that followed the 30-word high frequency list included: Review of target words, auditory stimulation, experiential play, phonological awareness, and stimulability.

The review of target words included the presentation of target words practiced during the previous session in a drill-based activity. Auditory stimulation included the presentation of a list of approximately twenty words containing the target phonological pattern error through headphones with slight amplification, which took approximately 30 seconds. Experiential play included practice target words embedded in a play activity. During the play activity, the administrator provided pictures of the target words and orthographic representation of words printed on index cards. Play activities included crafts and structured activities with an emphasis

on play scenes such as a day at the pizza parlor, zoo, or day fishing where the child was an active member. Activities were based around the child's interests and target words were incorporated throughout the play activity.

Phonological awareness activities focused at the phoneme-level and followed the outline by Carson, Gillon, & Boustead (2013). Odd-one-out tasks were initially targeted at the beginning of therapy. This task included identifying which word had a different initial or final phoneme than the other two words presented. Once this skill was mastered for both the initial and final phoneme positions, phoneme identification was practiced. The child was prompted to produce the initial and final phonemes of target words presented by the clinician. The words presented during each session included the target sound being treated that week. This differs from a traditional version of the CPRA where phonological awareness is not focused on the target pattern or phoneme and is not focused solely at the phoneme level.

Lastly, stimulability included imitation of target words to determine the selection of new target words. Home practice, which was given to parents at the end of every session, consisted of the parent reading the auditory stimulation stimuli words to the child and the child producing the production play word cards one time per day (Hodson, 2006; Hodson & Paden, 1991). Compliance was tracked via parent report at the beginning of each session.

Fidelity of Treatment

Undergraduate clinicians at the university clinic completed all treatment sessions. Each undergraduate completed a training session conducted by the primary researcher. Training included a review of protocol and treatment, as well as an overview of the fidelity procedures that was utilized. Videos and demonstrations of the CPRA were presented, and a teach-back method was used to ensure the clinicians understood the protocol. Previous research utilizing the CPRA was also reviewed. The primary researcher completed all testing to meet eligibility requirements and establish baseline behavior prior to undergraduate clinicians beginning treatment sessions. Fidelity was established through a checklist comprised of all necessary tasks included in each treatment session. Sessions were recorded and reviewed by the researchers to ensure that fidelity was established. To calculate procedural fidelity agreement data, the number of steps completed by each instructor in each session was divided by the number of steps that should be completed as outlined in the fidelity checklist and multiplied by 100 (Billingsley, White, & Munson, 1980). Procedural fidelity agreement was 93.4%.

Chapter IV
Results

To answer the first research question, Brad's production of the words on the 30-word high frequency list obtained at each session was analyzed. The words were transcribed and the number of consonants produced correctly was recorded. Graphic displays of Brad's data are shown in Figure 1 and descriptive statistics for his performance are summarized in Table 2. Mean accuracy percentages of consonants correct were low for all targeted phonemes within phonological patterns during baseline, creating a stable baseline behavior. When treatment was introduced for /s/ clusters, accuracy trended upward across cycles I, II, and III. Phonemes within the patterns of velars and liquids displayed no improvement throughout treatment phases. Only phonemes within the /s/ cluster patterns showed consistent performance across the three cycles of treatment following the baseline phase. To demonstrate that the modified CPRA effectively improved Brad's production of sounds within the targeted phonological patterns, his performance across all three phonological patterns had to improve above baseline (Kratochwill et al., 2010). Although Brad improved his production of /s/ in a phonological cluster pattern, the results do not support a causal relationship between the modified CPRA and Brad's production of targeted sounds.

<Insert Table 2>

To determine whether a clinical improvement of the child's reduction of phonological pattern errors produced and increase in phonological awareness, the scores on the HAPP-3 (Hodson, 2004) and PAT-2 (Roberston & Salter, 1991) were analyzed. See Table 3 for scores. Percentage of occurrence for all target phonological error patterns decreased from pretest to posttest. Occurrence decreased by 39%, resulting in a frequency of 28%. Fronting and gliding decreased by 5% and 26%, respectively. Brad demonstrated improvement on all phonological awareness skills assessed. Brad scored higher on the segmentation and blending subtests at posttest when compared to pretest. Raw scores were also converted to standard scores. Brad scored within the average range on isolation and blending subtest at posttest. This demonstrates a clinical improvement from pretest where he scored below the average range. Whether clinically significant improvement was made was determined by whether or not Brad's scores were within the average range following treatment. For the PAT-2, this meant within one standard deviation from the mean. Although scores improved, due to the nature of the design, it cannot be determine

whether this was specifically due to the CPRA treatment and whether these results had a direct impact on Brad's phonological patterns.

<center><Insert Table 3></center>

Post Hoc Behavioral Analysis

An analysis of the child's behavior was used to identify factors that may have interfered with the treatment procedures and thus affected outcome results. All treatment sessions were recorded and reviewed to identify behaviors that could have interfered with treatment procedures. A similar approach by Greulich and colleagues (2014) was used to describe positive and negative behaviors during the treatment phase. Descriptive statistics of these behaviors can be found in Table 4. Behaviors were categorized into three categories including verbal, physical, and interactional. Behaviors were subcategorized as either positively or negatively affecting the treatment activity (Greulich et al., 2014). Examples of verbal interactions included making noises, yelling, whispering and crying. Negative behaviors included statements such as "I can't do it" and "I don't want to" while avoiding participating in the activity. Positive behaviors in this category included variations of the listed behaviors that did not negatively affect the treatment behavior. For example, if the child playfully whispered or yelled the answer, but was still actively engaged, the behavior was labeled as a positive behavior. Behaviors in the physical category included crawling under the table, rocking back in the chair, putting his head on the table, pretending to sleep, and hiding therapy materials. Positive behaviors within this category included having the hands on the table without affecting treatment, or kicking the table while still responding to the clinician. Negative behaviors in this category included crawling under the table to avoid participation, putting the head on the table and not responding, and rocking back in the chair until he fell out. Behaviors that fell in the interactional category mainly were composed of negative and included asking the clinician repeated questions about the activity to avoid making progress, arguing about tasks at hand, and throwing materials at the clinician. Positive behaviors only included high fives. Frequency of behaviors was calculated for each session to identify trends for each target pattern. The average number of negative and disruptive behaviors was then calculated for each target pattern. It was found that the mean number of negative behaviors was low for /s/ clusters, and significantly higher for the remaining two patterns of velars and liquids. These findings regarding behavior could have had an impact on progress made on the

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suppression of phonological patterns and percent consonant correct during the treatment phase of the study.

Chapter V:
Discussion

The purpose of this study was to examine the effects of a modified Cycles Phonological Remediation Approach on the phonological pattern errors and phonemic awareness skills of a preschool child with a moderate phonological disorder. The phonemes included in the phonological pattern of /s/ clusters showed consistent performance across three cycles of treatment following the baseline phase, while phonemes included in the liquid and velar patterns did not show improvement. All phonological patterns targeted were reduced when comparing pre and post testing, with one reaching clinical significance (/s/ clusters). Phonological awareness showed improvement in all areas when comparing pre and post testing, with two skills reaching clinical significance (i.e., isolation and blending).

Brad's percent consonant correct did not improve for all phonological pattern errors targeted; however, significant gains were made when comparing pre and post testing on the HAPP-3 (Hodson, 2004). These findings are inconsistent with previous research. For example, Rudolph and Wendt (2014) found that two children attained significant improvement when comparing baseline phase and cycle II. All three children in their study showed significant improvement between the baseline and follow-up phases of the study. The results of the current study could be due to the behaviors observed during the treatment session activities and during the 30-word high frequency list. The most significant negative behaviors were observed during the liquid and velar patterns which could have affected outcome results. If these behaviors were not presented, or limited as observed during sessions where the /s/ cluster pattern was targeted, it is assumed the current results would have more consistent to previous research on the CPRA. Research on behavior and motivation reported that students with low reading abilities displayed lower expectations for success and lower persistence when tasks became difficult. According to Lepola, Salonen, & Vauras (2000), motivation is shaped by internal interpretations of feelings related to success or failure during task performance. Thus, children who are motivated to learn will spend more time on a task and seek out opportunities to practice the targeted skill. Research also supports that children who show high motivation result in permanent behavior change (Edmunds & Bauserman, 2006). Dobbs-Oates, Kaderavek, Guo, and Justice (2011) found that task orientation, a measurement of motivation, predicted children's emergent literacy development. It is hypothesized that because Brad was successful during sessions where /s/

clusters were targeted, he was more motivated which resulted in changes in his percent consonant correct specifically for that target pattern. Brad's was not successful during the other two targeted phonological pattern errors which led to decreased levels of motivation and resulted in no change to his percent consonant correct for those patterns.

The current study was considered a modified CPRA because specific modifications were made to phonological awareness activity. The modifications included focusing at the phoneme level (i.e. phonemic awareness) through tasks such as sound isolation and identification. Carson, Gillon, & Boustead (2013) suggested that phonological awareness training focused at the phoneme level is effective in increasing literacy skills of children with phonological disorders more than a whole language approach. Furthermore, Gillon (2000) suggested that phonological awareness treatment could have an impact on speech production more significant than a traditional phonological based approach in isolation. Brad's phonological awareness did reach clinical significance for both isolation and blending tasks when comparing pre and post testing. As suggested in the previous work done by Carson, Gillon, & Boustead (2013) and Carson (2000), phonological awareness activities focused at the phoneme level can be beneficial for children with phonological disorders, however; whether or not this had a direct impact on the reduction of phonological patterns cannot be determine due to the nature of this study.

Future Research

This study utilized a single subject design, which makes it difficult to make conclusions regarding generalization and group effects (Rudolph & Wendt, 2014). Future research should seek to employ a group study design to make generalizations. One limitation present was that the treating therapist served as one scorer to establish reliability. In the future, someone blind to this study may be more appropriate to ensure reliable results. To improve data collection, tracking phonological awareness and occurrence of phonological patterns gains throughout the study may provide more insight on true ability.

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Table 1

PTONI and CELF results.

Subject	Age (yrs; mos)	PTONI (Index)	CELF-P;2 (SS)
Brad	5;9	94	141

PTONI= Primary Test of Nonverbal Intelligence. CELF-P:2 = Clinical Evaluation of Language Fundamentals-Preschool 2, Receptive Language Index.

SS= Standard score

Table 2

Descriptive Statistics, Percent Consonant Correct

Unmodeled	/S/ Clusters	Velars	Liquids
Mean Accuracy (SD)[a]	6.5 (2.1)	0.1 (.3)	0 (0)
Baseline	.2 (.4)	0 (0)	0 (0)
Cycle I	1.3 (1)	0 (0)	0 (0)
Cycle II	7.2 (2.9)	0 (0)	0 (0)
Cycle III	8 (1.3)	0 (0)	0 (0)
Modeled	/S/ Clusters	Velars	Liquids
Mean Accuracy (SD)	5.9 (3.3)	0 (.1)	0 (0)
Baseline	.2 (.4)	0 (0)	0 (0)
Cycle I	4.5 (2.6)	0 (0)	0 (0)
Cycle II	8 (1.6)	0 (0)	0 (0)
Cycle III	7.3 (1.8)	.3 (.5)	0 (0)

[a] Raw scores are reported. The maximum possible score is 10.

Table 3

Phonological patterns percentage of occurrence and phonological awareness results.

Phonological Patterns[a]	Pretreatment (%)	Postreatment (%)	Difference (%)	
/S/ clusters	67%	28%	39%	
Fronting	82%	77%	5%	
Gliding	89%	63%	26%	
Severity Rating	moderate	moderate		
Phonological Awareness[b]	Pre treatment Raw score	Post treatment Raw score	Pre treatment Standard Score	Post treatment Standard Score
Segmentation	2	4	68	65
Isolation	0	18	0	96
Blending	8	13	83	91

[a]Calculated based on production of 50 single words from HAPP-3. [b]Calculated based on performance on PAT-2. Raw score maximum was 20 for segmentation and blending subtests and 30 for isolation.
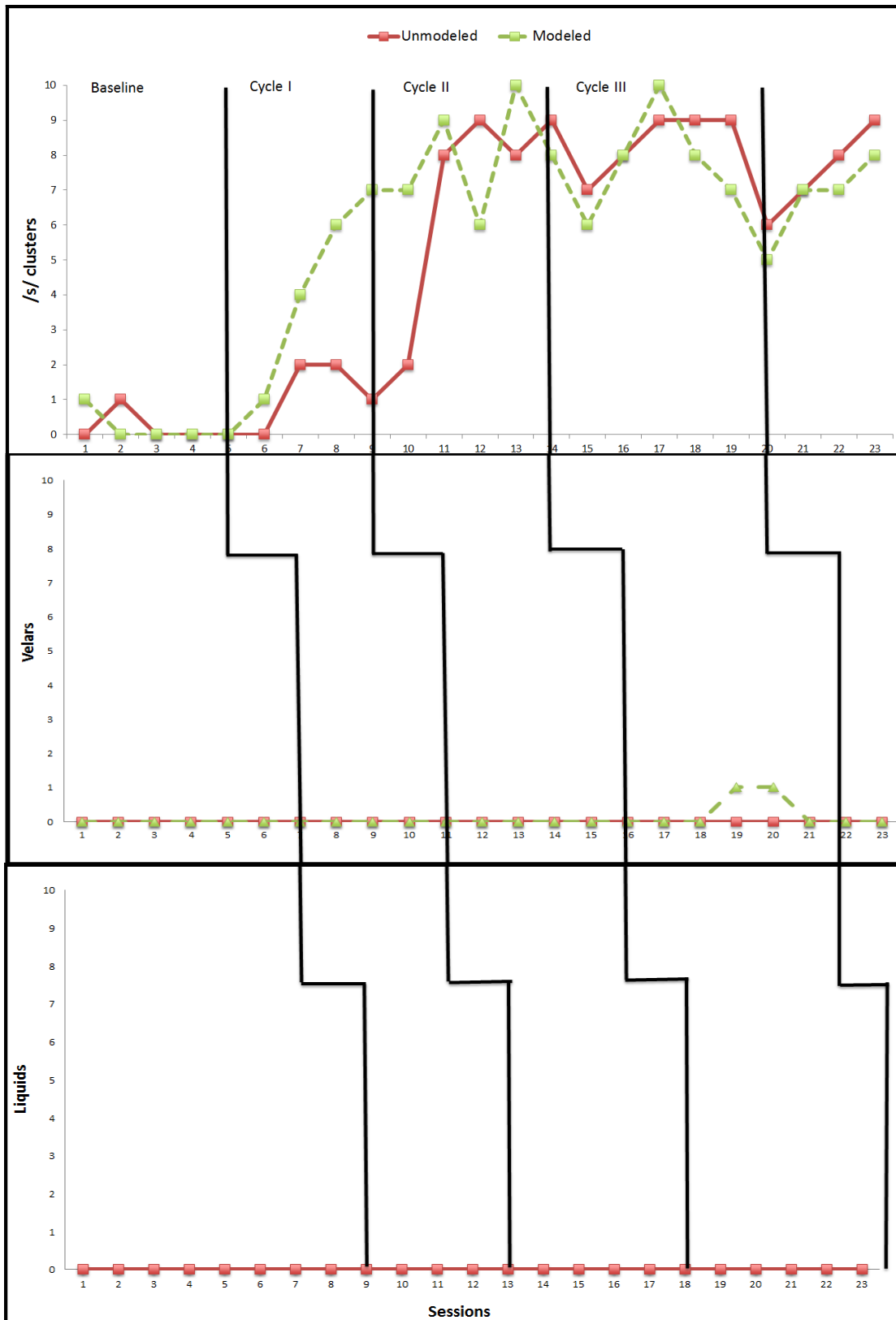
Table 4
Descriptive statistics for behavior.

Phonological Pattern Targeted	Mean Negative Behaviors (SD)	Mean Positive Behaviors (SD)
/s/ clusters	11.2(12.4)	4.6 (6.0)
Velar fronting	28 (26.3)	2.1 (2.8)
Liquid gliding	19.1 (12.3)	1 (.9)

Note. SD=Standard deviation; Mean behaviors were tallied per session when each phonological pattern was targeted.

Figure 1.

ABSTRACT

THE EFFECTS OF PHONOLOGICAL

CYCLES TREATMENT

ON THE OCCURRENCE OF PHONOLOGICAL PATTERNS

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This study investigated the effectiveness of a modified Cycles Phonological

Remediation Approach with phonemic awareness intervention on the phonological pattern

errors and phonemic awareness skills of a preschool child with a moderate phonological

disorder. One six-year-old child with a moderate phonological disorder was included in this

study. A multiple-baseline across behaviors was implemented. The treatment phase

implemented a modified CPRA with an emphasis on phonemic awareness. Results revealed

velar and liquids phonemes (i.e., patterns of fronting and gliding) displayed no

improvement throughout treatment phases. However, /s/ clusters (i.e., cluster reduction

pattern) showed consistent performance across the three cycles of treatment following the

baseline phase. Percentage of occurrence for all target phonological error patterns

decreased from pretest to posttest. Occurrence decreased by almost half for one of the

phonological patterns resulting in a clinically significant result. Improvement was shown

for all phonological awareness skills, with two tasks also reaching clinical significance. The

findings of this study support the implementation of phonemic awareness in the CPRA for

children with phonological disorders. Clinical implications will be discussed.