Nonword Repetition and Word Likeness Judgments in Speakers of African American English and Standard American English

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Abstract

In this study, adult speakers of African American English and Standard American English completed a nonword repetition task and made word likeness judgments of those nonwords. The nonwords were constructed to vary in phonotactic probability. The initial consonant vowel sequences in the adults' repetitions of the nonwords were analyzed for accuracy. The word likeness judgments and the accuracy of repetition were compared across the two speaker groups. Additionally, the participants' word likeness judgments were compared with their repetition accuracy of the nonwords. Analyses were conducted to determine if the phonotactic probability of the nonwords affected repetition accuracy or word likeness judgments. The data collected from the adults will be used to select stimuli for a larger longitudinal study of children's language development.

Table of Contents

List of Figures

List of Tables

Introduction

All too often children are recruited from university lab schools for studies of child language development. These participants are generally the children of highly educated parents from mid to high socioeconomic status (SES) backgrounds who represent only a narrow segment of society. In order for child development research findings to have relevance, researchers must make an effort to gather data from a diverse sample. When the sample is diverse, it becomes especially important to carefully construct and select stimuli from pilot data so that they are appropriate for all participants. The stimuli and experimental tasks must measure the constructs they are intended to evaluate. Potential effects of dialect should be considered when participants speak different varieties of English. The current investigation will examine the characteristics of stimuli to be used in a longitudinal study of children's phonology and word learning.

From infancy, children learn words at an incredibly fast pace. At 12 months a child's expressive vocabulary is fewer than 10 words and by 30 months it has increased to more than 500 words (Fenson et al., 1994). The number of words in a child's expressive vocabulary as a toddler is strongly related to language development later in childhood (Marchman & Fernald, 2008). While these estimates of vocabulary size are based on typically developing children, some children are at risk for a slower rate of vocabulary acquisition and smaller vocabularies. Among these at-risk groups are children from families with low SES (Hoff, 2003; Rowe, 2008).

Arriaga, Fenson, Cronan and Pethick (1998) compared the language skills of toddlers from low and middle SES families. The researchers used a parent report measure, the MacArthur Communicative Development Inventory (CDI), to gather information about each child's expressive vocabulary, tendency to combine words and sentence complexity. Low SES parents of toddlers were specifically recruited to participate in the study, while the data from the middle SES toddlers came from the norming sample used to develop the CDI. The mean expressive vocabulary percentile score of the low SES group was 29.5, which was significantly lower than the mean percentile score of 50.04 from entire CDI norming sample. Among the low SES group, 82.5% of the expressive vocabulary scores fell below the median score based on the CDI norms. More than half (55.3%) of the low SES group had expressive vocabulary scores below the 25^{th} percentile rank, according to the CDI norms. The percentages of children aged 16 to 25 months reported to be combining words were higher in the middle SES group. However, most children from both SES groups aged 26 months and older were reported to be combining words. The sentence complexity scores were significantly lower in the low SES group, with 78.5% of the scores falling below the 50^{th} percentile rank, according to CDI norms. While these results indicate that the CDI norms are not representative of low SES children, they also reveal the discrepancy in language skills between low and middle SES children.

One possible explanation for this discrepancy is differences in language learning experiences across SES groups (Hoff, 2003). Previous research has shown that when communicating with their children, mothers with lower SES speak less and use a fewer unique words than mothers with higher SES (Rowe, 2008). Hoff (2003) investigated the relationship between maternal speech and vocabulary growth of two-year-old children from mid SES and high SES families. Hoff found that SES related differences in maternal speech were associated with greater vocabulary growth in the high SES children as compared to the mid SES children.

There is a connection between socioeconomic status and race, given that African Americans are disproportionately represented among the nation's poor (Washington & Craig, 1998). African American children are more than three times more likely to grow up in poverty as compared to their peers of other races (Craig & Washington, 2006). The dialect spoken by some African American children differs from the variety spoken by most of their mainstream peers. Washington and Craig (1998) found that African American children from families with lower incomes used this distinctive dialect, called African American English (AAE), more frequently than their peers from middle income families.

African American English (AAE) is a systematic, rule-governed variety of English spoken by some African Americans. This variety contains phonological and morphosyntactic features that vary from Standard American English (SAE) (Thompson, Craig & Washington, 2004). The phonological features include substitutions, such as /n/ for /ŋ/ word finally, /t/ and /d/ for /θ/ and /ð/ before vowels and /f/, /t/ and /v/ for /θ/ and /ð/ after and between vowels. Other phonological features affect word endings, such as deletion of single consonants after vowels and devoicing of voiced consonants word finally. Additional features include consonant cluster reduction, movement of consonants within a consonant cluster, deletion of an unstressed syllable in a multisyllabic word and syllable additions. Most phonological features of AAE affect consonants; however, diphthongs can be reduced to monophthongs (Thompson et al., 2004). While African American English has been studied in children, adolescents and adults, there still are some gaps in the research on AAE. No large scale studies have been conducted to determine the proportion of African Americans who speak AAE, the percentage of time AAE speakers use the dialect and differences in features of AAE across geographic regions.

A speech-language pathologist (SLP) is responsible for the assessment and treatment of communication disorders. In order to avoid over identification of speech and language disorders in individuals who speak AAE, SLPs must be able to distinguish true speech and language deficits from differences that are due to dialect use (American Speech-Language-Hearing Association, 1983). Another issue of concern in culturally fair assessment is the influence of language experience on test performance. It is important that assessment tools do not confuse an individual's lack of language exposure with a language disorder. Recently, some have proposed using more processing dependent measures in order to minimize the impact of background experience on speech and language assessment (Campbell, Dollaghan, Needleman & Janosky, 1997; Washington & Craig, 2004).

One processing dependent task that assesses phonological working memory storage is nonword repetition (Campbell et al., 1997). In a nonword repetition task, an individual listens to a nonsense word and repeats it. A nonword repetition task addresses an individual's ability to break down an acoustic signal into its individual phonemes, hold the phonemes and their sequence order in working memory and prepare the articulatory production (Dollaghan & Campbell, 1998).

The structure of a nonword can affect how easily it is repeated. Dollaghan, Biber and Campbell (1995) investigated the effect of lexical influences on nonword repetition. Participants repeated nonwords more accurately when they contained a stressed syllable that was a real word. In cases where a syllable was phonologically similar to a real word, the participant often inaccurately produced the syllable by substituting a syllable that corresponded to a real word. The authors concluded that caution must be taken to minimize the effect of real word knowledge when constructing nonwords for tasks that are created to assess phonological working memory. In 1998, Dollaghan and Campbell constructed nonwords that were designed specifically to minimize the effect of prior language knowledge on repetition accuracy. The authors accomplished this in several ways, including: minimizing articulatory difficulty, excluding weak syllables and assigning consonants to word positions in which they appear $\leq$ 25% of the time in real English words. They found that their nonword repetition task accurately distinguished children enrolled in language intervention from their typically developing peers.

Phonotactic probability is a measure of how often sound sequences occur in words (Edwards, Beckman & Munson, 2004). Although Dollaghan and Campbell did not explicitly address the concept of phonotactic probability, the parameters used to construct the nonwords in their 1998 study likely resulted in low phonotactic probability values. This is because the nonwords were designed to be very different from real

English words in order to eliminate possible effects of language knowledge on nonword repetition performance.

In other studies of nonword repetition, the stimuli are constructed to vary systematically in phonotactic probability so that its effects can be examined. Existing research has established phonotactic probability using speech corpuses as well as dictionaries and their corresponding phonemic transcriptions. However, citation forms are not necessarily representative of the speech used by speakers of AAE. For this reason, it cannot be assumed that phonotactic probability is equivalent across varieties of English.

When asked to rate the suitability of a nonsense word as an addition to the English lexicon, adults demonstrate an implicit knowledge of phonotactic probability by rating nonwords with high phonotactic probability as more word-like than nonwords with low phonotactic probability (Frisch, Large & Pisoni, 2000). Phonotactic probability also affects the processing of nonwords. In a memory task, adults had better recognition of nonwords containing higher phonotactic probability sequences (Frisch et al., 2000). Nonwords with high phonotactic probability were repeated more quickly than low phonotactic probability in the Vitevitch and Luce (1998) study.

The effects of phonotactic probability are also seen in the nonword repetition performance of typically developing children. Several studies have shown that children repeat nonwords with low phonotactic probability more poorly than those with high phonotactic probability (Munson, 2001; Munson, Edwards & Beckman, 2005). The effect of phonotactic probability on children's nonword repetition declines as their vocabularies grow (Edwards, Beckman & Munson, 2004; Munson et al., 2005).

According to the lexical restructuring hypothesis, as discussed by Munson, Edwards and Beckman (2005), children initially process words in a holistic manner. However, as children's vocabularies increase, they begin to break down words into their constituent phonemes and this facilitates their ability to learn new words. This is a possible explanation for Edwards, Beckman and Munson's (2004) finding that children with larger vocabularies more accurately repeated not only nonwords that contained sequences with low phonotactic probability but also nonwords with sound sequences that do not occur in any real English words.

Children's ability to form a relationship between a phonological form and its referent after only minimal exposure has been termed "fast mapping" (Storkel, 2001). In order to learn a new word, a child must have knowledge of sound categories that are abstract enough so that subsequent exposures will be recognized, even though they may be produced in a different phonetic or prosodic context, by a different speaker or at a different rate of speech (Fischer, Hunt, Chambers & Church, 2001). At the same time, acoustic or context based differences across exposures to the same sound must also be learned, in order to more effectively process future words by way of language specific cues (Fischer et al., 2001). Evidence for this theory of word learning has been offered by Fischer and colleagues (2001).

There is a relationship between performance on nonword repetition tasks and a child's ability to learn the phonological forms of new words (Gathercole, 2006). Many skills required for nonword repetition overlap with skills thought to be necessary for word learning. These skills include sound segmentation, remembering phonemes and their sequence order and planning the motor movements necessary for production (Dollaghan & Campbell, 1998). Additionally, introducing nonwords in a priming task before repetition is required is a laboratory controlled approximation of fast phonological mapping. In research, nonword repetition tasks allow the processes that underlie word learning to be indirectly examined.

Children participating in a larger longitudinal study will complete a nonword repetition task. Given that children from a wide range of socioeconomic backgrounds will participate in the study, it is important to establish that the nonwords selected are valid for all participants. This will be accomplished by having adults, who are representative of the cross sectional sample of children, complete nonword repetition and word likeness rating tasks with candidate nonwords for the children's experiment. By including SAE and AAE speaking adults, potential dialect related differences in word likeness and nonword repetition accuracy can be examined. Stimuli will be chosen to minimize potential differences in performance due to dialect.

The focus of this paper is to examine adult SAE and AAE speakers' repetition accuracy and word likeness ratings of nonwords with high and low phonotactic probabilities, as calculated by the frequency of sound sequences of words produced using SAE. Given that research comparing nonword word likeness ratings and repetition accuracy across dialect groups has not been conducted, this study will offer a unique contribution to the knowledge base. Three questions will be addressed. First, do word likeness ratings vary across speaker groups? Given that past research has established a relationship between word likeness and phonotactic probability, differences in word likeness ratings across speaker groups may indicate differences in phonotactic probabilities across dialects. Second, does the repetition accuracy of nonwords vary across speaker groups? Lastly, is there a correlation between speakers' word likeness judgments and their repetition accuracy?

Methods

Stimuli:

The 144 nonwords used in the experiment were selected from a larger list of 1,080 possible nonwords. The nonword frames were taken from stimuli used in a nonword repetition task in the Paidologos project (Edwards & Beckman, 2008). These nonwords were two syllables and began with a consonant vowel (CV) sequence. The first syllable had a CV shape and the last syllable had either a CCVC or a CVC shape. The nonwords were constructed using 12 pairs of word initial CV sequences that contrasted in phonotactic probability. The phonotactic probability was determined by calculating the frequency of CVs in words that 90% of 30-month-old children should know, according to the McArthur-Bates Communication Developmental Inventory (Fenson et al., 1993). There were two pairs of CVs for each of the six consonants used: /t/, /d /, /k/, /ɡ/, /s/, and /ʃ/. The initial consonant was the same in each high and low phonotactic probability CV pair, e.g., /kɪ/ vs. /kɛ/. To the extent possible, the high and low probability CV in each pair had similar phonetic difficulty. The second syllables, referred to henceforth as the frames, were developed previously for a study of nonword repetition across languages (Edwards & Beckman, 2008). As a first pass, every CV was combined with every possible frame, resulting in 1,080 nonwords. Any of the original 1,080 nonwords that contained sequences that constituted a real word were eliminated, e.g., /kɪsɛp/ was excluded because it began with the real word "kiss." Six nonwords from each of the 24 CV categories were selected with a focus on maximizing variability in the nonword frames.

The selected 144 nonwords were recorded by a phonetically trained adult female speaker of Standard American English from Minneapolis, MN. Recordings were made using a Marantz professional CD recorder (model number CDR300) and an AKG head-mounted condenser microphone (model number C420). The resultant sound files were equated for RMS amplitude using the software program Praat (Boersma & Weenink, 2009).

Participants:

Twenty-seven adults (14 male, 13 female) participated in the study. The participants ranged in age from 18 to 49 years (M=27.07 years, SD=10.24). Participants were recruited using personal contacts, fliers and invitations to participate from staff at a local community center. According to self-report, 26 of the 27 participants had no history of speech, language or hearing disorders. One participant reported receiving therapy as a young child for a "speech impediment." All participants were native speakers of English. The data from three participants were excluded due to recording errors and time prohibited the experimenter from including data from two additional participants. Two participants' data were excluded because they did not meet the participation criteria. One participant exceeded the age limit of 50 years and the other participant indicated that she had a hearing loss.

All speakers in the Standard American English (SAE) group spoke only SAE, while all the speakers in the African American English (AAE) group reported that they code switch between SAE and AAE. The SAE group included 20 participants (8 male, 12 female), ranging in age from 18 to 48 years (M=23.8, SD=7.89). The AAE group included 7 participants (6 male, 1 female), ranging in age from 24 to 49 years (M=36.43, SD=10.94). The AAE group was identified through self-report by using a modified version of the dialect density questionnaire developed by Brown (2011). The questionnaire elicited information about the frequency of AAE use by the participant, the use of code switching and the use of AAE by the participants' family and friends. Table 1 provides the information gathered using this questionnaire.

Procedures:

Some individuals participated in the experiment in the laboratory, while others participated in a community center in Minneapolis. This choice was made to maximize the number of participants who speak AAE, most of whom were tested in the community. For the participants who completed the tasks in the laboratory, the visual components of the experiment were displayed on a computer monitor in a sound treated booth. Participants at the community center completed the tasks in a quiet conference room using a portable computer. At both sites, the stimuli were presented over speakers at a comfortable listening level and the participants' spoken responses were recorded. All participants completed the same nonword repetition and word likeness rating tasks. The task order was counterbalanced across participants.

In the nonword repetition task, the listeners were presented with each of the 144 nonwords played individually in a random order. In the task instructions, nonwords were defined as sequences of sounds that aren't real English words and an example nonword, "koofteeb," was given. The listeners were asked to repeat the nonwords as accurately as possible. Additionally, the listeners were informed that their voice would be recorded and that the accuracy of their productions would be measured. The full task instructions are included in the appendix. After the listeners repeated a nonword, they clicked the mouse to advance to the presentation of the next nonword. The participants' repetitions of the nonwords were recorded.

In the word likeness rating task, the participants were asked to consider how good each of the nonwords would be as potential English words. They made their ratings by completing a Visual Analog Scale (VAS) task. The continuum of word likeness was represented by a horizontal line with the endpoints labeled "this could never be a word of English" and "this word could easily be a word of English" (figure 1). The full task instructions for this task are included in the appendix. After the participants listened to each word, they made their rating by clicking along the line. In order to calculate reliability, 16 nonwords were presented twice during the task. The 144 nonwords and 16 reliability items were presented in a random order.

Analysis:

The participants' mouse click locations during the word likeness rating task were extracted from the e-prime data files. The locations were reported by e-prime as values representing the x and y coordinates of the pixel clicked by the participant. In order to remove outliers, word likeness judgments with click locations that were not within the vicinity of the line representing the continuum of word likeness were eliminated. The range for acceptable x mouse click locations were greater than 61 to less than 576 and the range of acceptable y mouse click locations was greater than 121 to less than 280. More leeway was afforded to y mouse clicks that fell above the line, as compared to those below the line. This accommodated participants who had a tendency to click above the line because of a possible association with writing above lines. No judgments fell within the unacceptability range because of y mouse click locations. Only three judgments were excluded because of unacceptable x mouse click locations.

In the word likeness rating task, 16 nonwords were presented twice in order to gather reliability data. Only the rating of the first presentation of each nonword was used for analysis of word likeness ratings. The first and second rating of the reliability items were compared to determine the rating reliability of each participant.

The adults' productions of nonwords were prepared for accuracy analysis using the software program Praat (Boersman & Weenink, 2009). First, the recording was divided into individual nonword productions. Next, the nonword productions were labeled with the target nonword. The transcriber evaluated the entire nonword production and categorized it as a target repetition or an additional production following the initial repetition. Only initial repetitions were evaluated for accuracy. If the participant did not repeat a nonword following its auditory presentation, this was noted and labeled as “non-response.” Across all participants, only seven non-responses were noted. The initial consonant and vowel (CV) sequences were transcribed by trained phoneticians who were native speakers of English. Productions that matched the target sound were scored as correct and assigned a score of 1. It was noted if a production was judged to be between two sounds. Intermediate productions were assigned a correct score if they sounded more like the target phoneme and incorrect if they were perceived to be more like a substitution. Errors were characterized as substitutions, voicing errors, or additional sound insertions. Disfluencies, devoicing of vowels, prevoicing and nasal pauses were labeled.

After the accuracy of each consonant and vowel production was determined and additional notes were made, accuracy scores were calculated. The accuracy score was the average of the C and V accuracy. Hence, the accuracy for a CV sequence could be 0, 0.5, or 1.0. The repetition accuracy was very high overall, with the distribution of accuracy scores falling around 1.0. For each participant, the average accuracies for high and low probability initial CV groups were calculated.

Results

A series of nonparametric statistical tests were run. Wilcoxon signed-rank tests were used to examine within-subjects factors and Mann-Whitney U tests were used to examine between-subjects factors. Nonparametric statistical tests were used because it was suspected that the primary dependent measures of CV accuracy and word likeness ratings were not normally distributed. The use of theses statistical methods was also appropriate because of the unequal group sizes.

The AAE speakers' word likeness ratings were significantly lower than the SAE speakers' ratings of high phonotactic probability nonwords (Mann-Whitney U=33, Wilcoxon W=61, Z= -2.05, p= 0.041) and low phonotactic probability nonwords (Mann-Whitney U= 24, Wilcoxon W=52, Z= -2.55, p= .009) (see figure 2). For the high probability nonwords, the AAE speakers had an average rating of 267.83 (SD=66.02) and the SAE speakers had an average rating of 317.13 (SD=37.91). For the low probability nonwords, the AAE speakers had an average rating of 259.21 (SD=56.1) and the AAE speakers had an average rating of 320.16 (SD=36.29). Phonotactic probability was negatively correlated with word likeness ratings of the SAE speaker group. This finding did not achieve significance at the .05 level, but significance was reached at the .10 level (Z= -1.72, p= .086). The AAE speakers' word likeness ratings were lower than the SAE ratings, overall. Even the AAE group's mean rating of the high probability nonwords was lower the SAE group's mean ratings of both the high and low probability words.

The nonword repetition accuracy of high phonotactic probability nonwords was significantly lower in the AAE speaker group than in the SAE speaking group (Mann-Whitney U=22, Wilcoxon W=50, Z= -2.67, p=0.006), but not low phonotactic probability nonwords (Mann-Whitney U=52, Wilcoxon W=80.5, Z= -0.97, p=0.341) (see figure 3). For the high probability nonwords, the AAE speakers had a mean accuracy of .95 (SD=.03) and the SAE speakers had a mean accuracy of 0.98 (SD=.02). A Wilcoxon signed ranks test revealed that participants in the SAE group repeated high probability nonwords more accurately (Z= -2.32, p=0.02) than low probability ones. The two types did not differ significantly for the AAE participants (Wilcoxon signed ranks test Z= -0.59, p=0.55). There was a group effect on nonword repetition accuracy, but only for the high probability nonwords. While there was no effect of phonotactic probability on the AAE group's repetition accuracy, phonotactic probability affected the SAE group's repetition accuracy of the high probability nonwords.

A subject by subject calculation of the nonparametric correlation coefficient statistic, Spearman's ρ, showed that there was no correlation between nonword repetition accuracy and word likeness ratings. The one exception of this finding was a clear positive correlation between the nonword repetition accuracy and word likeness ratings for one participant in the AAE speaker group. This shows that for the majority of the participants, an individual's word likeness ratings did not affect how accurately nonwords were repeated.

No significant differences on nonword repetition accuracy or word likeness ratings due to task order were found when separate Mann-Whitney tests were run for each speaker group. However, a Wilcoxon signed ranks test showed that participants who completed the repeating task first repeated high probability nonwords more accurately than those who completed the word likeness rating task first. However, this finding was only marginally significant (Z= -1.69, p= 0.09). There was a small effect of task order on the repetition accuracy of high probability nonwords for the participants who completed the repetition task first. Word likeness ratings did not differ as a consequence of task order.

Two sample *t*-tests found that there were no significant differences between the participants' first and second ratings of the reliability items, with the exception of one SAE participant. There was no difference in the correlation between the first and second rating of reliability items as a function of group (Mann-Whitney U= 63, Wilcoxon W= 273, Z= -.39, p= .73). The listeners' ratings were reliable because their ratings of the same words were correlated and did not differ significantly.

Discussion

Word likeness ratings were different across the AAE and SAE speaker groups. Additionally, the phonotactic probability affected the word likeness ratings of the SAE group, but not the AAE speaker group. However, this finding was less robust and only reached significance at the .10 level.

Here, two possible explanations for these findings are considered. Frisch, Large and Pisoni (2000) found that word likeness judgments are influenced by phonotactic probability. One possible explanation for the difference in word likeness ratings and the effect of phonotactic probability on those ratings across the speaker groups is that phonotactic probability varies across dialects.

Our high and low phonotactic probability designations were based on norms from the MacArthur Bates Communicative Development Inventory (Fenson et al., 1993). Only initial consonant vowel sequences beginning with /t/, /d /, /k/, /ɡ/, /s/, and /ʃ/ were considered. Given that narrow stimuli set, an effect of the phonological features of AAE that affect consonants in postvocalic or word final positions would not be expected. At the same time, /t/ and /d/ are sometimes substituted for interdental fricatives in AAE, such as "this" (/ðis/) pronounced as /dɪs/ (Thompson, Craig & Washington, 2004). This phonological feature might make these consonants more frequent in AAE. Additionally, consonant clusters can be reduced, such as "test" (/tɛst/) being produced as /tɛs/. It's possible that this makes singleton consonants more frequent in AAE. These potential differences may explain possible differences in phonotactic probability across SAE and AAE.

In the current investigation, a significant effect of phonotactic probability on nonword repetition accuracy was found only for the SAE group. Previous research has demonstrated that nonword repetition accuracy is better when the nonwords contain segments with high phonotactic probabilities (Munson 2001; Munson, Edwards & Beckman, 2005; Vivetich & Luce, 2005) This finding offers support for the possibility that phonotactic probability varies across the SAE and AAE dialects.

Vocabulary size may have played a role in group differences in word likeness ratings. Frisch, Large, Zawaydeh and Pisoni (2001) demonstrated that there is an interaction between word likeness judgments and vocabulary size. In order to measure lexical knowledge, their participants' familiarity with various words was compared to established high, medium or low familiarity categories. Adults with larger vocabularies gave more variable low word likeness ratings, whereas adults with smaller vocabularies tended to consistently give all low frequency segments the same lowest word likeness rating. Familiarity is positively correlated with usage frequency and words that are used less often contain more rare phonemes. The adults with higher lexical knowledge may have more readily accepted low probability nonwords as word like because of their familiarity with real words containing rare phonemes. In the current study, vocabulary size, rather than dialect, may explain the difference in word likeness ratings across the speaker groups. However, it is not possible to examine this possibility because a measure of vocabulary size was not collected.

A limitation of the study is that some characteristics of the participant groups were not equally matched. First, the sizes of the participant groups were unequal, with almost three times as many SAE participants than AAE participants (20 SAE and 7 SAE). While the SAE group had roughly equal distribution of men and women (eight men, twelve women), the AAE group had only one female participant out of eight in total. Additionally, the AAE group skewed older in age (M=36.43, SD=10.94), while the SAE participants were younger on average (M=23.8, SD=7.89).

The participants completed the experiment under slightly different conditions. While all of the SAE participants completed the tasks alone in a sound treated booth, some of the AAE speakers participated in a quiet conference room in the company of the experimenters. The participants from the community center may have been distracted by a minimal amount of noise, including quiet chatter and sounds from a nearby copy machine.

Due to time restraints, only the initial consonant vowel sequence of the nonwords was analyzed for accuracy. Most of the participants' performance was near ceiling. Additionally, the singleton consonants in the word initial CV sequences offered no opportunities for transfer of phonological features of AAE, such as postvocalic consonant reduction, substitutions for interdental fricatives, final consonant devoicing, consonant cluster reduction, consonant cluster movement or syllable deletion (Thompson et al., 2004). Transcription of the entire nonword would likely result in more variable performance. Errors could be analyzed to determine whether it is possible they are caused by the transfer of AAE features onto the production of nonwords.

The current investigation has revealed possible differences in phontactic probability across SAE and AAE. Given the known effect of phonotactic probability on nonword repetition accuracy, it may not be appropriate to compare performance on nonword repetition tasks across speaker groups. Additionally, these findings suggest that researchers should be cautious in interpreting nonword repetition accuracy as a factor of phonotactic probability if participants do not speak SAE. Data on dialect group differences can be applied to analysis in the larger longitudinal study in which these nonwords will be used. If differences between AAE and SAE speaking children's repetition accuracy of specific nonwords are seen, comparisons to the adult data can be made. It can be determined if differences in children's repetition accuracy can be predicted by differences between the SAE and AAE adults' word likeness ratings.

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Appendix

Word Likeness Rating Instructions:

In this brief experiment, you will listen to nonwords. Your job is to consider how good each of these nonwords would be as potential English words.

You will make your ratings on the screen that you are about to see. It will be shown for five seconds.

Click the mouse to continue.

In making your responses, should reflect on how good these words would be as additions to the English lexicon. If you think that the nonword is a very bad addition to English, click toward the text marked "this word could never be a word of English." If the word sounds like a very good addition to English, click toward the text marked "this could easily be a word of English."

Please use the entire line when making your judgments--don't just click on the endpoints. Click the mouse to continue.

There are no "right" or "wrong" answers here. We are simply interested in the kinds of things that people pay attention to when they perceive words. It's best to go with your 'gut instinct' in this task.

Press any key to begin.

Nonword Repetition Instructions:

Welcome to the nonword repetition portion of the experiment.

Click any button to read the instructions.

In this brief experiment, you will listen to some nonwords and you will repeat them. By "nonwords" we mean sequences of sounds that aren't real English words, like "koofteeb". Your job is to repeat the nonwords as accurately as possible. We will record your voice and will measure how accurately you repeated them.

Please press the "b" key to begin. Don't press the "b" key until you are ready to begin, because the experiment will start as soon as you press it.

Figures

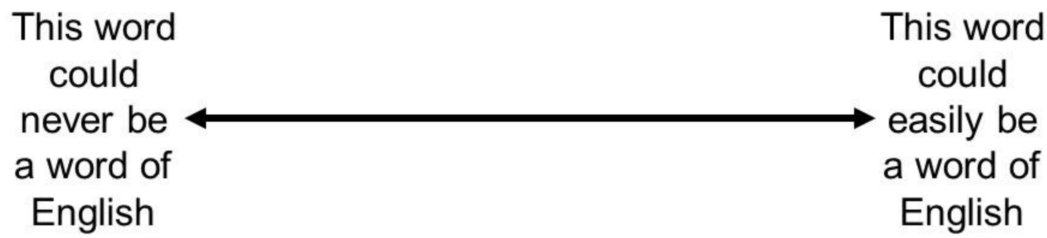

Figure 1. Visual Analog Scale (VAS)

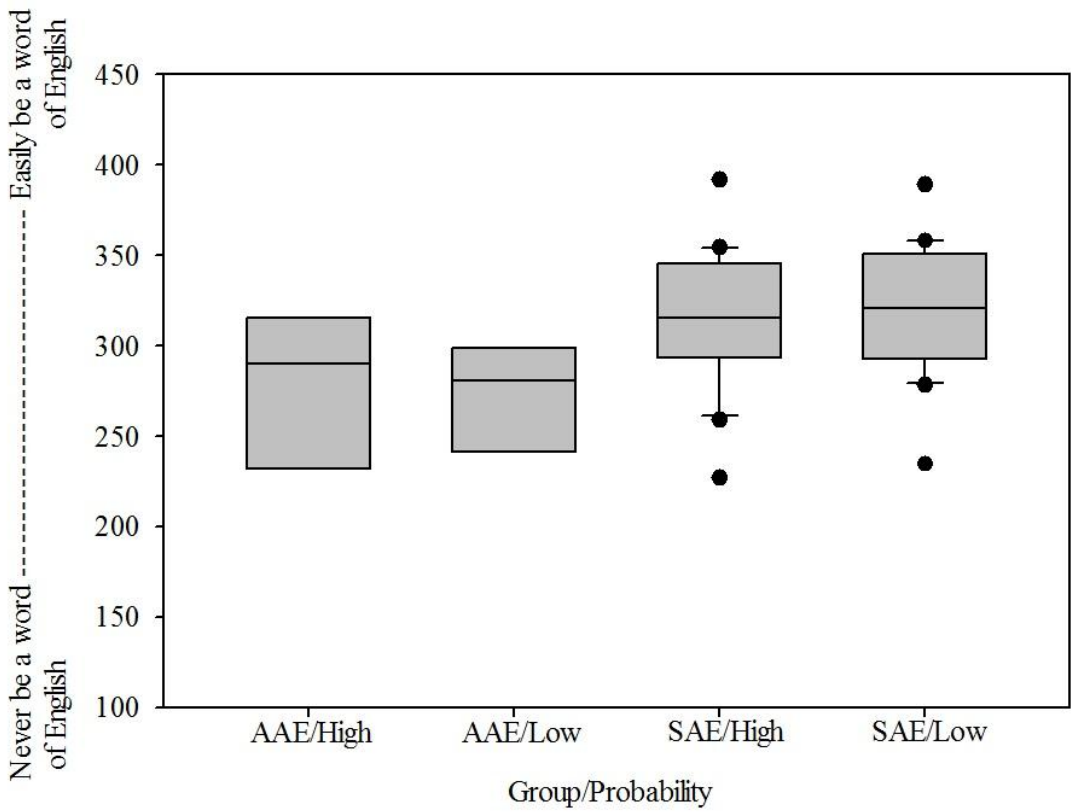

Figure 2. Boxplot showing participants' word likeness ratings separated by dialect group and phonotactic probability of the nonwords

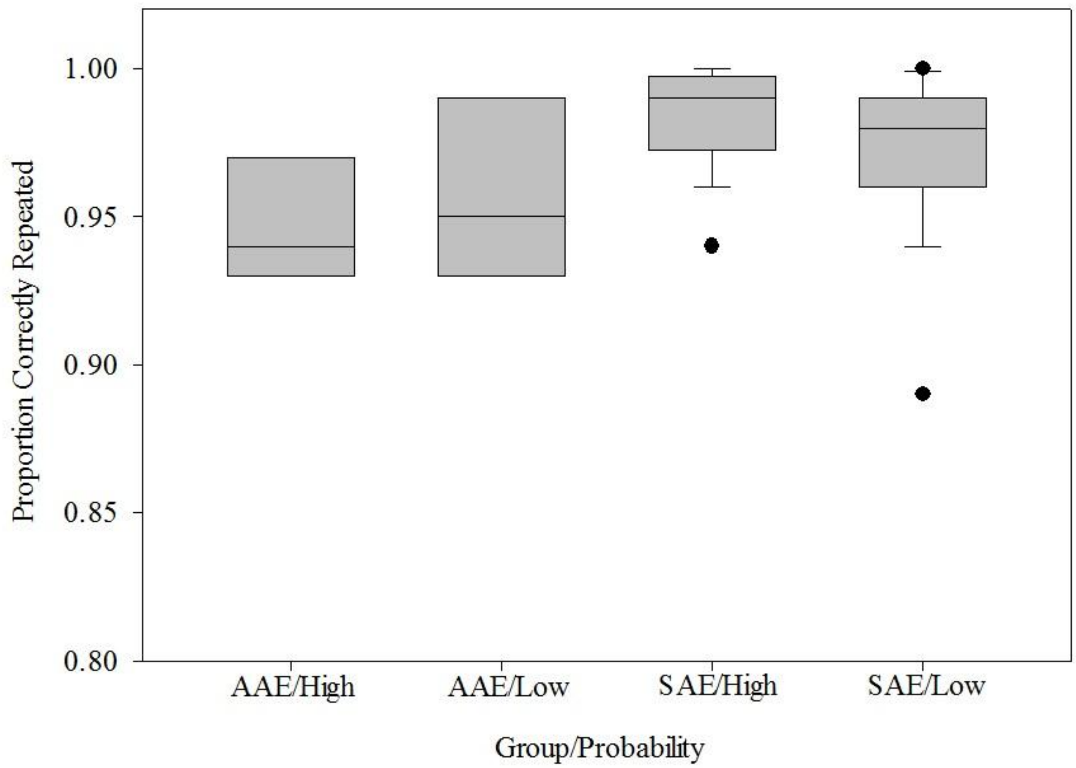

Figure 3. Boxplot showing accuracy of nonword repetitions separated by dialect group and phonotactic probability of the nonwords

Tables

Subject	On a scale of 0-10 how often do you use [AAE]? (0= never, 5= sometimes, 10= always)	Do you code-switch, or decide to use different dialects in some contexts?	Do any of your friends use AAE?	How many of your work friends regularly use AAE? (%)	How many of your social friends regularly use AAE? (%)	Does your family use AAE at home?	How often does your family use AAE?	Do you use AAE when speaking with your family?	Do your parents or caregivers [use AAE]?	What is the highest year of school you have completed?
1	4	Yes	Yes	0	40	Yes	6	Yes	Yes	Advanced Degree
2	5	Yes	Yes	0	20	Yes	3	Yes	No	Advanced Degree
3	1	Yes	Yes	30	20	No	8	No	Yes	Some College
4	1	Yes	No	10	40	Yes	4	Yes	No Response	Some College
5	8	Yes	Yes	70	50	Yes	8	Yes	Yes	Completed 2 Year Degree
6	10	Yes	Yes	100	100	Yes	10	Yes	Yes	No Response
7	4	Yes	No	0	40	Yes	4	Yes	No	Completed High School

Table 1. Use of Dialect in Participants from the African American English Group