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Phoneme Monitoring and Rhyme Monitoring in School-Age Children Who Stutter

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Phoneme Monitoring and Rhyme Monitoring in School-age Children Who Stutter

by

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Thesis

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Dedication

This thesis is dedicated to my mother and grandparents, who have supported and encouraged me through every step of my education.

Acknowledgements

The current study is part of a larger one, designed and lead by Jayanthi Sasisekaran at the University of Minnesota. I would like to thank the children and their families who participated in this study. It is only with their help that we can further our understanding of stuttering. Thanks also to Elizabeth Hampton for her part in recruiting participants for the current study. Finally, I would like to acknowledge and give special thanks to Courtney Byrd. She has been an inspiring and motivating mentor, teacher, supervisor, clinician, and friend.

Abstract

Phoneme Monitoring and Rhyme Monitoring in School-age Children Who Stutter

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The University of Texas at Austin, 2012

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Abstract: The present study investigated phonological encoding skills in children who stutter (CWS). Participants were 4 CWS (M=10;9years) and 4 children who do no stutter (CNS) (M=12;1 years) The groups were compared in phoneme monitoring and rhyme monitoring, with a tone monitoring task providing a neutral baseline for comparison. Both the phoneme monitoring and rhyme monitoring tasks were performed during silent picture naming. Results revealed that both groups were faster and more accurate when monitoring the rhyme than when monitoring the phoneme. Results further indicated that the children who stutter were significantly slower in both conditions. These findings suggest that there may be a later transition to incremental processing in both typically developing children and those who stutter and that children who stutter may be even less efficient than children who do not stutter. However, these results may have been compromised by a few key variables.

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Chapter 1: Background

Stuttering is a developmental disorder characterized by atypical disruptions in the forward flow of speech (ASHA, 1999). The onset of stuttering coincides with a time in development when children arguably experience the most significant growth both linguistically and motorically (Bloodstein, 2006). For this reason, in an attempt to understand the potential contributors to stuttered speech, researchers have examined the linguistic and motoric skills of children who stutter (Brocklehurst, 2008). The resultant data appears to suggest that phonological deficiency may be a key contributor to childhood stuttering (Brocklehurst, 2008; Melnick, Conture, & Ohde, 2003; Byrd, Conture, & Ohde, 2007; Hakim & Ratner, 2004; Anderson, Wagovich, & Hall, 2006; Anderson and Wagovich, 2010). The majority of the studies completed thus far have focused on differences in encoding that are apparent during overt production. Given that encoding is a nonverbal process, we hope to further our understanding of the differences in the phonological representations of children who stutter by examining those differences during nonverbal tasks. We have selected a nonverbal task that was used effectively to demonstrate differences between adults who do and do not stutter, but has not yet been used with children.

To date, phonological encoding in children who stutter has been investigated experimentally through the use of picture naming priming paradigms and also through the use of non-word repetition tasks. Melnick, Conture, and Ohde (2003) examined speech reaction times (SRTs) in three to six year-old children who stutter (CWS) and children who do not stutter (CNS). Participants were presented with three priming conditions: no prime, phonologically related prime, and phonologically unrelated prime. Results indicated no significant difference between groups in SRTs, with both groups performing better given phonologically related primes. However, the CNS group's SRTs were related to their articulatory mastery, while the CWS group's SRTs were not. The authors suggested that this indicated a disconnection between the phonological representations and the articulatory movements associated with those representations in individuals who stutter.

Byrd, Conture, and Ohde (2007) examined the overt naming abilities of preschool children who stutter given holistic versus incremental primes. They measured SRTs for 3 and 5 year-old CWS and CNS within three auditory priming conditions: neutral, holistic and incremental. They found that a shift occurred in the CNS group between ages 3 and 5, in which picture naming was better facilitated by incremental primes with age. This same shift did not occur in CWS, with holistic priming continuing to be more facilitatory at age 5. These findings provided evidence for the holistic processing theory of stuttering. The authors concluded that preschool CWS might be delayed in making the developmental shift in phonological encoding from holistic to more incremental processing. They further stated that preschool CWS might need additional acoustic-phonetic information to plan and produce faster naming responses at a later age than CNS. This requirement may contribute to the difficulties CWS have establishing fluency.

In addition to priming paradigms, the phonological encoding abilities of CWS have also been explored through the use of non-word repetition tasks. Hakim and Ratner (2004) studied the non-word repetition abilities of young school-age CWS compared to CNS. They found that CWS performed more poorly than CNS on measures of Number of Words Correct and Number of Phoneme Errors at all non-word lengths, although differences reached statistical significance for only 3-syllable non-words. When lexical stress of the non-words was varied to a non-English stress pattern, all participants repeated the stimuli with less accuracy, and the CWS again exhibited more errors than CNS. Though the study was relatively small (16 participants) the authors suggested that results indicated an underlying linguistic deficit that contributes to stuttering. More specifically, they concluded that CWS may have a diminished ability to remember/reproduce novel phonological sequences.

Anderson, Wagovich, and Hall (2006) assessed the non-word repetition skills of 24 preschool-age children with and without stuttering disorders. Their findings were similar to those of Hakim and Ratner (2004) in that CWS produced significantly fewer correct 2- and 3-syllable non-word repetitions and made significantly more phoneme errors on three-syllable non-words relative to CNS. In addition, Anderson, Wagovich, and Hall found a significant relationship between performance on a test of expressive phonology and non-word repetition for CWS, but not CNS. Their findings also revealed no significant fluctuation in fluency as non-words increased in length. The authors concluded that these findings could not be attributed to poor language performance on the part of CWS, or the occurrence of stuttering in the course of non-word production.

Anderson and Wagovich (2010) further examined the phonological encoding abilities of children who stutter by exploring the relationship between linguistic processing speed and nonword repetition. Participants were 3 to 5 year-old children who do and do not stutter. The children participated in a computerized picture naming task to measure linguistic processing speed, and a non-word repetition task to assess phonological working memory. Parents completed a questionnaire used to evaluate the children's attention. Results showed that the groups did not differ from each other on speed of picture naming or attention; however, the CWS performed significantly worse on non-word repetition. In addition, they found that for CWS only, there was a significant negative relationship between picture naming speed and non-word repetition; there were no significant relationships for either group between aspects of attention and picture naming speed; and only the CNS showed a significant relationship between non-word repetition and focused attentional skills. The authors concluded that their findings indicated the need to consider the underlying skills associated with lexically related aspects of language production when examining the task performances of CWS and CNS.

Taken together, results from both the priming and the non-word repetition studies suggest that there is a difference in the phonological encoding of children who stutter. However, these data are limited in that the analyses were completed on overt productions. Several factors contribute to the value of investigating phoneme monitoring in silent speech tasks. First, some studies have indicated that the time course of phoneme monitoring in silent speech mirrors the time course of phonological encoding. Second, examination of phonological encoding during silent speech, without overt speech requirements, is important in people who stutter where overt speech motor processes may otherwise make interpretation difficult. Finally, earlier findings of differences in monitoring patterns in silent speech and perception give us an opportunity to study specific monitoring skills in individuals who stutter. To date, however, nonverbal encoding differences have only been examined in adults.

Sasisekaran and DeNil (2006) investigated the phonological encoding skills of 10 adults who stutter (AWS) and 12 adults who do not stutter (ANS) using a phoneme monitoring task performed during silent picture naming. Performance on this task was compared to phoneme monitoring performed on aurally presented target words to rule out the attribution of observed differences to general differences in perception. Analysis of MRTs indicated that the adults who stuttered were significantly slower than the control group in phoneme monitoring during silent naming, but no significant difference was present in the perception task. The authors concluded that their findings suggested that people who stutter are slower in the encoding of segmental, phonological units during silent naming, but that this difference is not attributable to a general monitoring deficit.

A review of these studies reveals conflicting data regarding the role of phonology in stuttering. Thus, as a field, we are in need of additional research to better understand the potential contribution, or lack thereof. We applied the basic tenets of the holistic processing theory to the present study, and from that hypothesized that children who stutter will be faster when presented with a rhyme prime than when presented with a phoneme prime whereas children who do not stutter will demonstrate the opposite trend. If our hypotheses are confirmed, these findings will lend further support to the theoretical notion that children who stutter continue to process segmental information holistically at a later age than would be developmentally expected.

Chapter 2: Method

The present study was conducted at the University of Texas Speech and Hearing Center, by the primary author of this thesis who is a graduate student in Speech Language Pathology and her mentor, Courtney Byrd, Ph.D., CCC-SLP. This study was approved by the University of Texas at Austin Internal Review Board and informed consent as well as assent was obtained prior to participation.

PARTICIPANTS

Participants were recruited from the greater Austin, Texas area and were provided with monetary compensation for their time. The total testing time for each child was approximately 2.5 hours, and was divided into 2 sections (Section 1: inclusionary activities; Section 2: experimental paradigm).

Inclusionary criteria

Participants had to meet certain general standards in order to qualify for participation in the present study. First, all children had to pass a hearing screening at 25dB for 500, 1000, 2000, and 4000Hz. The children also had to perform within normal limits on a series of speech-language measures. In specific, the children were tested for receptive-expressive vocabulary using the Peabody Picture Vocabulary test – Edition IV (PPVT-IV; Dunn & Dunn, 2007), phoneme awareness using the Lindamood Auditory Conceptualization Test, Third Edition (LAC-3; Lindamood & Lindamood,2004), rhyme awareness (nonstandardized test of rhyme perception and production in word and non-word pairs), and short-term memory using the Forward Digit Span test (Weschler, 1955). See Table 1 for summary of participant characteristics.

				LAC-3		PPVT-4		Rhyming Real Words		Rhyming Non-words		Digit Span		Disfluency Count	
	Group	*Age*	*Gender*	*SS*	*PR*	*SS*	*PR*	*D*	*P*	*D*	*P*	*F*	*B*	*C*	*R*
1	CNS	7;3	Male	103	58	117	87	10	8	3	4	9	4	**	**
2	CNS	10;3	Male	121	92	149	99.9	10	11	5	5	9	9	**	**
3	CNS	10;11	Female	117	87	116	86	10	11	5	5	11	6	**	**
4	CNS	13;6	Male	118	89	124	95	10	11	5	5	13	7	**	**
5	CNS	13;11	Male	115	84	110	75	9	11	5	4	7	7	**	**
6	CWS	7;10	Male	144	99	146	99.9	9	11	5	5	8	6	17%	4%
7	CWS	10;4	Male	75	5	100	50	7	8	2	2	7	3	14%	16%
8	CWS	11;4	Female	105	63	120	91	10	10	5	5	8	4	1%	6%
9	CWS	13;6	Male	112	79	115	84	10	10	5	5	13	8	16%	15%

Table 1: Participant Characteristics (SS=Standard Score; PR=Percentile Rank; D=Discrimination; P=Production; F=Forward; B=Backward; C=Conversation; R=Reading; **not measured for CNS).

The resulting group of participants who met these criteria were two groups of children ages 7 to 13 (Mean Age = 10;11); one group of children who stutter (CWS) (n = 4), and one of children who do not stutter (CNS) (n = 5) matched for age (+/- 7 mos.) and gender (7 males, 2 females). With the exception of stuttering for the CWS group, none of the participants currently or previously presented with other disorders of speech, language, or cognition as confirmed via parent questionnaire. Additionally, all participants in both groups spoke English with native competency.

Children who stutter

All CWS participants had been diagnosed with developmental stuttering by a qualified speech-language pathologist. To determine the frequency and severity of the disfluent speech production of the children who stutter, researchers collected both a spontaneous speech sample and reading sample (The Rainbow Passage) from each participant in the CWS group.

Children who do not stutter

All CNS participants had never previously been diagnosed with developmental stuttering by a qualified speech-language pathologist and there was no present or past history of concern regarding speech fluency. In addition, the primary author and her mentor listened to the child's speech to further confirm typical speech fluency.

Excluded participant

One participant from the CNS group was excluded from the study post-data analysis. The participant's scores on the experimental paradigm were confounded by a programming error and the resulting data consisted of extreme outliers that would have significantly compromised the integrity of the results. The exclusion of this participant resulted in the groups no longer being perfectly matched for age, with the mean age of the CNS group being 12;1, and the CWS group being 10;9.

EXPERIMENTAL PARADIGM

The experimental protocol consisted of the following three monitoring tasks: phoneme, rhyme, and tone. To review, the purpose of the phoneme monitoring task was to investigate the development of segmental encoding in children who do and do not stutter. The purpose of the rhyme monitoring task was to investigate the development of rhyme encoding in children who do and do not stutter. The third task, tone monitoring, was a baseline control task. During each task, participants were presented with two blocks of 28 stimuli. Each child was presented a total of 6 blocks. Task and block order was counterbalanced across participants. Each target word occurred twice in a task, once requiring a 'yes' response from the child when it carried the target phoneme, rhyme, or tone sequence, and once requiring a 'no' response. The order of the stimuli within each block was pseudo-randomized such that no two stimuli occurred twice in the same order. Prior to the completion of the experiment, children were familiarized with the target words and the corresponding pictures in a picture-naming task.

A trial in each block consisted of the following series of events: 1) an orienting screen for 700 ms followed by auditory presentation of a pre-recorded stimulus (phoneme, non-word, or tone sequence depending on the task), 2) pseudo-randomly selected inter-stimulus interval (700, 1400, 2100 ms), 3) target picture (for the phoneme and rhyme tasks) or tone sequence (for the tone monitoring task). Participants were required to press the ‘yes’ or the ‘no’ button on the response box placed in front to indicate the presence/absence of a phoneme, rhyme, or tone sequence match between the pre-recorded stimulus and the target.

Stimuli

Twenty-eight target words representing monosyllabic high frequency words were chosen as target items. The age-appropriate words carried 7 target consonants, each occurring twice as a singleton (S) and twice as a consonant cluster (CC), balanced in distribution across word-initial and final positions. Black and white line-drawings corresponding to the target words were selected from Snodgrass & Vandervart (1980) and developed further using Adobe Photoshop. Twenty-eight non-words were developed by scrambling the phonemes within the target words. The target sounds and non-words spoken by a native English speaker were recorded and digitized using PRAAT software. The pre-recorded stimuli were then used in the phoneme and the rhyme monitoring tasks. For the tone monitoring task, 14 three-sequence tones (e.g., .5 KHz, 1 KHz, 2 KHz) consisting of varying combinations of pure tones synthesized using MATLAB software formed the target tones. The total length of each sequence was matched to the average duration of the monosyllabic words spoken by a native speaker of English. See Appendix A for the word and associated picture stimuli.

Chapter 3: Results

There were two experimental conditions and one baseline condition for the present study: phoneme monitoring, rhyme monitoring and tone monitoring, respectively. The two dependent variables that we measured across these three conditions were proportion of correct responses and manual reaction time.

PROPORTION OF CORRECT RESPONSES

A Mixed Model Repeated Measures Analysis of Variance with the between-subjects factor of Group (children who stutter vs. children who do not stutter) and a within-subject factor of Condition (phoneme, rhyme, and tone) was conducted for the dependent variable proportion correct responses. There was a significant main effect for condition, $F(2,12) = 11.444$, $p = .002$. There was no interaction between condition and group , $F(2,12) = 1.434$, $p = .276$. In addition, there was not a between-subjects effect, $F(1,6) = 4.624$, $p = .075$. (See Figure 1).

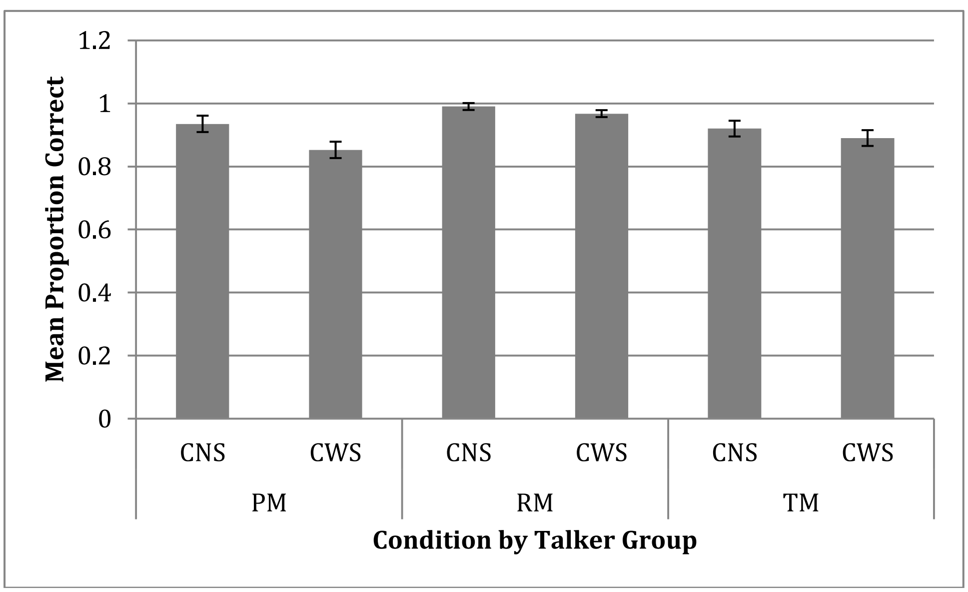


Figure 1: Proportion of Correct Responses by Talker Group Mean proportion correct for the phoneme monitoring (PM), rhyme monitoring (RM) and tone monitoring (TM) tasks for children who do not stutter (CNS) and children who stutter (CWS).

MANUAL REACTION TIME

For the measurement of manual reaction time differences, we completed another Mixed Model Repeated Measures Analysis of Variance with the between-subjects factor of Group (children who stutter vs. children who do not stutter) and a within-subject factor of Condition (phoneme, rhyme, and tone) but for this analysis the dependent variable was manual reaction time. There was a significant main effect for condition, $F(2,12) = 15.425$, $p < .0001$. There was no interaction between condition and group, $F(2,12) = 1.741$, $p = .217$. However, there was a between-subjects effect, $F(1,6) = 6.849$, $p = .040$. (See Figure 2).

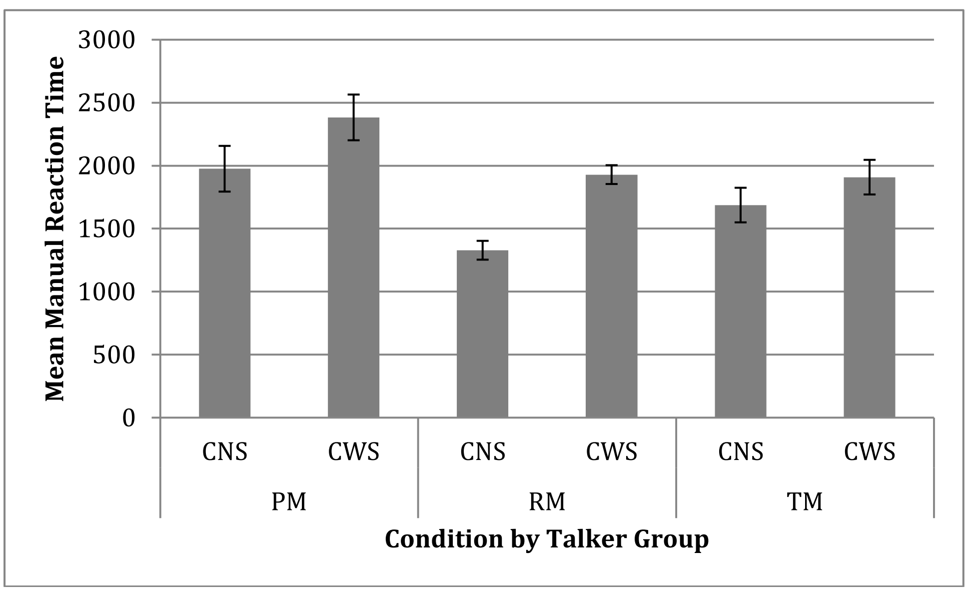


Figure 2: Mean manual reaction time for the phoneme monitoring (PM), rhyme monitoring (RM) and tone monitoring (TM) tasks for children who do not stutter (CNS) and children who stutter (CWS).

Chapter 4: Discussion

To review, the purpose of the present study was to explore whether the differences in phonological encoding that have been demonstrated during overt production tasks in children are present when using a nonverbal phoneme monitoring task. Participants were presented with three priming conditions: tone, rhyme, and phoneme. Within each condition participants were asked to judge the likeness of tones, the presence of rhyme, and the presence of phonemes, respectively. Their responses were measured in terms of accuracy and manual reaction time.

ACCURACY

Both groups were more accurate in the rhyme monitoring condition than they were in the phoneme monitoring and tone monitoring condition. There was no interaction between the talker group and the condition, and there was no between subjects effect. This finding further suggests that both groups performed similarly across all three conditions. This difference in accuracy suggests that for both groups the rhyme monitoring condition was markedly easier. In other words, the provision of the rhyme prior to seeing the picture, “primed” their ability to correctly encode the presence of that particular group of sound segments in the target picture. This finding was unexpected as we had presumed that (at least) the children who do not stutter would have found the phoneme monitoring task to be more facilitative. Our hypothesis was based on the presumption that children shift from holistic to incremental processing at an age that is younger than the age of the participants of the present study. That being said, when examining the proportion correct by talker group, CWS were still less accurate than CNS across all conditions, but the difference in accuracy was not significant. However, it was approaching significance and if the study had more power, there may have been a significant difference.

Perhaps the performance differed in this study as compared to the Byrd et al. (2007) study because of the methodological differences. The prime that was considered to be incremental in the Byrd study was the initial target sound of the word only. That is, the target incremental phoneme always occurred in the initial position of the word. By comparison, for the present study, the incremental phoneme occurred across all positions in the word. Thus, one could argue that the incremental task for the present study was significantly more challenging than the comparable task in the Byrd et al. (2007) study, given that children develop their monitoring skills in a left to right fashion. Therefore, any point in the word beyond that initial sound in the word would arguably be significantly more challenging to monitor.

Additionally, the overall nature of the silent monitoring task may have contributed to the increased difficulty of the phoneme monitoring task. Studies using overt speech production during phoneme monitoring, such as the one by Byrd and colleagues(2007), have demonstrated a significant difference between CWS and CNS in terms of their ability to process incremental versus holistic linguistic stimuli. The fact that this same relationship was not seen in the current study may indicate simply the more complex and difficult nature of accessing such phonemic representations without the benefit that is afforded through overt production. Furthermore, findings from the current study may suggest that while differences in silent monitoring ability can be seen in adults who stutter, this skill has not yet emerged in school-aged children, and thus the same observation cannot be made.

MANUAL REACTION TIME

Similar to the data regarding accuracy of the responses, there was also main effect for condition. Both groups were slower in the phoneme monitoring than the tone or the rhyme monitoring condition. In contrast to the accuracy data, the manual reaction times (MRTs) for CWS were significantly slower across all conditions. That is, there was a significant between subjects effect. However, there was not a significant interaction between MRT and talker group. This may indicate an overall auditory processing deficit in CWS, though further research is needed to draw such a conclusion.

Another possible explanation for the slower responses of CWS is a general deficit in motor skills. It has been hypothesized that stuttering is, at least in part, attributable to difficulty in planning and executing the articulatory movements necessary for speech (Namasivayam & Van Lieshout, 2011). Pressing a button, like speech, is a fine motor task, and there is some evidence to suggest that differences may also exist between stutterers and non-stutterers in completing such non-speech motor tasks. Neef et al. (2011) found that the right dorsolateral premotor cortex plays a compensatory role in the control of paced finger tapping in adults who stutter, while this function is lateralized in the left hemisphere for most adults who do not stutter. In addition, the common occurrence of secondary motor behaviors in individuals who stutter has been well documented. Furthermore, stuttering-like behaviors have also been documented in the manual gestures of deaf individuals who communicate through sign language (Quinto-Pozosa, Forber-Pratt, & Singleton, 2011). These phenomena provide support for the perspective that stuttering is correlated to some underlying motor difference/deficit.

CAVEATS

Although this preliminary study did support the developmental acquisition of incremental processing skills, there were at least a few caveats that may have compromised the integrity of the findings, including but not limited to, the auditory stimuli, the visual stimuli and the participant sample.

Auditory stimuli

The stimuli presented may have been compromised by one key potentially differentiating factor in the phoneme monitoring (PM) condition. The speech sounds presented in the PM condition were artificial productions of the target phonemes. That is, they were not spliced out of the complete production of the target words to offer an accurate phonetic/phonemic representation. In addition, the presented phonemes were followed by a schwa to make the stimuli more audible. For example, [lə] was presented followed by a picture of a wolf. The correct response for this target was to select the key for "yes", because the phoneme /l/ is present in the word /wʊlf/. However, the given stimuli of prevocalic /l/ has different phonetic properties than the actual within-word production of /ɫ/, or dark 'L'.

In the rhyme monitoring (RM) condition, the non-words were not controlled for word-likeness or phonotactic probability. This could mean that the task of rhyme monitoring was made easier due to the non-words being very similar to real words. While these factors take on more importance in non-word repetition tasks, they still may have contributed to the result that both CWS and CNS groups were faster and more accurate in the RM condition.

Visual stimuli

The visual stimuli presented in both the rhyme monitoring and phoneme monitoring tasks also introduced some unexpected variables. Though most of the black and white line drawings were easily recognized by all of the children, there were several that were not. For example, during the picture naming trial, the picture representing 'wolf' was often called 'fox', or could not be named at all. Even once trained that the picture's name was 'wolf', some children had trouble remembering the target name during the experimental tasks. An additional picture that presented some naming difficulty amongst the participants, perhaps due to unfamiliarity, was 'top'.

Participant sample

The relatively small sample size, and also the exclusion of the CNS participant further compromised data as we no longer had a match for one CWS participant. It should be noted, however, that the youngest member of the CWS group performed higher than older participants on both inclusionary and experimental tasks, possibly making up for the CNS group's higher mean age. It should also be noted that one participant from the CNS group and one from the CWS group were identical twin brothers, which may have contributed to the less robust findings for intergroup relationships.

FUTURE RESEARCH

Future research in the area of silent monitoring abilities in children who stutter should consider (at least) the following four key questions. First, does word position of the target phoneme affect monitoring? Intuitively we may assume yes, word-initial phonemes will be most easy to monitor, followed by word-final, then word-medial. This follows the typical trajectory of development for children's phonological awareness skills. But is it any different for children who stutter? Future studies may want to compare phoneme monitoring for consistent phonemes in each word position, as well as comparing stutterers to non-stutterers.

Second, does place, manner, or voicing affect phoneme monitoring? It is possible that performance may vary between targets based on the distinctive features of the given phoneme. Perhaps stops/plosives are easier to monitor than fricatives, or maybe velar sounds are more challenging than bilabials. Though no overt production may take place, we know that motor speech areas of the brain are activated during other silent tasks, such as subvocal rehearsal, thus it would make sense that sounds and sound sequences that are more difficult to produce might be more difficult or take more time to access in a silent naming task. This hypothesis could be explored in greater depth with an experimental paradigm that controlled for place, manner, and voicing of targets and examined these individual variables.

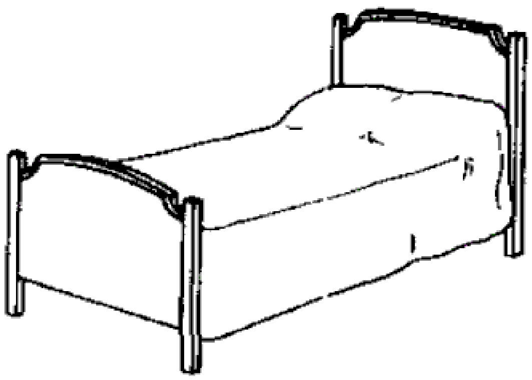
Does severity of stuttering impact monitoring skills? The current study, though small, included CWS participants representing a broad range of stuttering severities. While such terms as mild, moderate, and severe are relative by nature, future research into the frequency or severity of stuttering and its correlation to speed and accuracy of phonological processing in individuals would be very valuable. In addition, this relationship should be observed on an item-by-item basis, reporting the accuracy, speed, and *fluency* upon overt naming for monitoring tasks. This would provide the opportunity to compare not only different degrees of stuttering, but also the correlation between disfluent productions and performance on encoding tasks.

Does practice effect level the playing field? Studies of non-word repetition abilities have in fact indicated a diminished practice effect for AWS compared to ANS (Ludlow, Siren & Zikria, 1997; Namasivayam & Van Lieshout, 2008). Future research should examine the effect of practice on the performance of CWS on phonological encoding tasks such as those used in the current study. Perhaps, given repeated attempts, CWS accuracy and MRTs would approach that of CNS. Practice effects may also be investigated within the PM condition to see if performance of either group might surpass that in the RM condition, to support an emerging capacity for the shift from holistic to incremental processing.

CONCLUSION

Both CWS and CNS were most accurate in the Rhyme Monitoring (RM) condition, and least accurate in the Phoneme Monitoring (PM) condition. The MRTs for both groups were also longest in the PM condition, and shortest in the RM condition. We hypothesized that this would be true for CWS, but not for CNS, in keeping with the basic tenets of the holistic processing theory. These results appear to indicate a later transition to incremental processing in both typically developing children and those who stutter, however, this interpretation should be taken with caution given to the other extraneous variables that we noted that may have contributed to the results.

Appendix



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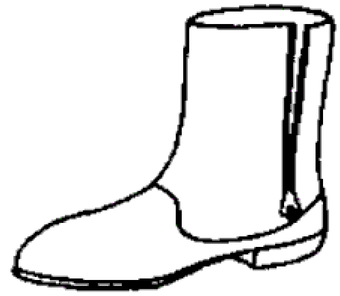

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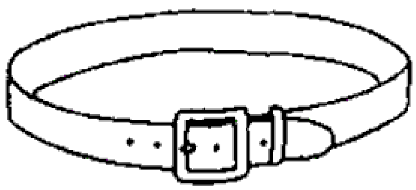

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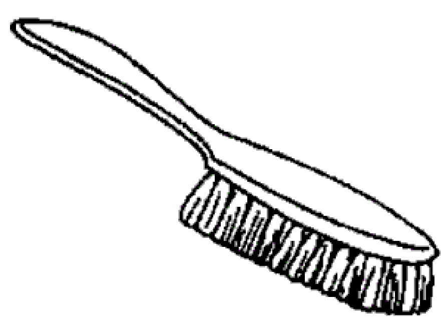

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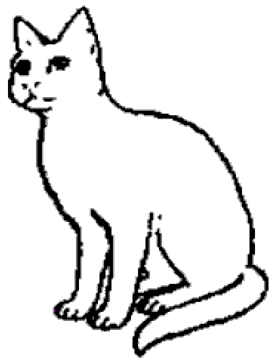

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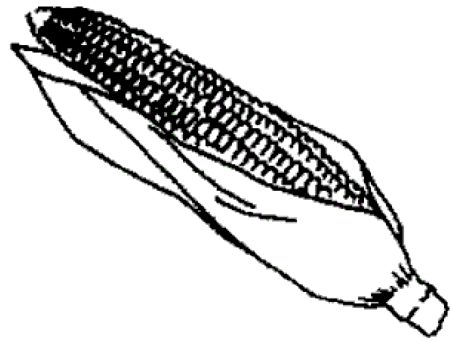

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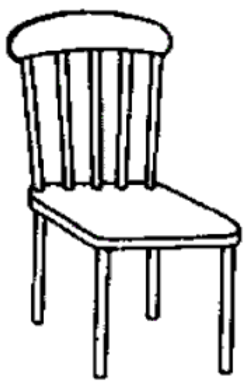

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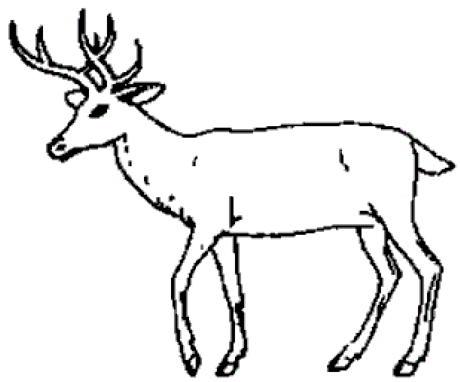

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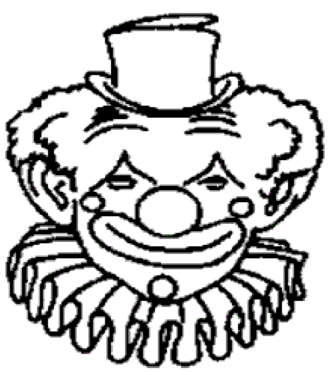
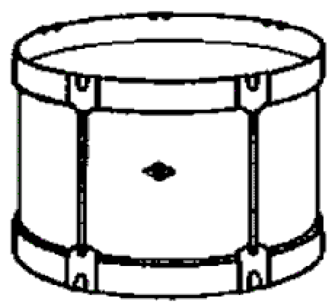


clown



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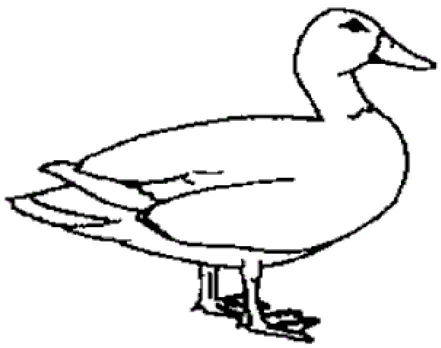

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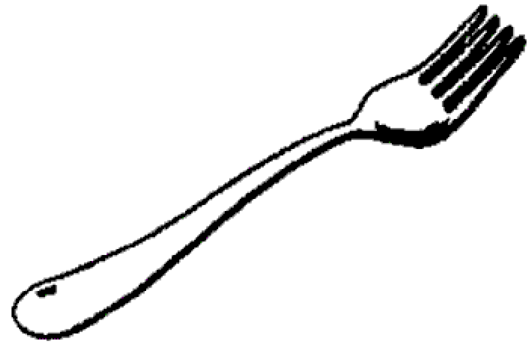
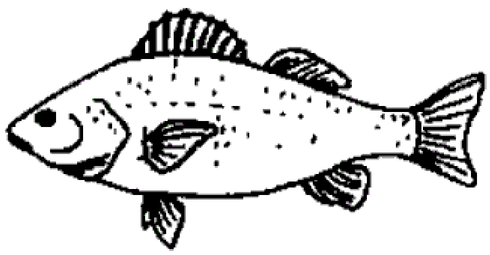
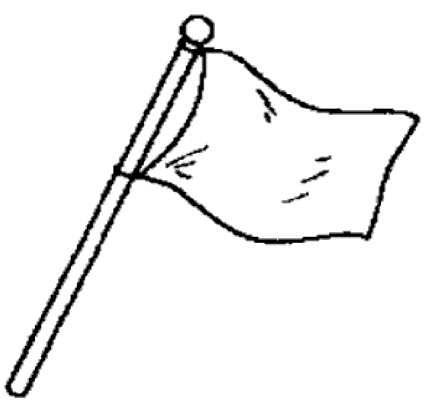


fork

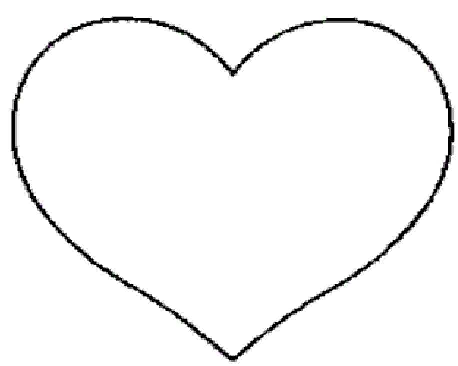


fish

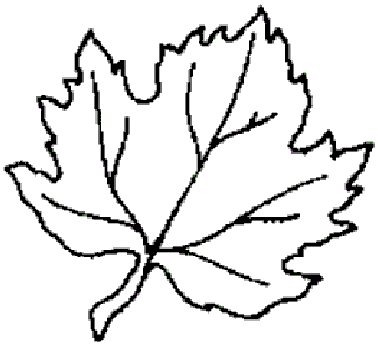
frog



flag

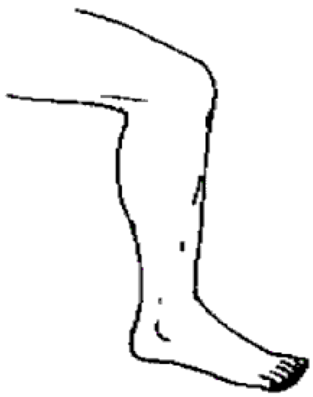


heart



leaf

nail



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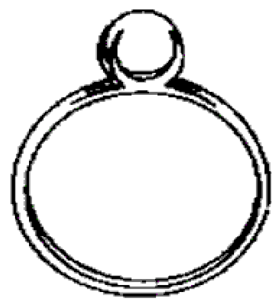
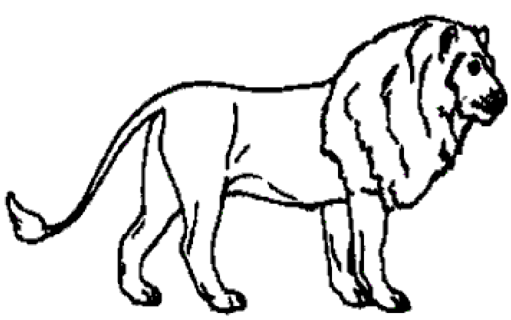
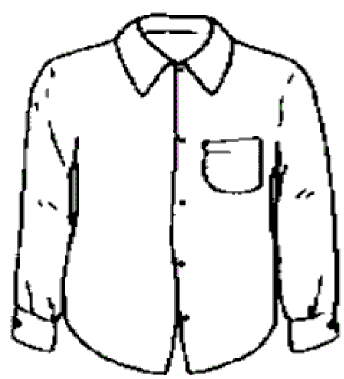


ring



lion



shirt

snail

top

star

wolf

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