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Lillian Ferragamo April 10, 2024

Dissecting the Relation between Language Attitudes, Language Proficiency, and Executive Functioning in African American English (AAE) / Standard American English (SAE) Bidialectal Individuals

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Abstract

Dissecting the Relation between Language Attitudes, Language Proficiency, and Executive Functioning in African American English (AAE) / Standard American English (SAE) Bidialectal Individuals

By Lillian Ferragamo

African American English (AAE) is a widely spoken dialect in the United States; however, it is not the dialect most used in academic and professional settings, where Standard American English (SAE) is typically preferred. AAE often faces social stigma in comparison to SAE, particularly among children, with perceptions of AAE being linked to academic performance. This confounding difference underscores the impact of language attitudes on children's learning outcomes. There is a critical need for a deeper understanding of how pervasive language bias affects these outcomes and how they manifest in older populations. To investigate the relationship between self-reported language attitudes and cognitive skills in bidialectal speakers of AAE and SAE, five participants completed a language attitudes questionnaire alongside a series of language, reading, and executive functioning tasks. Due to a lack of sufficient data, the proposed path model analysis was not able to be completed. Instead, descriptive, and correlational analysis was utilized to interpret the data. Overall, no statistically significant correlational findings were observed. However, there was a suggested language processing difference between the SAE and AAE dialects. Ultimately, the directionality and strength of the correlation coefficients suggest evidence of the predicted relation between the three variables. These findings will contribute to our understanding of how societal perceptions and self-confidence in language use can influence both linguistic and non-linguistic cognitive skills.

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Introduction

As of 2021, 328 languages were spoken in the United States of America ranking the country as the fifth most linguistically diverse country in the world (Dyvik, 2023). Although English is the most prominent language used, the 2019 consensus reported that nearly 68 million people spoke at least one other language at home (Dietrich & Hernandez, 2022). This linguistic diversity reflects the large-scale cultural tapestry that is the United States. In addition to the multitude of languages spoken within the United States, there is a resoundingly large number of dialects among English speakers. Dialects are language variation caused by changes in use between geographical locations and social groups. In academic and professional settings, the most widely used dialect is Standard American English (SAE). Thus, by default, much of the work exploring individual differences in language (and dialect) use has focused on SAE. However, there has been growing interest in exploring other widely used dialects in the United States. One such dialect that has been receiving increased interest is African American Vernacular English (AAVE), which is associated with younger and working-class African Americans, often in more colloquial and informal spaces (King, 2020). AAVE is the most grammatically and phonologically distinct form of African American speech from SAE. African American English (AAE) is described as the broader collection of African American linguistic practices which show up in a variety of settings (King, 2020). This label denotes similarity to AAE's English roots, while the label African American Language (AAL) emphasizes the additional creole roots (King, 2020). The present study will use AAE as an umbrella term for the dialect's continuum. Interest in understanding the use and implications of AAE began in the early 1960s when Labov examined AAE's influence on sociolinguistic factors (Labov, 1968). Since then, there has been a steady increase of research in this area. Over the last few decades, in particular, this work has greatly expanded, with less than 2,000 research articles noting "African

American English" or "African American Vernacular English" from 1990-2000, to almost 16,000 research articles noting the same terms in the last decade from 2013-2023, according to Google Scholar. Given that AAE tends to be used in more social and community settings, whereas SAE tends to be used in more academic and professional settings, it is often the case that AAE speakers must become bidialectal, or speakers of two dialects, to achieve professional success in the United States.

Understanding the nuances of bidialectalism is crucial because it sheds light on the cognitive processes involved in language adaptation and their implications on other non-linguistic cognitive skills. While there has been limited research exploring the cognitive consequences of bidialectalism, prior research has demonstrated that bilingual individuals, or those who speak two distinct languages, show greater executive functioning skills as compared to monolingual individuals (e.g., Bialystok & Craik, 2022; Chrysochoou et al., 2022; Degirmenci et al., 2022; Gandara & Escamilla, 2017; Nguyen et al., 2023). Executive functioning is a multifaceted construct encompassing various higher-level cognitive processes that support our goal-directed behavior, including inhibition, cognitive flexibility, and working memory (Diamond, 2013). It has been proposed that individuals proficient in two dialects may show a similar association between dialect use and executive functioning skills as has been seen between language use and executive functioning skills in those who speak two languages (Goodman & Buck, 1973). This is primarily driven by the fact that using two close dialects, like AAE and SAE, has been shown to engage the same control mechanisms as using two close languages in bilingual speakers (e.g., Kirk et al., 2019; Lundquist & Vangsnes, 2018; Vorwerg et al., 2019). Vorwerg et al. (2019) explored linguistic control in groups of bilinguals and bidialectal speakers, to see if switching costs, behavioral costs experienced when switching between language or

dialects, were alike between groups. Using mean response rate and error analysis, the authors saw a similarity between groups in both accuracy and response time when switching between dialects or languages.

To date, only a handful of papers have directly explored the potential impacts of bidialectalism on individual differences in executive functioning and the findings have been mixed (e.g., Alrwaita et al., 2022; Johnson, 2012; Ross & Mellinger, 2017; Wu et al., 2016). Ross & Mellinger (2017) compared the performance of bilingual, bidialectal, and monolingual children on the Simon and Flanker tasks, which require the suppression of cognitive interference (i.e., inhibition). While it was not found that the bilingual and bidialectal groups showed a cognitive "advantage" (or better performance on the inhibition tasks as compared to monolinguals), it was noted that this could have been driven by the fact that the sample consisted of 2-15 year-olds and that the impact of diverse linguistic experiences may be more prominent later in life. Other work within the field of bilingualism has also suggested that the impact of dual language use on individual differences in executive functioning is related to specific factors regarding how and when bilinguals use their languages (e.g., De Bruin, 2019; Festman et al., 2010; Tao et al., 2015; Yamasaki et al., 2018). In particular, it has been shown that how often or frequently a bilingual uses their languages is related to variability in executive functioning skills (e.g., Mas-Herrero et al., 2021; Tao et al., 2015).

While there are sociocultural reasons why a bilingual individual may or may not want to use their languages in certain contexts, the impact of social pressures on language use is particularly prominent among speakers who are bidialectal in SAE and AAE. This is due to the negative biases towards AAE known to exist in many settings. While much of the core structure of AAE is consistent with that of SAE, certain aspects, such as the more prominent use of double

negation and the habitual be, have separated these dialects. These dissimilarities have caused stigmatization of AAE in academic and professional settings leading to negative labels like, 'linguistically backward', 'uneducated', and 'unintelligible' (Luu, 2020). Evidence of these linguistic biases has been shown in prior research in which individuals are presented with exemplars or samples of AAE- and SAE-based speech and asked to rate the characteristics or quality of that speech (e.g., Charity et al., 2004; Franklin & Hixon, 1999). In one study, participants were presented with speech samples from AAE and SAE speakers and asked to report on the perceived intelligence of the speaker. Overall, participants reported the AAE speaker as less intelligent than the SAE speaker, regardless of the age of the speaker or the content of the speech (Franklin & Hixon, 1999).

Language bias not only influences patterns of language use but has also been proposed to have broader negative consequences on academic and professional success. For example, it has been suggested that negative attitudes towards AAE, and not necessarily low proficiency in SAE, contributes to the racial achievement gap between African American students and their peers in literacy gains, standardized testing scores, and overall educational attainment in school (e.g., Godley & Escher, 2012; Labov, 1995; Vellemen & Pearson, 2010). Bidialectal African American students often deal with the challenges associated with thinking in one dialect (AAE) and being asked to perform in another (SAE; Franklin & Hixon, 1999).

Prior research investigating the impact of linguistic biases on AAE speakers has focused on the external attitudes of teachers, employers, and institutions (e.g., Holliday & Squires, 2021; Kraemer et al., 2000; Terrell & Terrell, 1993). This work suggests that, at the very least, these negative attitudes lead to a lack of self-confidence (e.g., Godley & Escher, 2012; Labov, 1995). Holliday & Scquires (2021) interviewed black college students, about how their experience of

negative external attitudes of AAE has impacted them. Regardless of the students' proficiency in AAE, all individuals reported feeling 'marked' and consistently worried about how they spoke (Holliday & Scquires, 2021).

Much of the research exploring the impacts of diverse linguistic experience, to date, has focused on the effects of learning and using multiple languages. There is, comparatively, very little research considering how bidialectalism impacts language and cognitive skills. The aim of the current study is to contribute to this area of work by exploring and extending some of the relations previously shown to the context of bidialectalism.

In particular, the following questions were examined in this study:

1. Does language proficiency relate to executive functioning skills in bidialectal adults (as has been shown with bilingual individuals)?
2. Is the relation between proficiency and executive functioning skills influenced by self- (as opposed to external) language attitudes?

While these questions have not previously been explicitly explored, based on the limited prior work in related areas, it was predicted that there would be a positive relation between language proficiency and executive functioning, such that those with higher dialectal proficiency would show better executive functioning skills. In addition, it was predicted that self-language attitudes would impact this relation, such that this relation would weaken when language attitudes were entered into the model. More specifically, it was predicted that more positive attitudes towards one's dialect would lead to strong relations between dialectal proficiency and executive functioning because of increased dialect use given the positive attitudes.

Methods

Participants

Participants were recruited via two phases, an initial piloting phase, in which individuals from the broader Emory community were recruited, and a later study phase, in which individuals from the Emory Psychology community were recruited via SONA. For the purposes of this study, these two samples were combined prior to data analysis. In both cases, IRB-approved study procedures were followed and in the case of those who participated via SONA, course credit was given at a rate of 1 credit per 60 minutes of participation. A total of 5 individuals (mean age = 21.6; 2 female; 3 male) participated in this study, with all participants self-reporting speaking both SAE and AAE.

Materials and Procedures

Language Attitudes

Modified Implicit Association Task (mIAT). The modified Implicit Association Task (mIAT) used in this study was adapted from the original Race Implicit Association Task (Greenwald, 1998). In total, the task took ten minutes to complete and was administered via PsychoPy. The IAT is used to measure subconscious attitudes and beliefs individuals may be hesitant or unable to disclose explicitly. The mIAT used in this study was designed to measure implicit attitudes related to SAE and AAE. Seven words were selected belonging to four separate categories: Negative or Positive and AAE or SAE (see Table 1 for the specific task stimuli). On each trial, one word was presented, and participants used button presses to sort the words into the categories given for each block.

Table 1

Modified Implicit Association Test: Category Words

Category							
Positive	Respectable	Proper	Professional	Good	Successful	Hardworking	Intelligent
Negative	Shameful	Sloppy	Unprofessional	Bad	Disgraceful	Lazy	Dumb
African American English	African American English	AAE	African American Vernacular English	AAVE	Black English	Black Vernacular	Black Vernacular English
Standard American English	Standard American English	SAE	Mainstream American English	MAE	Academic English	General American English	European American English

Note. Participants saw these four categories and their associated words before beginning the mIAT.

Participants completed 5 blocks of the mIAT: (1) AAE or SAE words only, (2) Negative or Positive words only, (3) All words, with AAE and Negative words sorted together, and SAE and Positive words sorted together, (4) AAE or SAE words only, and (5) All words, with AAE and Positive words sorted together, and SAE and Negative words sorted together.

Performance on two of the blocks were used to index self-attitudes related to AAE, specifically, performance on Blocks 3 and 5 were used, in which participants sorted AAE and Negative words together and AAE and Positive words together. Prior research suggests that individuals will have an easier time sorting whichever connection, (AAE/Negative, AAE/Positive), is more consistent with their internal perspective. Behaviorally, this is reflected by faster reaction times for the pair of categories that best aligns with internal attitudes.

Language Proficiency

Three tasks were used to measure individual differences in AAE proficiency. The first task was a self-reported questionnaire that asked participants to identify the dialects they spoke and report on their exposure, use, and attitudes about each dialect. The other two tasks were sentence processing tasks that either asked participants to answer comprehension questions about the sentences or indicate whether or not the sentence would be used in a particular linguistic

context. Stimuli for the two sentence tasks followed the same structure. Each sentence was 11 words in length and began with the word “Last”, explicitly indicating a past tense tone. There were 3 versions of each sentence. Within each version, the only difference between the sentences was the verb form used. In the first version (Grammatical), the sentences contained a past tense verb form indicated by the -ed suffix, which is considered to be grammatical in both SAE and AAE. In the second version (Critical), the sentences contained only the root verb, which is considered to be grammatical in AAE and ungrammatical in SAE. In the third version (Ungrammatical), the sentences contained present tense verb form indicated by the -ing suffix, which is ungrammatical in SAE. In addition, it contained a copula *be* deletion, which along with the progressive form verb is considered to be ungrammatical in AAE (see Table 2 for example sentences from each condition).

Table 2

Example of the 3 versions of one sentence.

Condition	Sentence
Grammatical	Last Sunday the television host asked the guest a hard question.
Critical	Last Sunday the television host ask the guest a hard question.
Ungrammatical	Last Sunday the television host asking the guest a hard question.

Note. Grammatical is grammatical in both Standard American English (SAE) and African American English (AAE). Critical is grammatical in only AAE. Ungrammatical is ungrammatical in both SAE and AAE.

Dialect Experience and Proficiency Questionnaire (DEAP-Q). The Dialect Experience and Proficiency Questionnaire (DEAP-Q) is a version of the commonly used Language Experience and Proficiency Questionnaire developed by the Northwestern Bilingual and Psycholinguistic Research Lab (Marian, 2007). Administered on Redcap, an online survey platform, this survey collects self-reported dialect background information and takes 10-15 minutes to complete. Participant responses are given on an 11-point Likert scale (0-10). Language proficiency was operationalized as the average self-reported speaking and

understanding proficiency rating in AAE. In this study, the DEAP-Q was additionally used as a secondary index of self-language attitudes (along with the mIAT, described above). Specifically, two attitude questions were added to the DEAP-Q that asked participants to rate, on a 11-point Likert scale (0-10), how likely and comfortable they are with using each dialect in different social contexts including with friends, with family, at work, at school or at home. Language attitudes were operationalized as the average ratings across these questions for AAE.

Sentence Comprehension Task. A total of 54 sentences were split into 3 sets for the Sentence Comprehension Task. Each set had 2 versions where the pairing between the responses (True/False) and the keys (Left/Right) were switched to control for response hand bias. Each participant only saw one of the six versions of the task. Within each version, each condition (Grammatical, Critical, and Ungrammatical) was shown 6 times, for a total of 18 sentences presented one at a time. To control for the participant becoming familiar with the sentences, no one sentence was shown in more than one condition (i.e., participants only saw one version of each sentence). These versions were counterbalanced using *t*-tests, across the six versions, no lists or conditions were significantly different in average word frequency or average word length (all $ps > .05$).

In this task, participants were asked to read each sentence and then respond true or false to a provided statement. For example, “Last Sunday the television host asked the guest a hard question,” would prompt either a true statement, “The host asked the guest a hard question,” or a false statement, “The teacher asked the guest a hard question.”

The critical variable in this task was the time it took participants to read each sentence. To isolate this variable, participants were asked to read each sentence, press the spacebar, and then were prompted to respond to the provided statement. Because it takes longer to read an

ungrammatical sentence, it was expected that reading times would be longer for the Ungrammatical vs. Grammatical condition. The condition of most interest was the Critical condition. If a participant has high AAE proficiency, then it was predicted that they would process sentences in the Critical condition as valid (or grammatical) sentences and therefore would show faster reaction times (consistent with reaction times for the Grammatical condition). Alternatively, if a participant has low AAE proficiency, then it was predicted that they would process sentences in the Critical condition as invalid (or ungrammatical) sentences and therefore would show slower reaction times (consistent with reaction times for the Ungrammatical condition).

Sentence Usage Task. A total of 90 sentences were split into 3 sets for the Sentence Usage Task. Each set had 2 versions where the pairing between the responses (Yes/No) and the keys (Left/Right) were switched to control for response hand bias. Each participant only saw one of the six versions of the task. Within each version, each condition (Grammatical, Critical, and Ungrammatical) was shown 5 times, for a total of 15 sentences presented one at a time. This task included two separate blocks, resulting in 30 sentences per participant. To control for the participant becoming familiar with the sentences, no one sentence was shown in more than one condition (i.e., participants only saw one version of each sentence). These versions were counterbalanced using *t*-tests, across the six versions, no lists or conditions were significantly different in average word frequency or average word length (all *p*s >.05).

In the first block of the task, participants were asked to read each sentence, and then respond to the question: “When you’re using AAE, would you say this sentence?” In the second block of the task, participants were asked to read each sentence, and then respond to the question: “When you’re using SAE, would you say this sentence?” This structure places

participants in two separate linguistic contexts, first AAE, then SAE. The critical variable in this task was the time it took participants to read each sentence. To isolate this variable, participants were asked to read each sentence, press the spacebar, and then were prompted to respond to the dialect specific question. Because it takes longer to read an ungrammatical sentence, it was expected that reading times would be longer for the Ungrammatical vs. Grammatical condition. The condition of most interest was the Critical condition, particularly, in the AAE context block. If a participant has high AAE proficiency, then it was predicted that in the AAE block, they would process sentences in the Critical condition as a sentence they would say and therefore would show faster reaction times (consistent with the reaction times for the Grammatical condition). Alternatively, if a participant has low AAE proficiency, then it was predicted that they would process sentences in the Critical condition as a sentence they would not say and therefore would show slower reaction times (consistent with reaction times for the Ungrammatical condition).

Executive Functioning

Spatial Stroop Task. The Spatial Stroop task (for a review see Viviani, 2023) was used to measure executive functioning. In this task, participants are presented with planes on either the right or left side of the screen, pointing to either the left or the right. After two practice blocks, two experimental blocks were presented in which 32 planes were shown one at a time. Each block contained 24 congruent and 8 incongruent trials. On congruent trials, the plane pointed in the same direction as the side of the screen in which it was presented. For example, a plane pointing to the left would appear on the left side of the screen. On incongruent trials, the plane pointed in the opposite direction as the side in which it was presented. For example, a plane pointing to the left would appear on the right side of the screen. Previous work has shown that there is a natural tendency to want to respond to the stimuli with a button press that aligns with

the location of the stimulus (e.g., plane on RIGHT, respond with RIGHT button press). Therefore, on incongruent trials, one must override this natural tendency to instead respond with the correct rule-based response. The outcome variable for this task was calculated as the difference in reaction time between incongruent and congruent trials. Only correctly responded to trials were considered. A smaller difference between incongruent and congruent trials indicates higher executive functioning skills.

Analysis Plan

Two path models were to be used to examine the relation between Language Proficiency and Executive Functioning (Unadjusted model; see Figure 1a), and then to examine the change in the magnitude of this relation when Language Attitudes were added to the model (Adjusted Model; Figure 1b).

Figure 1a

Unadjusted Model

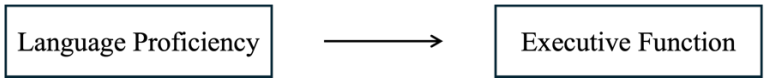
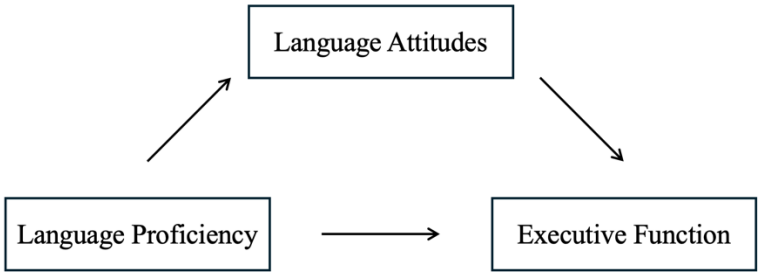


Figure 1b

Adjusted Path Model



Results

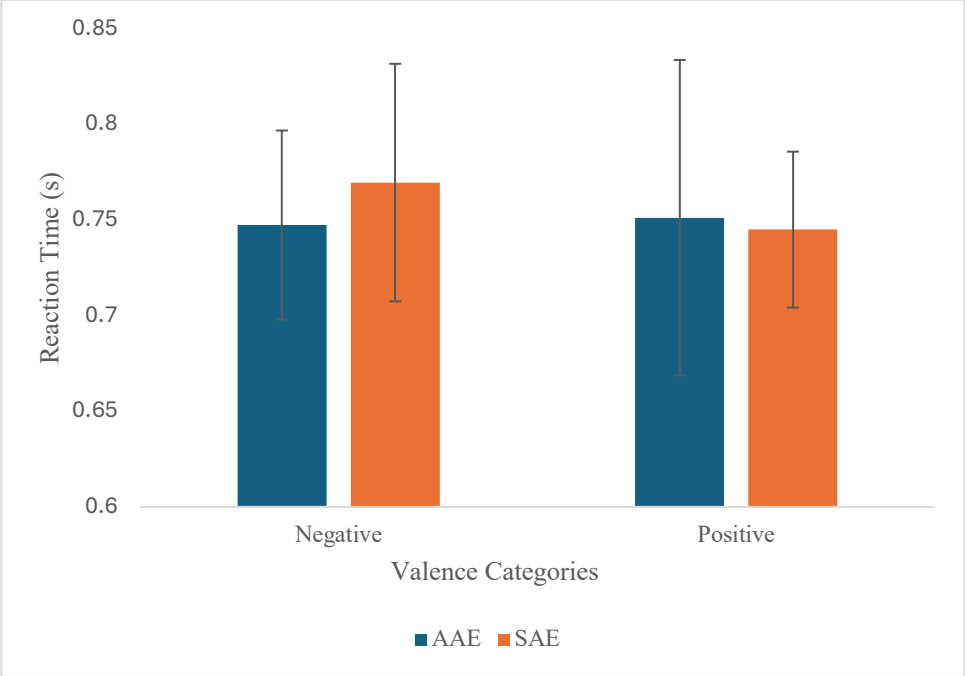
Due to a lack of sufficient data, the proposed analysis plan was not able to be completed. Instead, the following is a descriptive, and correlational analysis of the data.

Language Attitudes

Numerically, participants showed slower reactions times when pairing AAE and Positive words (average reaction time = 751ms) vs. AAE and Negative words (average reaction time = 747ms) and slower reaction times when pairing SAE and Negative words (average reaction time = 769ms) vs. SAE and Positive words (average reaction time = 745ms; see Figure 1) on the mIAT task. However, there were no significant differences within dialect [AAE/Positive vs. AAE/Negative: $t(3) = -0.8$, $p = .45$; SAE/Positive vs. SAE/Negative: $t(3) = -0.8$, $p = .46$] or within valence [AAE/Positive vs. SAE/Positive: $t(3) = -0.5$, $p = .63$; AAE/Negative vs. SAE/Negative: $t(3) = -1.25$, $p = .30$].

Figure 1

Average Reaction Times in the Critical Blocks 3 and 5 of the mIAT



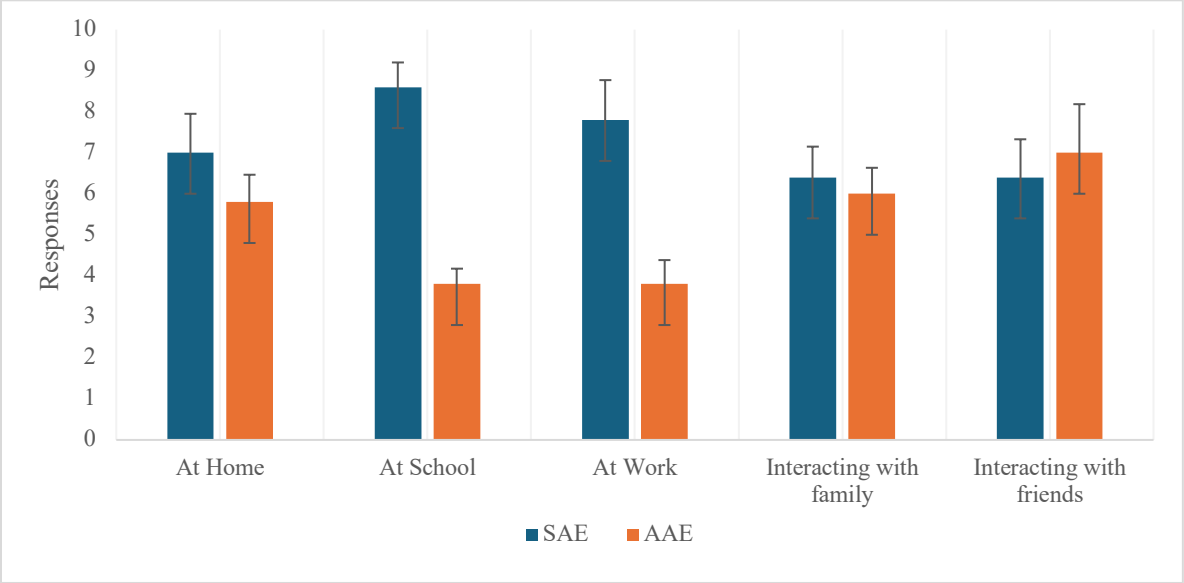
Note: Block 3 associated AAE with Negative words and SAE with Positive words. Block 5 associated SAE with Negative word, and AAE with Positive words. The left two bars display when the dialect was associated with Negative words, and the right two bars display when the dialect was associated with Positive words. Error bars = standard error of the mean.

On the DEAP-Q, the first attitude question added, asked participants to rate how likely they are to use the AAE or SAE dialect in different contexts (see Figure 2). The second attitude question added, asked participants to rate how comfortable they are using the AAE or SAE

dialect in different contexts (see Figure 3). For analysis, the six contexts were split into Professional (i.e., "At work" and "At school") and Social (i.e., "At home," "Interacting with family," and "Interacting with friends") contexts. Overall, participants reported being more likely to use and more comfortable using SAE as opposed to AAE in Professional settings, $t(3) = 6.18$, $p < .01$, but there were no differences between dialects in Social settings, $t(3) = 0.75$, $p = .50$.

Figure 2

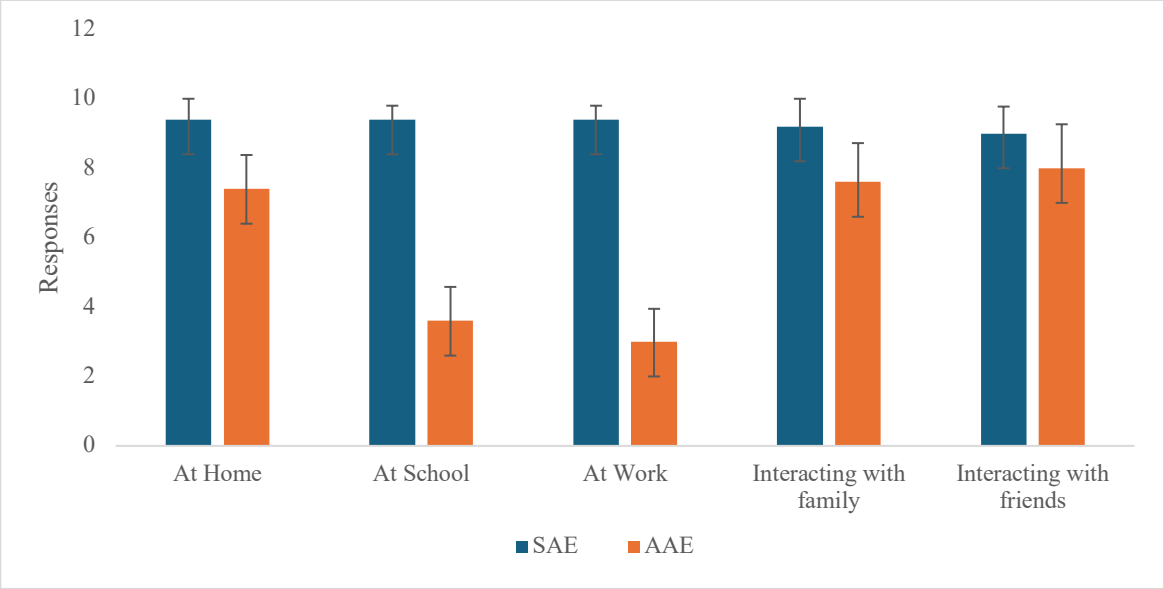
Average "Likely to Use" Ratings Across Contexts



Note. Responses were on an 11-point Likert scale from 0 (Never likely to use) to 10 (Always likely to use). Error bars = standard error of the mean.

Figure 3

Average "Comfort to Use" Ratings Across Contexts



Note. Responses were on an 11-point Likert scale from 0 (Not comfortable) to 10 (Highly comfortable). Error bars = standard error of the mean.

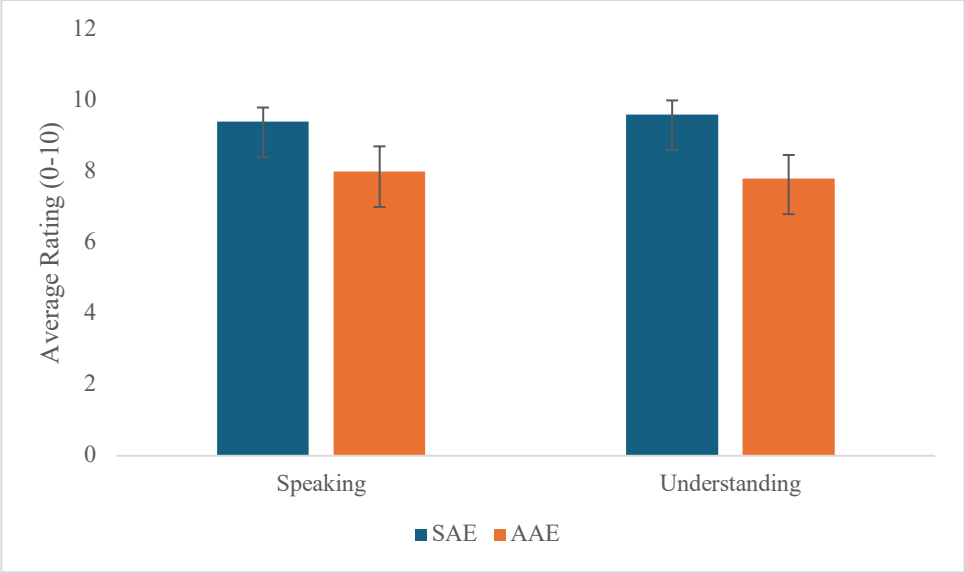
Across these two measures, one can characterize the mIAT as describing implicit language attitudes, and the DEAP-Q as describing explicit language attitudes. For all analyses with the mIAT, a difference score was taken between average reaction time to pair AAE and Positive words subtracted by the average reaction time to pair AAE and Negative words. As the outcome variable for the DEAP-Q attitude questions, average self-reported rating of likelihood and comfort to use AAE, collapsed across contexts and questions, was used. While a correlation analysis between these variables showed a moderately-sized and in the expected direction r of -.48, given the small sample size the correlation was not significant, $r(3) = -.48$, $p = .40$.

Language Proficiency

On the DEAP-Q, participants self-reported a higher proficiency in SAE over AAE in both speaking (SAE: M = 9.4; AAE: M= 8.0; $t(3) = 3.6$, $p = .03$) and understanding (SAE: M = 9.6; AAE: M= 7.8; $t(3) = 9.0$, $p < .01$; see Figure 4).

Figure 4

Average Self-Reported Language Proficiency: Speaking and Understanding

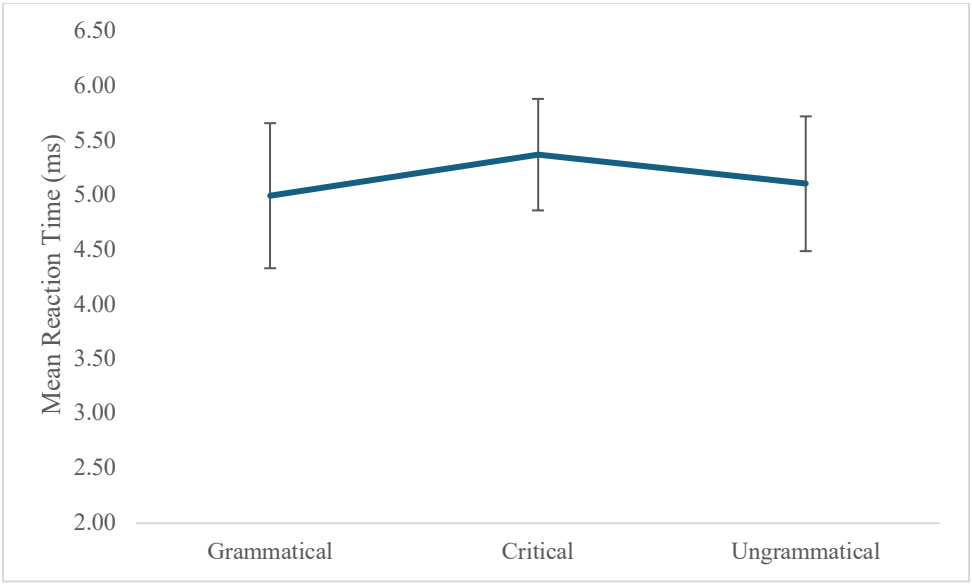


Note. Responses were on an 11-point Likert scale from 0-10. Error bars = standard error of the mean.

Average reaction times on the Sentence Comprehension task are displayed in Figure 5. Participants showed no mean difference between the Ungrammatical vs. Grammatical conditions [average reaction times: Ungrammatical = 5110ms, Grammatical = 5000ms; $t(3) = -0.13$, $p = .90$]. Participants also showed no difference between the Critical (average reaction time: 5380ms) and Grammatical conditions, $t(3) = -0.6$, $p = .56$, or the Critical and Ungrammatical condition, $t(3) = -0.47$, $p = .67$.

Figure 5

Average Reaction Time Across Conditions on the Sentence Comprehension Test

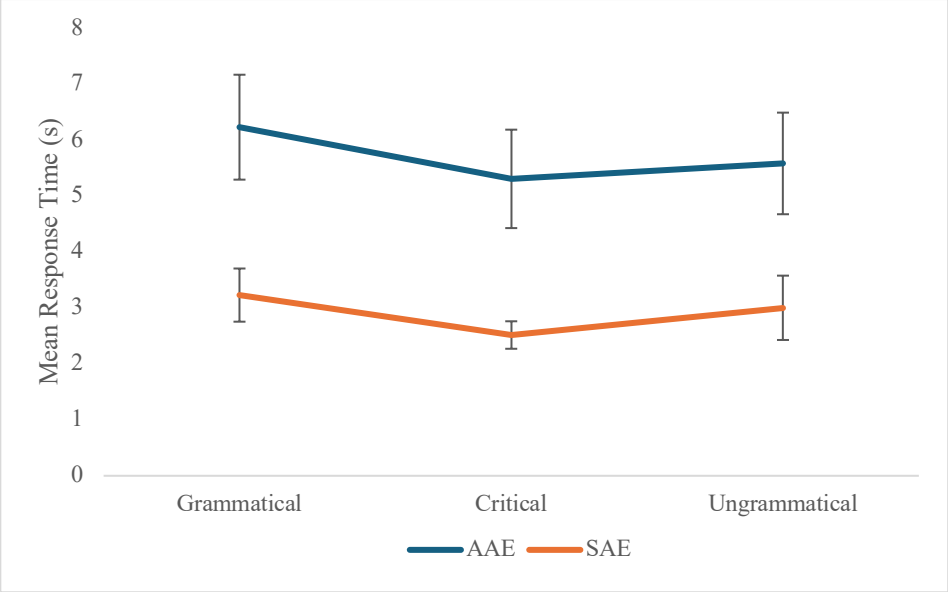


Note. Grammatical condition is grammatical in both dialects. Critical condition is only grammatical in AAE. Ungrammatical condition is ungrammatical in both dialects. Error bars = standard error of the mean.

To evaluate AAE proficiency with the Sentence Usage Task, sentence reading times within both the AAE and SAE blocks were examined. Within both blocks, mean reading times across the three conditions were not significant (AAE Context Block: Grammatical = 6233ms; Critical = 5309ms; Ungrammatical = 5585ms; SAE Context Block: Grammatical = 3231ms; Critical = 2517ms; Ungrammatical = 3003ms; all *p*s > .05; see Figure 6). Between blocks, and collapsing across condition, participants overall responded slower in the AAE Context block (average reaction time = 5745ms) vs. the SAE Context block (average reaction time = 2978ms; $t(3) = 4.37$, $p < .01$).

Figure 6

Sentence Usage Task Mean Reaction Times Separated by Condition and Context



Note. Grammatical condition is grammatical in both dialects. Critical condition is only grammatical in AAE. Ungrammatical condition is ungrammatical in both dialects. Error bars = standard error of the mean.

Across these language proficiency measures, the Sentence Comprehension Task and the Sentence Usage Task can be characterized as describing implicitly measured language

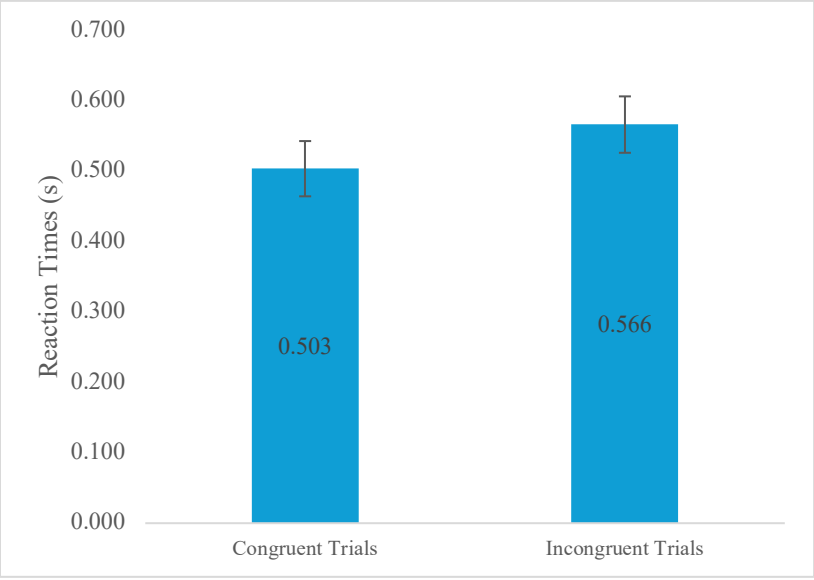
proficiency, via sentence reading times, and the DEAP-Q can be characterized as describing explicit language proficiency. Given that there were no condition differences on either sentence task, as the outcome variable for both measures, average sentence reading time on just the Critical condition was elected to be used. However, due to low accuracy in the Critical condition in both blocks of the Sentence Usage Task, data from this task was not used in subsequent analyses. When correlating the outcome variables from the DEAP-Q and the Sentence Comprehension task, a moderately-sized and in the expected direction r of -.28 was found, but, again given the small sample size, there was not found to be a statistically significant correlation between the implicit and explicit language proficiency measures, $r(3) = -0.28$, $p = .64$.

Executive Functioning

Across participants, the average difference between reaction times on the Congruent and Incongruent trials was 63ms, with the Incongruent trials showing longer reaction times (average reaction time = 566ms) than the Congruent trials (average reaction time = 503ms; $t(3) = -3.5$, $p < .05$; see Figure 7).

Figure 7

Average Reaction Time on the Spatial Stroop By Condition



Note. Spatial Stroop effect is the difference of response time between Incongruent and Congruent trials, for correct trials only. Error bars = standard error of the mean.

Correlations

To examine interrelations between the constructs of interest, five outcomes variables were computed: (1) Average reaction time to pair AAE and Positive words - Average reaction time to pair AAE and Negative words (on the mIAT; Implicit Attitudes), (2) Average self-reported rating of likelihood and comfort to use AAE, collapsed across contexts and questions (on the DEAP-Q; Explicit Attitudes); (3) Average sentence reading time for the Critical condition (on the Sentence Comprehension Task; Implicit Proficiency), (4) Average self-reported proficiency in AAE, collapsed across speaking and understanding (on the DEAP-Q; Explicit Proficiency); and (5) Average reaction on Incongruent trials - Average reaction time on Congruent trials (on the Spatial Stroop task; Spatial Stroop Effect).

As a proxy for the proposed path analysis, bivariate correlations among the outcome variables were examined, specifically, the relation between language proficiency and executive functioning, the relation between language proficiency and language attitudes, and the relation between language attitudes and executive functioning were examined. All correlations were not significant, *ps* > .05, but many were in the expected direction (to be discussed subsequently; see Tables 3-5).

Table 3

Language Proficiency and Executive Functioning

	Executive Functioning
Language Proficiency - Implicit	$r(3) = -.10,\ p = .87$
Language Proficiency - Explicit	$r(3) = .11,\ p = .85$

Note. Implicit Language Proficiency is the response time of the Critical Condition on the Sentence Comprehension Task. Explicit Language Proficiency is the mean of self-reported AAE speaking and understanding proficiency on the DEAP-Q. Executive functioning is the difference of repones times between the incongruent and congruent trials on the Spatial Stroop Task.

Table 4

Language Attitudes and Language Proficiency

	Language Proficiency - Implicit	*Language Proficiency - Explicit*
Language Attitudes - Implicit	$r(3) = -.18,\ p = .77$	$r(3) = -.66, p = .22$
Language Attitudes - Explicit	$r(3) = .43, p = .47$	$r(3) = .71, p = .18$

Note. Implicit Language Attitudes is the response time difference between AAE and Positive words and AAE and Negative words on the mIAT. Explicit Language Attitudes is the mean self-reported rating of likelihood and comfort to use AAE across contexts from the DEAP-Q. Implicit Language Proficiency is the response time of the Critical Condition on the Sentence Comprehension Task. Explicit Language Proficiency is the mean of self-reported AAE speaking and understanding proficiency on the DEAP-Q.

Table 5

Language Attitudes and Executive Functioning

	Executive Functioning
Language Attitudes - Implicit	$r(3) = -.66,\ p = .22$
Language Attitudes - Explicit	$r(3) = -.11,\ p = .86$

Note: Implicit Language Attitudes is the response time difference between AAE and Positive words and AAE and Negative words on the mIAT. Explicit Language Attitude is the mean self-reported rating of likelihood and comfort to use AAE across contexts from the DEAP-Q. Executive functioning is the difference of repones times between the incongruent and congruent trials on the Spatial Stroop Task.

Discussion

The present study considered the relation between language attitudes, language proficiency, and executive functioning skills in bidialectal speakers of Standard American English (SAE) and African American English (AAE). In all, there was not enough power to run the initially proposed path analysis, however descriptive and correlational analyses begin to provide key insights on bidialectalism and its cognitive implications, while also highlighting areas for further investigation.

First, while the relations were not statistically significant, the within construct correlations showed moderately-sized, and importantly, expected directionality for both language attitudes and language proficiency. The correlation coefficient for the two attitude measures was negative (r = -.48), given that higher values on the mIAT were associated with more negative (implicit) attitudes towards AAE and higher values on the DEAP-Q were associated with more positive (explicit) attitudes towards AAE, the negative correlation suggests that positive implicit

attitudes were associated with positive explicit attitudes. The correlation coefficient for the two proficiency measures was also negative ($r = -.28$). Given that higher values on the Sentence Comprehension Task were associated with lower AAE proficiency and higher values on the DEAP-Q were associated with higher AAE proficiency, the negative correlation suggests higher self-reported AAE proficiency corresponds to higher AAE proficiency as reflected by sentence reading times for AAE-based sentences.

Language Proficiency and Executive Functioning

When examining the correlations between measures of AAE proficiency and measures of executive functioning, not only were the correlations not significant but they were also numerically very small. This suggests that there is likely not a relation between these two constructs, at least in the ways measures in this study. This interpretation is in line with previous work suggesting that bidialectalism does not impact executive functioning (e.g., Ross & Mellinger, 2017; Wu et al., 2016). However, they are inconsistent with the proposed argument that the cognitive demands, and thus the cognitive consequences of bidialectalism are similar to those of bilingualism (Goodman & Buck, 1973).

While the effects of bidialectalism don't appear to impact individual differences in executive functioning, the pattern of results in the current study do support the notion that there are greater cognitive demands when switching between dialects (e.g., Franklin & Hixon, 1999). On the Sentence Usage Task, individuals had a harder time responding to every condition in the AAE Context Block. On this block, participants were asked to essentially switch from an SAE mindset, which is what the task instructions were written in and the dialect that is most prominently used in the academic context in which the study took place, to their other dialect (AAE). This increase in response time for the AAE Context Block behaviorally shows evidence

for a "switching cost," similar to the switch costs that have been shown for bilinguals when switching between their two languages (e.g., Vorwerg et al., 2019).

Language Proficiency and Language Attitudes

When looking at the correlations between measures of AAE attitudes and measures of AAE proficiency, although the correlations were not significant, most were moderate to large and in the expected direction. These included the correlations between, implicit attitudes (mIAT) and explicit proficiency (DEAP-Q), explicit attitudes (DEAP-Q) and implicit proficiency (SCT), and explicit attitudes (DEAP-Q) and explicit proficiency (DEAP-Q). Ultimately, the direction of these correlations suggest that the more positive participants were about AAE, the higher their AAE proficiency was. These conclusions are in line with previous work reviewed, where negative external attitudes impact academic outcomes (e.g., Godley & Escher, 2012; Labov, 1995; Vellemen & Pearson, 2010). However, this previous work focused exclusively on the impact of external attitudes, thus these results extend this line of work to show similar patterns of relations with internal (self) attitudes

Language Attitudes and Executive Functioning

Although there was a large correlation observed between implicit attitudes (mIAT) and executive functioning, it was observed in the opposite direction as what was predicted. That is, it was predicted that more positive attitudes would be associated with higher executive functioning skills. However, instead the directionality of the correlation suggests that more positive attitudes towards AAE were related to lower executive functioning skills.

Previous work has found that bidialectal speakers of AAE report feeling as though they have to constantly monitor their speech and use of AAE due to knowledge of the negatively stigmatization of AAE (Holliday & Scquires, 2021). It is possible that the more positive an individual is about AAE, the less likely they are to engage in this monitoring while they speak.

Given that monitoring is known to rely on executive functions, this would mean that more positive attitudes may actually reduce the load on executive functions during language use. While more work is necessary to confirm these relations, this line of thought may explain the pattern of results observed in the current study.

Limitations

Several limitations of this study warrant consideration. The sample population in the current study consisted exclusively of Emory University students who identified as more SAE-dominant. This dominance was not only reflected in self-reported measures but also behaviorally on the sentence tasks. For example, on the Sentence Usage Task, participants showed consistently higher sentence reading times and lower accuracy on the AAE Context Block. This dialectal homogeneity may have influenced the pattern of results. Vorwerg et al., (2019) tested only individuals highly proficient in both dialects and found evidence of similar cognitive processing between bidialectal and bilingual participants. Therefore, it might be that the higher and more balanced the proficiency one has in their dialects (or languages) the more likely it is to see cognitive consequences of that linguistic experience.

Another limitation of the experimental design that may have impacted the behavioral measures of language proficiency, specifically, was in the presentation method and manipulation of the sentences chosen for the Sentence Comprehension and Sentence Usage tasks. AAE is predominantly a spoken dialect, and participants may have encountered challenges with the written form of AAE used in the study. Furthermore, simply altering verb morphology may not have sufficiently discriminated between conditions. Introducing a higher variety of sentence transformations with lexical and semantic changes that align with SAE vs. AAE dialectal rules could enhance future studies abilities to accurately measure dialect proficiency. For the Sentence Comprehension Task, in particular, the structure of the “True/False” statement could have also

influenced participants' performance. That is, the comprehension probes primarily focused on identifying subject or object-related information, potentially diverting participants' attention away from the morphosyntactic accuracy of the sentence. Altering the design of the comprehension probes in future work may encourage participants to evaluate the morphosyntactic features more explicitly relevant to each dialect. Most importantly, the sample size in the present study poses a significant limitation. The lack of sufficient data limited our ability to run the planned analyses to more directly test the study questions and the associated lower statistical power limited our ability to detect meaningful relations even among the analyses that were able to be conducted. Future research should aim to not only increase the overall sample size, but also consider the communities in which participants are recruited to obtain a sample that better represents a greater spectrum of bidialectalism.

Implications & Conclusion

In the current study, both explicit and implicit attitudes towards AAE were found to be numerically associated with self-reported measures of AAE proficiency, such that more positive attitudes were related to higher proficiency. This finding extends previous work suggesting that external (teacher and peer) attitudes about AAE are related to academic outcomes (Kraemer et al., 2000; Terrell & Terrell, 1993). Taken together, these finding highlight the need for educators to address and actively mitigate biases that may disadvantage bidialectal students. Implicit bias held by teachers and others can influence educational practices, the design of standardized tests, and student confidence, contributing to systemic differences in educational outcomes. Leveraging language intervention strategies tailored for bilingual learners and enhancing teachers' awareness of bidialectal speech could foster more inclusive classrooms conducive to bidialectal students' cognitive development (Kraemer, 2000; Kirk et al., 2019; Lundquist &

Vangsnes, 2018; Vorwerg et al., 2019). Embracing linguistic diversity in education is not only an act of inclusion but also a strategic imperative for promoting equitable learning outcomes. As bidialectalism becomes increasingly prevalent in diverse sociocultural contexts, having a more inclusive working and learning environment would bridge the gap between implicit and explicit language attitudes and outcomes, and ultimately contribute to a more equitable educational and professional landscape (Hall, 1997; Godley, 2012; Franklin, 1999).

References

Alrwaita, N., Meteyard, L., Houston-Price, C., & Pliatsikas, C. (2022). Is there an effect of diglossia on executive functions? An investigation among adult diglossic speakers of Arabic. *Languages*, *7*(4), 312.

Bialystok, E., Craik, F.I. (2022). How does bilingualism modify cognitive function? Attention to the mechanism. *Psychon Bull Rev* 29, 1246–1269 https://doi.org/10.3758/s13423-022-02057-5

Charity, A. H., Scarborough, H. S., & Griffin, D. M. (2004). Familiarity with school English in African American children and its relation to early reading achievement. *Child Development, 75*(5), 1340–1356. https://doi.org/10.1111/j.1467-8624.2004.00744.x

Chrysochoou, E., Vivas, A. B., Cana, L., & Demetriou, A. (2022). The bilingual effect on cognitive development: Not an executive function advantage, but a differentiation of mental abilities. *Journal of Cognitive Psychology*, *34*(4), 470–484. https://doi-org.proxy.library.emory.edu/10.1080/20445911.2021.2002875

De Bruin, A. (2019). Not all bilinguals are the same: A call for more detailed assessments and descriptions of bilingual experiences. *Behavioral Sciences*, *9*(3), 33.

Degirmenci, M. G., Grossmann, J. A., Meyer, P., & Teichmann, B. (2022). The role of bilingualism in executive functions in healthy older adults: A systematic review. International Journal of Bilingualism, 26(4), 426-449. https://doi.org/10.1177/13670069211051291

Diamond, A. (2013). Executive functions. *Annual review of psychology*, *64*, 135-168. https://doi.org/10.1146/annurev-psych-113011-143750

Dietrich, S., & Hernandez, E., (2022, December). Languages We Speak in United States. U.S. Census Bureau. https://www.census.gov/library/stories/2022/12/languages-we-speak-in-united-states.html

Dyvik, E.H. (2023, September 26). The most linguistically diverse countries worldwide 2021, by number of languages. Retrieved from https://www.weforum.org

Festman, J., Rodriguez-Fornells, A., & Münte, T. F. (2010). Individual differences in control of language interference in late bilinguals are mainly related to general executive abilities. *Behavioral and Brain Functions*, *6*, 1-12.

Franklin, G., & Hixon, M. W. (1999). Your dialect could place you on the wrong side of the intelligence bell curve. *Negro Educational Review*, *50*(3–4), 89–100.

Gándara, P., & Escamilla, K. (2017). Bilingual education in the United States. *Bilingual and Multilingual Education*, *12*(1), 439-452.

Godley, A., & Escher, A. (2012). Bidialectal African American adolescents' beliefs about spoken language expectations in English classrooms. *Journal of Adolescent & Adult Literacy, 55*(8), 704–713. https://doi.org/10.1002/JAAL.00085

Goodman, K. S., & Buck, C. (1973). Dialect Barriers to Reading Comprehension Revisited. *The Reading Teacher*, *27*(1), 6–12. http://www.jstor.org/stable/20193381

Greenwald, T., Banaji, M., & Nosek, B. (1998). Project implicit. Retrieved from https://www.projectimplicit.net/

Hall, P. A. (1997). The Ebonics debate: Are we speaking the same language? *Black Scholar, 27*(2), 12.

Holliday, N. R., & Squires, L. (2021). Sociolinguistic labor, linguistic climate, and race(ism) on campus: Black college students' experiences with language at predominantly white institutions. *Journal of Sociolinguistics, 25*(3), 418–437.

Johnson, L. (2012). *The impact of dialect use, executive functioning, and metalinguistic awareness on dialect awareness*. The Florida State University.

King, S. (2020). From African American vernacular English to African American language: Rethinking the study of race and language in African Americans' Speech. *Annual Review of Linguistics*, *6*, 285-300.

Kirk, N. W., Declerck, M., Kemp, R. J., & Kempe, V. (2022). Language control in regional dialect speakers–monolingual by name, bilingual by nature?. *Bilingualism: Language and Cognition*, *25*(3), 511-520.

Kraemer, R. J., Rivers, K. O., & Ratusnik, D. L. (2000). Sociolinguistic perceptions of African-American English. *Negro Educational Review*, *51*(3/4), 139-148.

Labov, W. (1968). A Study of the Non-Standard English of Negro and Puerto Rican Speakers in New York City. Volume II: The Use of Language in the Speech Community.

Labov, W. (1995). Can reading failure be reversed? A linguistic approach to the question. In V. Gadsden & D. Wagner (Eds.), *Literacy Among African-American Youth* (pp. 39–68). Cresskill, NJ: Hampton Press.

Lundquist, B., & Vangsnes, Ø. A. (2018). Language separation in bidialectal speakers: Evidence from eye tracking. *Frontiers in Psychology*, 9, 369862.

Luu, C. (2020, February 12). *Black English Matters.* JSTOR Daily. https://daily.jstor.org/black-english-matters/

Mas-Herrero, E., Adrover-Roig, D., Ruz, M., de Diego-Balaguer, R. (2021) Do bilinguals outperform monolinguals in switching tasks? Contrary evidence for nonlinguistic and linguistic switching tasks. *Neurobiology of Language (Cambridge, Mass.), 2*(4), 586-604. https://doi.org/10.1162/nol_a_00059

Nguyen, M. V. H., Hutchison, L. A., Norvell, G., Mead, D. L., & Winsler, A. (2023). Degree of bilingualism and executive function in early childhood. *Language and Cognition*, 1–23. doi:10.1017/langcog.2023.46

Marian, V., Blumenfeld, H. K., & Kaushanskaya, M. (2020). The LEAP-Q language experience and

proficiency questionnaire: Ten years later. *Bilingualism: Language and Cognition, 23*(5), 945-950

Ross, J., & Melinger, A. (2017). Bilingual advantage, bidialectal advantage or neither? Comparing performance across three tests of executive function in middle childhood. *Developmental Science*, 20(4), e12405.

Wu, Y. J., Zhang, H., & Guo, T. (2016). Does speaking two dialects in daily life affect executive functions? An event-related potential study. *PloS one*, *11*(3), e0150492.

Tao, L., Taft, M., & Gollan, T. H. (2015). The Bilingual Switching Advantage: Sometimes Related to Bilingual Proficiency, Sometimes Not. *Journal of the International Neuropsychological Society*, *21*(7), 531–544. doi:10.1017/S1355617715000521

Terrell, S. L., & Terrell, F. (1993). African American cultures. In D. E. Battle (Ed.), *Communications Disorders in Multicultural Populations* (pp. 3-37). Stoneham, MA: Butterworth-Heinemann.

Velleman, S. L., & Pearson, B. Z. (2010). Differentiating speech sound disorders from phonological dialect differences: Implications for assessment and intervention. *Topics in Language Disorders*, *30*(3), 176–188. https://doi.org/10.1097/TLD.0b013e3181efc378

Vorwerg, C. C., Suntharam, S., & Morand, M. A. (2019). Language control and lexical access in diglossic speech production: Evidence from variety switching in speakers of Swiss German. *Journal of Memory and Language*, *107*, 40-53

Yamasaki, B. L., Stocco, A., & Prat, C. S. (2018). Relating individual differences in bilingual language experiences to executive attention. Language, Cognition, and Neuroscience, 33(9), 1128-1151. https://doi.org/10.1080/23273798.2018.1448092