AWARENESS OF RHYME IN CHILDREN AND ADOLESCENTS WITH DOWN SYNDROME

by

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A THESIS

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ABSTRACT

The aim of the present study was to measure rhyme awareness, along with alliteration and final phoneme detection, in a sample of children and adolescents with Down syndrome, compared with typically developing children of similar verbal mental age. Each phonological task was a judgment task requiring participants to decide whether two auditory words rhymed, alliterated, or shared the final phoneme. However, most participants with Down syndrome did not score above chance on a non phonological same-different judgment control task. Although it was not possible to test the original hypotheses in this group, this finding is informative for future attempts to measure phonological skills in this population. Also, item analyses of data from typically developing children revealed specific performance patterns on the phonological tasks.

LIST OF ABBREVIATIONS AND SYMBOLS

DS	Down syndrome
TD	Typically developing
PPVT-4	Peabody Picture Vocabulary Test, Fourth Edition
WRMT-R	Woodcock Reading Mastery Tests, Revised
e.g.	For example
min	Minutes
dB	Decibels
r	Pearson product-moment correlation
C_i	Initial Consonant
V	Vowel
C_f	Final Consonant
M	Mean
SD	Standard deviation
N	Total sample size
n	Sample size for group
F	Fisher's *F* ratio
p	Probability associated with the occurrence under the null hypothesis of a value as extreme as or more extreme than the observed value
ANOVA	Analysis of variance
$\eta^2 p$	Partial eta squared

Fisher's LSD	Fisher's least significant difference
t	Computed value of *t* test
%	Percent
≥	Greater than or equal to
=	Equal to
<	Less than

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INTRODUCTION

Down syndrome (DS) is the most common known genetic cause of intellectual disability (Dykens, Hodapp, & Finucane, 2000). Although individuals with DS vary greatly in levels of overall cognitive functioning, there is a distinct cognitive profile consistent among most people with DS. They have a relative strength in visual-spatial processing (Powell, Houghton, & Douglas, 1997) and perform much higher on visual rather than auditory tasks. However, their linguistic profile is more complicated. While their receptive vocabulary seems relatively intact for their developmental level, individuals with DS show particular weaknesses in grammatical abilities, articulation, and expressive language (Dykens et al., 2000). They also show a deficit in auditory memory (see Jarrold & Baddeley, 2001, for a review).

The verbal and auditory skills that are impaired in children with DS directly relate to reading skill acquisition in typical populations. Thus, for many years, there was an assumption that individuals with DS could not learn to read. Only in the last couple of decades have researchers begun to give attention to reading skill development in this population. As accumulating research is clearly suggesting that they *can* develop reading skills, the focus has shifted toward *how* they develop these skills (Dykens et al., 2000). This is an important topic of research because knowledge about how reading skills develop in this population will lead to the development of literacy instruction that will help them reach their potential in reading achievement.

Before investigating reading skill development in the population with DS, it is necessary to understand the trajectory of development of these skills in typically developing (TD) children.

Converging evidence clearly indicates a positive relation between phonological awareness and reading ability (see Wagner & Torgesen, 1987, for a review). Phonological awareness encompasses a variety of skills that allow children to differentiate sounds (syllables, rimes, or phonemes) within words. Phonological skills emerge before formal reading instruction and are highly related to subsequent literacy achievement in TD children (Bryant, MacLean, Bradley, & Crossland, 1990; Castles & Coltheart, 2004; Hatcher, Hulme, & Ellis, 1994). Successful training in phonological processing to improve reading achievement in children with reading deficits has provided additional evidence for the link between phonological awareness and reading ability (Hatcher et al., 1994). This relation can be described as bidirectional: pre-reading phonological awareness skills predict literacy development and literacy skills predict the development of more complex phonological awareness skills (Morais, Cary, Alegria, & Bertelson, 1979).

Studies that examine early developing reading skills typically subcategorize phonological awareness into rhyme awareness and phoneme awareness. Rhyme awareness involves the understanding that two words rhyme, or sound alike. Phoneme awareness involves the ability to distinguish phonemes, or basic sound units, within words. Tasks that measure phonological awareness typically include assessments of both of these subcomponents. However, in recent years there has been some disagreement as to whether the two subcomponents are truly separable or simply a developmental progression of the same skill. Researchers such as Anthony and Lonigan (2004) have argued that both rhyme and phoneme awareness are inseparable parts of the same construct. Others contend that the two are developmentally different and contribute independently to reading (Hoien, Lundberg, Stanovich, & Bjaalid, 1995; Muter, Hulme, Snowling, & Stevenson, 2004). Muter et al. reported evidence for separate constructs, with only phoneme awareness directly related to reading through word recognition. These authors

suggested that rhyme awareness is indirectly related to reading by predicting vocabulary knowledge, which relates to reading comprehension. Still others have provided evidence that rhyme awareness develops as a precursor to phoneme awareness (Bryant et al., 1990; Carroll, Snowling, Stevenson, & Hulme, 2003), which ultimately correlates with reading skill level (Foy & Mann, 2001). Regardless of these differences in developmental conceptualization, it is clear that awareness of rhyme emerges as a pre-reading skill and is related to later reading ability at some level (Bryant et al., 1990; Bradley & Bryant, 1983; Carroll et al., 2003). Therefore, rhyme awareness should not be overlooked as a valuable skill in the development of reading ability.

Whereas most researchers agree that phoneme awareness is positively correlated with reading ability (see Adams, 1990, for a review), the nature of this relation is not clear. Some suggest that phoneme awareness begins with formal literacy instruction and develops with reading skill level (Blaiklock, 2004; Foy & Mann, 2001). Others have found evidence that it is a pre-reading skill that emerges before the beginning of reading instruction (Bryant et al., 1990). Although there is considerable disagreement concerning which factor causes which, researchers agree that there is a positive correlation between phoneme awareness and literacy. Thus, it can be concluded from the literature focusing on TD children that rhyme and phoneme awareness are both subcomponents of phonological awareness and are somehow related to reading. However, the controversy remains as to whether they are independent constructs, and if so, which better predicts reading ability.

Interestingly, individuals with DS seem to be the exceptions to many of these findings. Since Cossu, Rossini, and Marshall (1993) published their controversial study of phonological awareness in 11 children with DS, more researchers who study reading have directed their attention toward this population. Cossu et al. reported that children with DS performed

significantly lower on measures of phonological awareness than a TD control group matched on reading ability. The reason this study has been so controversial is that the researchers claimed that the development of phonological awareness is not necessary for reading acquisition. Although there were many limitations to their findings (e.g., groups vastly differed in mental age), they sparked an interest in the investigation of specific skills related to reading ability within this population.

Many studies have highlighted a relative strength in word identification (Boudreau, 2002; Kay-Raining Bird, Cleave, & McConnell, 2000) and weaknesses in nonword reading (Fletcher & Buckley, 2002; Kay-Raining Bird et al., 2000; Verucci, Menghini, & Vicari, 2006) and reading comprehension (Fletcher & Buckley, 2002) in individuals with DS. Following Cossu et al.'s (1993) findings, there is mounting evidence that individuals with DS have a particular weakness in phonological awareness despite achieving some degree of literacy (Fletcher & Buckley, 2002; Kay-Raining Bird et al., 2000; Verucci et al., 2006; Kennedy & Flynn, 2002).

Verucci et al. (2006) found that individuals with DS scored lower on measures of phonological awareness when compared with TD children matched on reading ability. Kay-Raining Bird et al. (2000) reported reduced phonological skills, in comparison with word identification skills, in children with DS. This evidence that individuals with DS learn to read without fully developing phonological awareness suggests that their reading development differs from that of TD children. Some researchers such as Kennedy and Flynn (2002) have suggested that, despite differing from TD children, a relation between phonological awareness and reading still exists in this population. As opposed to the bidirectional relation found in TD children, Kennedy and Flynn proposed a unidirectional relation. They suggested that although phonological skills do not develop subsequent literacy, exposure to reading instruction causes the

development of later phonological awareness skills. This might explain some correlational studies which have found better developed phonological skills in children with higher reading ability (Gombert, 2002).

Regardless, researchers have found overall less developed phonological awareness in individuals with DS than would be expected from their mental age (Kay-Raining Bird et al., 2000; Kennedy & Flynn, 2002). A closer examination reveals differences in performance on tasks that measure differing aspects of phonological awareness. Particularly, a growing number of studies has reported a specific deficit in this population on tasks that assess rhyme awareness, when compared with TD matches of mental age or reading ability (Boudreau, 2002; Cardoso-Martins, Michalick, & Pollo, 2002; Gombert, 2002; Snowling, Hulme, & Mercer, 2002; Verucci et al., 2006). Many researchers have also found lower performances on rhyme awareness than phoneme awareness tasks within the population of individuals with DS (Boudreau, 2002; Cardoso-Martins et al., 2002; Evans, 1994; Gombert, 2002; Kennedy & Flynn, 2002; Snowling et al., 2002). However, the focus of all of these studies was to assess a range of phonological awareness and literacy skills in children and young adults with DS. The rhyme awareness tasks were only a single portion of a battery of tasks administered to the participants. None of these studies was originally designed with the specific intent of measuring rhyme awareness; the authors did not begin to direct their attention toward this particular skill until the results of these studies were analyzed. Regardless of intent, all of these studies reported similar findings: a specific impairment in rhyme awareness in individuals with DS.

However, there is wide variability in methodology of the studies investigating awareness of rhyme in populations with DS. Whereas some studies have reported a *relative* weakness in rhyme awareness in this population (Kay-Raining Bird et al., 2000; Kennedy & Flynn, 2002), a

control group is necessary to make the claim that children with DS have a *specific* impairment in rhyme awareness compared to TD children. Only a handful of studies have used a comparison group of TD children, and they differ in how the two groups were matched. Some have matched the groups based on nonverbal mental age (Boudreau, 2002) whereas others have used reading ability (Cardoso-Martins et al., 2002; Gombert, 2002; Snowling et al., 2002; Verucci et al., 2006).

There is also a wide variety in the measures used to assess rhyme awareness in this population. Despite this variety, researchers have consistently reported low performances on rhyme awareness tasks. However, task demands are of more concern when administering measures to people with DS. For example, Kennedy and Flynn (2002) used an oddity task that required participants to judge which word from a list of alternatives does not rhyme with the target word. Only one of their participants scored on the rhyme task, and the authors commented that the rhyming task was more cognitively demanding than their other tasks. Kay-Raining Bird et al. (2000) used a difficult task format. In their study, participants were given a spontaneous rhyme task in which they were to name as many words that rhyme with a target word within a three minute period. This task format is particularly challenging for children with DS who are known to have problems with language production (Dykens et al., 2000). Several studies have used matching tasks that required participants to choose from a list the word that rhymes with the target word (Cardoso-Martins et al., 2002; Fletcher & Buckley, 2002; Gombert, 2002; Laws & Gunn, 2002; Snowling et al., 2002; Verucci et al., 2006). It is known that auditory working memory is impaired in individuals with DS (Jarrold & Baddeley, 2001). Thus, to reduce auditory working memory load, most of the studies that included a rhyme matching task used picture cards to accompany the word lists (Cardoso-Martins et al., 2002; Fletcher & Buckley,

2002; Laws & Gunn, 2002; Snowling et al., 2002; Verucci et al., 2006). These researchers also used a picture card to accompany the target word, with the exception of Fletcher and Buckley (2002), who only presented the target word orally.

Tasks demands can be particularly problematic when conducting research with participants with DS. Rhyme matching, with accompanying picture cards, is the least cognitively demanding of the tasks discussed. Without the picture cards, the memory load might be too high for some individuals with DS. However, it is possible that the pictures are distracting to the participants. It is known that people with DS have intact visual-spatial skills, and many believe that they often focus their attention to visual cues in their environment (Dykens et al., 2000). It follows that children would pay more attention to the pictorial representations instead of the auditory sounds of the words presented. Therefore, they might respond based on which *pictures* are similar instead of word *sounds*. To rule out the possible role of distracting pictures, a task without picture cards is needed. However, as previously noted, auditory memory demands must be low. Snowling et al. (2002) used a less demanding rhyme judgment task in Experiment 2 of their study after finding that most of their participants scored below chance on the matching task presented in Experiment 1. In Experiment 2, they presented the participants with pairs of words and asked them to judge whether or not they rhyme. This task only required participants to hold two words in their memory for comparison. Rhyme judgment continued to be lower for individuals with DS than TD children. However, the researchers still used accompanying picture cards with this task. A similar rhyme judgment task without the use of pictures is needed to ensure low cognitive task demands and reduce possible visual distractions.

If an improved task such as this is used and participants with DS continue to show low awareness of rhyme, another explanation for this finding is that individuals with DS are distracted by the beginning sounds of words. Snowling et al. (2002) explained this possibility by suggesting that this could be a result of encouragement to sound out the beginnings of words during reading instruction. If they are accustomed to focusing on the beginning sounds of words, they might find it more difficult to shift attention toward word endings. If so, they should not only perform worse on rhyming tasks but also on tasks which measure ability to detect final phonemes. Snowling and colleagues tested this hypothesis in Experiment 2 and found that participants with DS performed worse on rhyme awareness and final phoneme detection tasks than TD children. Participants did not significantly differ on the initial phoneme detection task. However, the three tasks (rhyme judgment, final phoneme detection, initial phoneme detection) were not comparable, so a true comparison of these tasks within groups was not possible.

The current study will use a quasi-experimental design to test Snowling et al.'s (2002) 'attention to the beginning' suggestion that individuals with DS perform poorly on rhyme awareness tasks because they focus their attention to the beginning sounds of words. The study will include one group of children and adolescents with DS and one group of TD children. Rhyme awareness will be assessed using a rhyme judgment task in which participants decide whether or not a pair of words rhymes. The judgment task requires that participants only hold two words in their working memory at a given time. Therefore, task demands should be minimal. Alliteration (initial phoneme) and final phoneme detection will also be assessed in the same manner. A fourth judgment task, an identity task, will also be used. This task will be equivalent to the other phonological tasks in cognitive demand but will assess a non phonological skill in which children in both groups should reach ceiling. The purpose of this

task is to ensure that performance on the other tasks is not affected by high cognitive demands in the group with DS.

The central hypotheses of this study are: (a) individuals with DS will show significantly lower performance than TD children on the rhyme awareness task (b) individuals with DS also will show significantly lower performance than TD children on the final phoneme task, and (c) there will be no significant group difference for the alliteration task. The format of the tasks will eliminate possible attention to visual instead of phonological components of the stimuli, thus eliminating this as an explanation for low rhyme awareness performance. Also, the only difference among the three tasks should be the skill assessed, so support for the hypotheses will imply that children with DS have a greater difficulty on tasks that require attention to the beginning sounds of words than ending sounds. This result would be in accordance with Snowling et al.'s (2002) 'attention to the beginning' explanation for low rhyme awareness performance in individuals with DS. No significant group difference is expected for the identity task. If supported, this will be further evidence that task performance for the phonological measures was not affected by cognitive demands.

Support for the central hypotheses will confirm previous findings that individuals with DS have impaired rhyme awareness skills. Methodology from past studies will be improved by the use of tasks with minimal cognitive demands and the elimination of visual distraction as a possible confound. Furthermore, support for the hypotheses will provide an explanation for why rhyme awareness is impaired in this population. This would provide a missing link in the literature regarding the development of reading skills in this population. Subsequently, it would aid in the construction of appropriate literacy instruction in this population.

METHODOLOGY

Participants

Participants were 10 children with Down syndrome (DS) ages 7 – 15 recruited from a local parent support group and 31 typically developing (TD) children ages 3 – 6 recruited from a University-supported daycare center and a local public elementary school. Criteria for continuing in the study were that participants could hear at a normal level (based on the hearing screener), their primary mode of communication was verbal, and they successfully completed the Identity Task (proportion score ≥ .80). In other words, participants must have demonstrated that they could judge whether words presented orally are the same or different. This task will be described in more detail in the following section.

Group with DS. The original ten participants with DS ranged in chronological age from 7.83 – 15.00 (M = 9.57, SD = 2.28). Nine of these participants completed the PPVT-4, and their verbal mental age range was 3.33 – 7.75 (M = 5.08, SD = 1.39), with a mean standard score of 60.33 (SD = 19.01). All ten participants were females (9 Caucasian, 1 Hispanic). All were verbal, and all passed the hearing screener; thus, it was deemed that they could speak and hear at a level adequate for the study tasks. Most, however, were unable to score above chance on the Identity Task, and because of this, they did not continue in the study. Only three participants with DS scored above chance on the Identity Task and completed the study. The failure of participants with DS to perform above chance on the Identity Task was highly unexpected, and the decision was made to discontinue recruiting of participants with DS.

TD Group. Of the original 31 TD children, some did not complete every session for the study, and only those who completed all tasks and met all criteria were included in the final analyses. Reasons for attrition were that children did not meet criteria (n = 4), transferred schools (n = 1), and scheduling difficulties (n = 6). Thus, the final sample consisted of 20 TD children (14 females, 6 males; 10 Caucasian, 9 African-American, 1 Hispanic). Their chronological age range was 3.25 - 6.75 (M = 5.30, SD = .95). According to the PPVT-4, their verbal mental age range was 3.42 - 7.33 (M = 5.29, SD = 1.13), with a mean standard score of 100.00 (SD = 14.70). Because it was a criterion for continuing in the study, all TD children in the final sample (n = 20) passed the Identity Task (Mean proportion score = .94, SD = .07) and scored within a normal hearing range on the hearing screener.

Measures

McCormick Toy Test. (McCormick, 1977; 5 min) This test is designed to measure children's abilities to discriminate speech sounds and was used as a hearing screener in the present study. A modified version of the test, used by Cairns and Jarrold (2005) in individuals with DS, was administered. The test consists of fourteen toys which can be grouped into pairs with acoustically similar labels (e.g., *duck* and *cup*, *plate* and *plane*). These labels were pre-recorded in a female voice in a sound file on a computer. The toys were placed directly in front of each child in no particular arrangement. Then, the participant was asked to verbally label each toy. If the participant failed to correctly identify a toy, the experimenter provided the name of the toy. Again, the participant was asked to label the toy. If the child still could not label the toy, the name of that toy was skipped in scoring of the hearing portion of this task. The test consisted of five sets with six trials per set. In the first set, the computer played six of the pre-recorded labels at a sound level of 72 dB. Each subsequent set, the labels were played at 6 dB

less than the previous set. The final set was played at 48 dB. Children with normal hearing can discriminate speech at this level. After each sound was played, the participant was asked to point to the correct toy. Participants with a set score of less than five out of six correct responses were considered to hear at that level. Thus, participants with five or more correct responses at the 48 dB were considered to be within a normal hearing range. The McCormick Toy Test has been used in many audiology clinics to detect early hearing problems in young children. Summerfield, Palmer, Foster, Marshall, and Twomey (1994) found that a similar version of this test was highly correlated with pure-tone audiometry measures (r = .82).

Peabody Picture Vocabulary Test, Fourth Edition. (*PPVT-4*; Dunn & Dunn, 2007; 15 min) This test was used to screen each child's receptive vocabulary, or verbal ability. It consists of a series of illustrations arranged on a page. Each child selected the picture that best represented a word presented orally by the examiner. The PPVT-4 has an internal consistency reliability of .94. The test-retest reliability is reported to be .93. Raw scores were calculated by subtracting number of errors from each child's ceiling score. Standard scores and percentile scores were calculated by using the norms provided by the publisher. Higher scores on this measure indicated more developed receptive vocabulary and higher verbal mental age. The PPVT-4 is standardized for ages 2.5 years through 90 years and older.

Pre-Reading Phonological Skills Assessment. (See Appendix; 5 min per task) This includes measures of identity, rhyme awareness, alliteration, and final phoneme detection presented in a judgment task format. These tasks were constructed for the present study. With the use of MRC Psycholinguistic Database search program (Fearnley, 1997), a list of all consonant-vowel-consonant words consisting of three letters and three phonemes was generated. From that list, the word pairs were created for each task.

The Identity task served as a control task to assess whether participants were able to listen to two words, compare them, make a judgment based on how the two words sound, and respond accordingly. It was designed in the same format as the phonological tasks (Rhyme Awareness Task, Alliteration Task, and Final Phoneme Detection Task), but it measures a non phonological skill. Performance of ≥ .80 on this task was required for continuing in the study. In this task, the examiner orally presented a total of twenty word pairs in random order, ten of which are exactly the same words and ten of which are different words. After each word pair participants judged whether the two words sound exactly the same by responding with "yes" or "no". The foils, or word pairs that do not sound exactly the same, consist of two words pairs with no sounds in common (e.g., *bus* and *jam*), two pairs with the first phoneme only in common (e.g., *cap* and *cot*), two with only the final phoneme in common (e.g., *wig* and *sag*), two with the middle and final phonemes in common (e.g., *get* and *set*), one with the first and final phonemes in common (*mud* and *mid*), and one with only the middle phoneme in common (*job* and *sop*). Including these criteria provided a range of difficulty.

For the three phonological tasks, the MRC search program computed the Thorndike Lorge Frequency count for each word. This was included to estimate levels of familiarity of the words. The database contained a frequency count for all but three words; therefore 99 % of the words were included in this count. From this, a mean frequency count was calculated for each of six lists of words. The correct word pairs from each list were separated from the incorrect word pairs, resulting in two lists for each of the three tasks. The mean frequency counts for each word list were not significantly different, $F(5, 111) = 0.33$, $p = .90$.

The Rhyme Awareness Task was presented in the same format as the Identity Task, but participants judged whether the words rhyme. For the foils, two pairs share no common sounds,

two only share the first phoneme, two only share the final phoneme, two share the first and final phonemes, and two share the first two phonemes (e.g., *web* and *wet*). Once again, this provided a range of difficulty.

The Alliteration Task also used the same format, but participants judged whether the beginning sound is the same in both words. For the correct list, or word pairs that do alliterate, five pairs only share the first phoneme (e.g., *bad* and *beg*) and five share both the first and middle phonemes (e.g., *dog* and *dot*). For the foils, three pairs share no common sounds, four share the final phoneme, and three share both the middle and final phonemes.

The Final Phoneme Detection Task also used the same format, but participants judged whether the last sound is the same in both words. For the correct list, five of the word pairs share only the final phoneme (e.g., *run* and *tan*), and five share both the middle and final phonemes (e.g., *wag* and *tag*). For the foils, three share no common phonemes, four share the first phoneme, and three share both the first and middle phonemes.

Each task also included detailed instructions with three practice items. Feedback was given for the practice items only. Scores for each task were the proportion of correct items out of 20. Higher scores on the Identity Task indicated the ability to recognize that two words are the same. Higher scores on the Rhyme Awareness Task, Alliteration Task, and Final Phoneme Detection Task indicated more developed rhyme awareness skills, alliteration skills, and phoneme awareness skills, respectively.

Woodcock Reading Mastery Tests-Revised. (WRMT-R; Woodcock, 1998; 10 min total) The Letter Identification and Word Identification subtests were used to examine early reading ability of the participants. This test has been standardized for first grade and beyond because formal reading instruction typically begins at the first grade level. However, it was thought that

despite lower mental age, some participants in the current study might be able to recognize some letters and words. Particularly, this was likely for the group with DS, since they had a higher chronological age and probably have been exposed to more words. Because this test has not been standardized for lower mental ages, only raw scores could be calculated (by subtracting number of errors from each child's ceiling score). Higher scores on the Word Identification subtest indicated higher word reading ability. Higher scores on the Letter Identification subtest indicated the ability to identify letter names. Inclusion of this measure allowed for individual differences in early reading ability to be recorded and included in some analyses.

For Letter Identification, participants were presented with one printed letter at a time and asked to name the letter or produce the common letter sound. For Word Identification, participants were presented with printed words and asked to pronounce each word. At the first grade level, the WRMT-R has split-half reliability coefficients of .94 for Letter Identification and .98 for Word Identification with standard errors of measurement of 4.0 and 5.2, respectively. For criterion-related validity, the correlation between the WRMT-R Word Identification and the Reading Tests in the Woodcock-Johnson Psycho-Educational Battery (Woodcock, 1978) is .82 at the first grade level. No such data are provided for the WRMT-R Letter Identification subtest.

Procedure

Testing consisted of four short sessions, each of which took place on separate days. This was done in order to reduce fatigue. Also, this allowed for a separate phonological task to be administered in each session, which reduced possible confusion from switching tasks.

Each participant was tested individually by a female examiner. The testing sessions took place in a private room, either at the participant's school or in the participant's home. The full

purpose of this study was disclosed to the participants before testing began. Both parental consent and child assent were obtained.

In the first session, the examiner administered the McCormick Toy Test. If the participant did not score within normal hearing range, testing was discontinued. If the participant met this criterion, the examiner proceeded.

For the group with DS, the Identity Task was administered, followed by the PPVT-4. A ten minute break was provided between these two measures to avoid fatigue. This concluded the first session. If the participant met criteria by scoring at least .80 on the Identity Task and within a verbal mental age range of 3 – 6 years on the PPVT-4, the next session was scheduled for another day.

For the TD group, only the Identity Task was administered after the McCormick Toy Task in the first session. If the participant met criterion on this task, the next session was scheduled. The Identity Task was always administered before any of the phonological tasks because it was a criterion for continued participation. Also, it allowed participants to become accustomed to the task format.

In the second session, one of the phonological tasks (Rhyme Awareness, Alliteration, and Final Phoneme Detection) was administered. Since these tasks were similarly formatted, the order of the three tasks was counterbalanced so that all possible orders were exhausted. This was done to control for any possible practice effects. For the TD group, the PPVT-4 was also administered in this session.

In the third session, another phonological task was administered, depending on the counterbalanced order for each participant. The WRMT-R Letter Identification and Word Identification subtests were also administered in this session.

In the final session, the third phonological task was administered. Then, participants were given the opportunity to ask additional questions about the study and provide feedback about participation. They were thanked for their participation and offered a small prize.

RESULTS

Descriptives

Of the ten participants with DS, seven were unable to score above chance on the Identity Task (Mean proportion score = .51, *SD* = .05), and three successfully completed the Identity Task (*M* = .97, *SD* = .03). There was a significant difference between the number of children who scored above chance and the number of children who did not, $p = .01$, using Fisher's Exact Test because of small sample size. Upon examination of the characteristics of these two groups, the group who passed the Identity Task had a higher verbal mental age equivalent on the PPVT-4 (*M* = 6.03, *SD* = 1.55) than the group who did not pass the Identity Task (*M* = 4.61, *SD* = 1.15), although the difference was not statistically significant. Of the three participants who scored above chance on the Identity Task, two completed the entire battery of tests. Their scores on the three phonological tasks as well as the WRMT-R Word and Letter Identification subtests are presented in Table 1.

Table 1

DS Participants – Phonological Skills Tasks and WRMT-R Scores

Case	Alliteration	Final Phoneme	Rhyme	Letter Identification	Word Identification
Participant 1	.65	.60	.30	26	11
Participant 2	.70	.55	.65	31	32

Note. Alliteration, Final Phoneme, and Rhyme are proportion scores
Letter and Word Identification are WRMT-R raw scores

Because so many of the children with DS were unable to score above chance on the Identity Task (a criterion for inclusion in the study), the remainder of the data analyses focus solely on the TD group. For the TD group, mean proportion scores for the three phonological tasks were as follows: Rhyme Awareness (M = .69, SD = .17), Alliteration (M = .65, SD = .17), and Final Phoneme Detection (M = .60, SD = .18). According to the WRMT-R, TD children were able to name most letters (Letter Identification raw score M = 25.00, SD = 11.77) but only a few words (Word Identification raw score M = 5.84, SD = 8.34).

Mean Differences

Because the three phonological tasks were constructed in similar format, they were considered repeated measures. Thus, a one-way within-subjects ANOVA was used to test differences in TD children's performance on the three phonological tasks. Results showed that there was a marginally significant difference in performance across tasks, Wilk's Lambda = .73, $F(2, 18) = 3.37$, $p = .06$, $\eta^2_p = .27$. A Fisher's LSD post hoc analysis revealed that there was a significant difference between mean scores on the Final Phoneme Detection Task and the Rhyme Awareness Task. When foils were excluded from the analysis, the effect of task was clearly significant, Wilk's Lambda = .47, $F(2, 17) = 9.43$, $p = .002$, $\eta^2_p = .53$. A Fisher's LSD post hoc analysis revealed that children scored significantly higher on rhyme detection items than on alliteration or final phoneme detection items. However, there was no significant difference between scores on alliteration detection and final phoneme detection items.

Item Analysis

For each phonological task, participants scored higher on correct items than foils. On the Rhyme Awareness Task, they performed better on items requiring them to detect that a word pair rhymes (M = .90, SD = .12) than on items requiring them to reject a word pair that does not

rhyme (*M* = .51, *SD* = .32). This difference was statistically significant, $t(18) = 4.84$, $p < .001$. On the Alliteration Task, they performed better on items requiring them to detect that a word pair alliterates (*M* = .76, *SD* = .22) than on items requiring them to reject a word pair that does not alliterate (*M* = .58, *SD* = .27). This was also a statistically significant difference, $t(18) = 2.16$, $p = .04$. For the Final Phoneme Detection Task, they performed better on items requiring them to detect a word pair that shares a final phoneme (*M* = .67, *SD* = .25) than on items requiring them to reject a word pair that does not share a final phoneme (*M* = .52, *SD* = .30). However, this difference was not statistically significant, $t(19) = 1.72$, $p = .10$.

Further examination of performance on the different types of foils indicated that for each phonological task, children were able to reject words pairs with no shared phonemes more easily than they could reject any type of word pair with shared phonemes. For example, on the Rhyme Awareness Task, they rejected word pairs such as *ban-lot* (*M* = .66, *SD* = .41 for these item types) more often than they rejected word pairs such as *peg-pig*, (*M* = .47, *SD* = .32 for these item types), where mean scores were at chance. The same pattern emerged with the Alliteration Task and the Final Phoneme Detection Task, in which mean scores for rejecting items consisting of word pairs sharing no phonemes (*M* = .72, *SD* = .30; *M* = .65, *SD* = .35, respectively) were higher than scores for rejecting items consisting of word pairs sharing some phonemes (*M* = .51, *SD* = .29; *M* = .45, *SD* = .32, respectively). See Table 2 for a complete breakdown of scores by item type.

Table 2

Phonological Tasks Item Analysis – Mean Proportion Scores

Item Type	Sample Item	Mean	SD	N
Alliteration Correct Items				
Share Ci	*gum, gas*	.83	.20	19
Share Ci, V	*pin, pit*	.68	.29	19
Alliteration Foils				
Share none	*fin, hop*	.72	.30	19
Share Cf	*sat, vet*	.58	.32	19
Share V, Cf	*pan, fan*	.44	.37	19
Final Phoneme Correct Items				
Share Cf	*met, lit*	.60	.31	20
Share V, Cf	*sun, fun*	.74	.28	20
Final Phoneme Foils				
Share none	*cob, men*	.65	.35	20
Share Ci	*big, bat*	.46	.38	20
Share Ci, V	*tub, tug*	.43	.36	20
Rhyme Correct Items				
Share V, Cf	*nod, rod*	.90	.12	19
Rhyme Foils				
Share none	*cup, wad*	.66	.41	19
Share Ci	*jog, jet*	.42	.42	19
Share Ci, V	*web, wet*	.39	.43	19
Share Ci, Cf	*nap, nip*	.53	.39	19
Share Cf	*got, hut*	.55	.40	19

Note. Ci = initial consonant; V = vowel; Cf = final consonant

DISCUSSION

The aim of the present study was to test Snowling et al.'s (2002) 'attention to the beginning' hypothesis that individuals with DS perform poorly on rhyme awareness tasks because they focus their attention toward the beginning sounds of words. For this hypothesis to be supported, participants with DS would perform as well as TD children on the Alliteration Task, but they would show significantly lower scores on the Rhyme Awareness and Final Phoneme Detection tasks. Additionally, a major goal for this study was to improve methodology from previous studies by using phonological tasks with minimal cognitive demands and eliminating visual distraction as a possible confound.

Group with DS

The most unexpected finding in this study was that the majority of participants with DS were not able to perform above chance on the Identity Task. This was a control, non phonological task designed to be equivalent to the phonological tasks in cognitive demand. In terms of cognitive demand, each task required participants to hold two auditory words in memory, compare them, and make a judgment based on how the two words sound. The Identity Task was meant to demonstrate that performance on the phonological tasks was not affected by cognitive demands in the group with DS. The number of children with DS who failed the Identity Task was significantly greater than the number who passed.

There are several possible explanations for this occurrence, such as difficulties in (a) hearing the stimuli, (b) understanding the instructions, (c) attending to the stimuli, (d) holding two words in memory, and (e) making a same-different judgment based on two auditory words.

It is important to note that whatever caused the group with DS to have difficulty on the Identity Task must be due to a difference between the group with DS and the TD group because the TD group passed the task. Verbal ability cannot explain the finding because the two groups were similar on verbal mental age.

One way in which individuals with Down syndrome may differ from those who are typically developing is hearing ability. Hearing loss occurs more frequently in the DS population than in the typically developing population. Thus, it is possible that the children with DS in the present study had more difficulty with the Identity Task than the children with TD because they could not hear the spoken word stimuli quite as well. However, all participants with DS passed the hearing screener, which suggests that their hearing was adequate for the tasks used in the study. Thus, hearing problems can be ruled out as a possibility for their poor performance on the Identity Task.

A second possible explanation for the poor performance of participants with DS on the Identity Task is that they had difficulty understanding the task instructions. Even though they were similar in verbal age to the participants with TD, there may have been reasons that the instructions were particularly difficult for them to understand. However, this is unlikely given that they were able to understand the instructions for the hearing screener. In the hearing screener, participants were required to first orally name objects, then listen to a word presented auditorially and point to the object that corresponded with that word. These instructions seem at least as complex as the instructions for the Identity Task.

Third, it is possible that the participants with DS had difficulty attending to the stimuli. Research suggests that, performance of young children with DS is more unstable than that of their same-age typically developing peers (e.g., Wishart, 1993; Wishart & Duffy, 1990), and it

might have been more difficult for them to stay on task and hold their attention while the word stimuli were being spoken. There were no visual stimuli associated with the Identity Task, so it is possible that the absence of a visual focal point caused these children to have trouble attending to the auditory stimuli. However, for the hearing screener, they were able to listen to one word and make a judgment without an initial visual stimulus. In other words, they did not have difficulty staying on task and holding their attention during presentation of one-word trials in which there was no visual focal point.

A fourth possible explanation for poor Identity Task performance in the group with DS is that they had difficulty holding two words in memory. This is a possibility given what is known about poor verbal short term memory in this population (see Jarrold & Baddeley, 2001). In the present study the children with DS may have had shorter word spans than the children with TD. Word span was not measured in the present study, however, and there was no other task completed by all participants that required listening to two words in sequence. Thus, it is impossible to know whether the two groups differed in verbal short-term memory, or more importantly, whether two words in sequence exceeded the word span of the participants with DS. However, this explanation seems unlikely because previous literature suggests that they would be able to hold at least two words in their verbal short term memory.

Finally, it is possible that the difficulty experienced by participants with DS on the Identity Task was related to making a same-different judgment based on two auditory words. The main difference between the demands of the hearing screener and those of the Identity Task was the number of words presented in one trial *as well as* the type of judgment required. Perhaps for the Identity Task, holding two words in auditory working memory while making a same-different judgment was simply too cognitively demanding for the group with DS. Although only

two words were presented at a time, it may be that the auditory working memory load was too high for these participants. Because of their intellectual disability, it would be expected that children with DS would have limitations in working memory. Also, because of their Down syndrome, it would be expected that they would have special difficulties in the auditory/verbal modality. Previous studies of phonological awareness in children with DS might have avoided this issue by using visual memory aids. Because the present study did not include a measure of verbal working memory, this explanation can not be confirmed. However, it seems a likely explanation and future researchers should consider this when designing the methodology for their studies.

TD Group

Not surprisingly, the TD children were able to score above chance on the Identity Task; thus measures of their phonological skills can be interpreted. Consistent with the pattern reported in the literature (Adams, 1990; Bryant et al., 1990; Carroll et al., 2003, Treiman & Zukowski, 1996), children were able to judge rimes (larger units) more accurately than individual phonemes. Also consistent with the extant literature, there was the trend that rhyme judgment was most accurate, followed by alliteration judgment, then final phoneme judgment.

From prior literature, it is known that children develop phonological awareness during the age range represented in the current sample (3-6 year olds). Because of this, some children, but not all, were expected to show phonological awareness, so group performance was expected to fall between 50% and 100% on average. The data in the current study were consistent with this expectation and reflect phonological skill development.

Although mean scores on the three phonological tasks were above chance and between 50% and 100%, overall they seemed fairly low. This reflects difficulty of the tasks for this age

group. It may be that, due to their difficulty level, these tasks captured the latter end of development of these skills. For example, in order for children to perform well on the Alliteration Task, they might have had to already develop alliteration more fully than if a different task format, such as matching a target word to a word from a list of choices, was used to measure the skill. Also, they may have had to develop alliteration more fully to be able to correctly reject a pair of words that do not alliterate but share other similar phonemes. This possibility is explained below. Because the three phonological tasks in this study were similarly formatted, the above logic can be applied to the Rhyme Awareness Task and the Final Phoneme Detection Task as well. It is important to note that because all children in the final sample successfully completed the control task, low scores on the phonological tasks cannot simply be due to a difficulty in task demands of listening to two words, making a judgment about their similarity, and responding appropriately.

Within each task, some item types were more difficult than others. Overall, children scored higher on detection items than rejection items. For example, children were more likely to correctly detect that two words rhyme than correctly reject a word pair that does not rhyme. The same pattern held for alliteration and final phoneme detection. Although the difference between detections and rejections was not significant for final phoneme detection, the trend was in the same direction such that they scored higher on detection items. For each item, frequency of use in the English language was recorded and a mean frequency count for word lists on the three tasks was computed. A separate mean frequency count was calculated for the ten correct items and the ten foils for each task, and each of these six word lists were similar in their mean frequency. This makes it unlikely that the detection items were easier than the rejection items because of increased word familiarity.

For the foils (rejection items), word pairs with no common phonemes were easier to reject than word pairs that shared at least one phoneme. For the foils with one or more shared phonemes, scores were at chance. In other words, when children heard a word pair that shared phonemes, they were unable to reject that item even if the shared phonemes were not the correct ones for that task. One then might argue that children were not discriminating between the three tasks and simply responded to all items that were phonetically similar, regardless of whether they rhyme, alliterate, or share the final phoneme. However, their differential performance across tasks on the detection (correct) items suggests that they did discriminate among tasks. They scored higher on rhyme (larger unit) detection than on alliteration and final phoneme (smaller unit) detection, which is in concordance with the literature.

Prior studies measuring phonological awareness in TD children have not included item-level analysis in the manner conducted in the present study, so it is not known if these findings are typical for the 3 – 6 year age range. Based on the present study's results, children of this age have trouble rejecting phonetically similar items, even if they are incorrect for the task of interest. It is likely that studies including foils that are vastly different from the target word in terms of shared phonemes would yield higher scores than those which include foils that are phonetically more similar. This item-level analysis should be an important consideration in future research endeavors.

Conclusion

The present study was not able to accomplish the original goal of investigating rhyme awareness in children with DS. The children with DS had so much difficulty with the control task that the three phonological skills could not be measured in this sample. Therefore, the 'attention to the beginning' hypothesis could not be tested, and the question of whether there is a

specific impairment in rhyme awareness in individuals with DS remains. Most likely, the two-word decision task without visual support overly taxed the verbal working memory of the participants with DS, and it is suggested that researchers take this into consideration in future studies. The finding that children with DS could not perform well on a simple verbal task with a judgment format is informative to those attempting to measure phonological skills in this population. Results from the current study highlight the importance of taking task demands into special consideration when testing individuals with DS, as well as the importance of including a control task to account for the effect of task demands.

The item analysis based on data from TD children provided insight into performance patterns on the phonological tasks. Children in the 3 – 6 year age range were much better at detecting correct items than rejecting incorrect items. For the incorrect items, their ability to reject word pairs that are more dissimilar greatly exceeded their ability to reject word pairs that are phonetically more similar. This demonstrates the importance of designing different types of items within a task, as well as considering differences by item type in analyses.

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APPENDIX

Identity Task
Instructions & Practice

Instructions to examiner: Read script aloud. Check blank next to participant's response. Provide feedback according to each response.

Let's play a word game. In a minute, I will say two words. Your job is to decide if the two words are the same. If they sound *exactly* the same, say *yes*. If they do *not* sound exactly the same, say *no*.

Let's try some for practice.

can, can….Do they sound the same?

___(Yes) Good! That's just what I want you to do.

___(No) That's not quite right. Can sounds the same as can. Let's try it again. Listen carefully.
(Repeat Item. Did participant then give correct response? Yes / No)

Let's try another one.
wag, dug…Do they sound the same?

___(Yes) That's not quite right. Wag does *not* sound the same as dug. Let's try it again.
(Repeat. Did participant then give correct response? Yes / No)

___(No) Good! That's just what I want you to do.

Try this one.
rig, was…Do they sound the same?

___(Yes) That's not quite right. Rig does *not* sound the same as was. Let's try it again. Listen carefully.
(Repeat. Did participant then give correct response? Yes / No)

___(No) Good! That's just what I want you to do.

OK. Now we're ready to start the word game.
Remember, I will say two words. If they sound *exactly* the same, say *yes*. If they *do not* sound exactly the same, say *no*.

Identity Task
Test Items

1. bus, jam ..... Yes / No

2. nut, nut ..... Yes / No

3. bin, bin ..... Yes / No

4. pen, lap ..... Yes / No

5. pot, pot ..... Yes / No

6. get, set ..... Yes / No

7. sod, sod ..... Yes / No

8. log, fig ..... Yes / No

9. tap, rap ..... Yes / No

10. hub, hub ..... Yes / No

You're doing great! We're halfway finished already! You get a sticker. (give sticker) And when we get to the end, you'll get *another* sticker! OK, now let's finish this game. Remember, I will say two words. If they sound *exactly* the same, say *yes*. If they do *not* sound exactly the same, say *no*.

11. job, sop ..... Yes / No

12. wig, sag ..... Yes / No

13. bag, bag ..... Yes / No

14. cap, cot ..... Yes / No

15. kin, kin ..... Yes / No

16. mud, mid ..... Yes / No

17. rid, rag ..... Yes / No

18. rip, rip ..... Yes / No

19. win, win ..... Yes / No

20. mat, mat ..... Yes / No

Rhyme Task
Instructions & Practice

Instructions to examiner: Read script aloud. Check blank next to participant's response. Provide feedback according to each response.

Let's play another word game. This one's a little bit different from the others. In a minute, I will say two words. Your job is to decide if the two words *rhyme*, or have the *same middle and end sounds*. If they *rhyme*, say *yes*. If they *do not* rhyme, say *no*. For example: cat & vat *rhyme*, because they have the *same middle and end sounds*. Cat & vat both have aaattt.

Let's try some for practice.

bit, hit….Do they rhyme?

___(Yes) Good! That's just what I want you to do. Bit & hit *do* rhyme because they both have it.

___(No) That's not quite right. B**it** & h**it** rhyme because they have the *same middle and end sounds*. They both have iiittt. Let's try it again. Listen carefully.
(Repeat item. Did participant then give correct response? Yes / No)

Let's try another one.
hap, tip…Do they rhyme?

___(Yes) That's not quite right. Hap & tip do *not rhyme*. They do *not* have the same *middle and end sounds*. Let's try it again. Listen carefully.
(Repeat item. Did participant then give correct response? Yes / No)

___(No) Good! That's just what I want you to do.

Try this one.
rat, cat…Do they rhyme?

___(Yes) Good! That's just what I want you to do. Rat & cat *do* rhyme because they both have at.

___(No) That's not quite right. R**at** & c**at** rhyme because they have the *same middle and end sounds*. They both have aaattt. Let's try it again. Listen carefully.
(Repeat item. Did participant then give correct response? Yes / No)

OK. Now we're ready to start the word game.
Remember, I will say two words. If they *rhyme*, say *yes*. If they *do not* rhyme, say *no*.

Rhyme Task
Test Items

1. got, hut..... Yes / No

2. web, wet..... Yes / No

3. mop, top..... Yes / No

4. hug, bug..... Yes / No

5. peg, pig..... Yes / No

6. jog, jet..... Yes / No

7. lip, zip..... Yes / No

8. bun, pun..... Yes / No

9. hat, fat..... Yes / No

10. fib, fed..... Yes / No

You're doing great! We're halfway finished already! You get a sticker. (give sticker) And when we get to the end, you'll get *another* sticker! OK, now let's finish this game. Remember, I will say two words. If they *rhyme*, say *yes*. If they do *not* rhyme, say *no*.

11. rim, dim..... Yes / No

12. nap, nip..... Yes / No

13. sip, sit..... Yes / No

14. ban, lot..... Yes / No

15. nod, rod..... Yes / No

16. led, bed..... Yes / No

17. hum, ram..... Yes / No

18. cup, wad..... Yes / No

19. cab, tab..... Yes / No

20. gem, hem..... Yes / No

Alliteration Task
Instructions & Practice

Instructions to examiner: Read script aloud. Check blank next to participant's response. Provide feedback according to each response.

Let's play another word game. This one's a little bit different from the others. In a minute, I will say two words. Your job is to decide if the two words *start* with the *same* sound. If they *start* with the same sound, say *yes*. If they *do not* start with the same sound, say *no*. For example: **b**og & **b**el *start* with the *same* sound. They both start with "bbb".

Let's try some for practice.

had, has….Do they start with the same sound?

___(Yes) Good! That's just what I want you to do. Had & has *do* start with the same sound. They both start with "hhh".

___(No) That's not quite right. **Hhh**ad & **hhh**as both *start* with the same sound. They both start with "hhh". Let's try it again. Listen carefully. (Repeat item. Did participant then give correct response? Yes / No)

Let's try another one.
jab, jig…Do they start with the same sound?

___(Yes) Good! That's just what I want you to do. Jab & jig *do* start with the same sound. They both start with "jjj".

___(No) That's not quite right. **Jjjj**ab & **jjj**ig both *start* with the same sound. They both start with "jjj". Let's try it again. Listen carefully. (Repeat. Did participant then give correct response? Yes / No)

Try this one.
man, lad…Do they start with the same sound?

___(Yes) That's not quite right. **Mmm**an does *not start* with the same sound as **lll**ad. Let's try it again. Listen carefully. (Repeat. Did participant then give correct response? Yes / No)

___(No) Good! That's just what I want you to do.

OK. Now we're ready to start the word game.
Remember, I will say two words. If they *start* with the *same* sound, say *yes*. If they *do not* start with the same sound, say *no.*

Alliteration Task
Test Items

1. sub, van ..... Yes / No

2. cop, cut ..... Yes / No

3. mad, map ..... Yes / No

4. bad, beg ..... Yes / No

5. sat, vet ..... Yes / No

6. pin, pit ..... Yes / No

7. rub, rug ..... Yes / No

8. pet, net ..... Yes / No

9. pan, fan ..... Yes / No

10. dog, dot ..... Yes / No

You're doing great! We're halfway finished already! You get a sticker. (give sticker) And when we get to the end, you'll get *another* sticker! OK, now let's finish this game. Remember, I will say two words. If they *start* with the *same* sound, say *yes*. If they do *not* start with the same sound, say *no*.

11. hen, hot ..... Yes / No

12. bud, hid ..... Yes / No

13. hog, lag ..... Yes / No

14. jug, mug ..... Yes / No

15. rib, ran ..... Yes / No

16. den, ton ..... Yes / No

17. yes, yet ..... Yes / No

18. fin, hop ..... Yes / No

19. dig, put ..... Yes / No

20. gum, gas ..... Yes / No

Final Phoneme Detection Task
Instructions & Practice

Instructions to examiner: Read script aloud. Check blank next to participant's response. Provide feedback according to each response.

This is another game. This one's a little bit different from the others. In a minute, I will say two words. Your job is to decide if the two words *end* with the *same* sound. If they *end* with the same sound, say *yes*. If they *do not* end with the same sound, say *no*. For example: na**g** & ji**g** *end* with the *same* sound. They both end with "ggg".

Let's try some for practice.

but, jot….Do they end with the same sound?

___(Yes) Good! That's just what I want you to do. But & jot *do* end with the same sound. They both end with "ttt".

___(No) That's not quite right. Bu**ttt** & jo**ttt** both *end* with the same sound. They both end with "ttt". Let's try it again. Listen carefully. (Repeat item. Did participant then give correct response? Yes / No)

Let's try another one.
jag, lug…Do they end with the same sound?

___(Yes) Good! That's just what I want you to do. Jag & lug *do* end with the same sound. They both end with "ggg".

___(No) That's not quite right. Ja**ggg** & lu**ggg** both *end* with the same sound. They both end with "ggg". Let's try it again. Listen carefully. (Repeat. Did participant then give correct response? Yes / No)

Try this one.
bum, bid…Do they end with the same sound?

___(Yes) That's not quite right. Bu**mmm** does *not end* with the same sound as bi**ddd**. Let's try it again. Listen carefully. (Repeat. Did participant then give correct response? Yes / No)

___(No) Good! That's just what I want you to do.

OK. Now we're ready to start the word game.
Remember, I will say two words. If they *end* with the *same* sound, say *yes*. If they *do not* end with the same sound, say *no*.

Final Phoneme Detection Task
Test Items

1. met, lit ..... Yes / No

2. lid, yam ..... Yes / No

3. fog, leg ..... Yes / No

4. pal, pat ..... Yes / No

5. sun, fun ..... Yes / No

6. gut, gap ..... Yes / No

7. wag, tag ..... Yes / No

8. kid, wed ..... Yes / No

9. won, wit ..... Yes / No

10. big, bat ..... Yes / No

You're doing great! We're halfway finished already! You get a sticker. (give sticker) And when we get to the end, you'll get *another* sticker! OK, now let's finish this game. Remember, I will say two words. If they *end* with the *same* sound, say *yes*. If they do *not* end with the same sound, say *no*.

11. tub, tug ..... Yes / No

12. bet, let ..... Yes / No

13. mob, sob ..... Yes / No

14. red, run ..... Yes / No

15. dip, hip ..... Yes / No

16. ten, kit ..... Yes / No

17. sad, sap ..... Yes / No

18. ham, sum ..... Yes / No

19. run, tan ..... Yes / No

20. cob, men ..... Yes / No