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Research Article

# Distance and Interference in the Reference Management of African American Adults

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**Purpose:** The purpose of this study was to examine the effect of distance and interference on the adequacy of reference management in 2 contrasting narrative conditions among age-defined groups of healthy African American adults.
**Methods:** Twenty middle-aged (*M* = 51 years) and 20 older (*M* = 72 years) women produced a complex story retelling and a personal narrative of a childhood experience. All narratives were transcribed orthographically, parsed into terminal units (T-units), and analyzed for surface structure markings of referents.
**Results:** Results varied on the basis of task complexity and specific dependent variables. Older adults produced shorter T-unit distances between nouns and pronouns in story retelling compared with middle-aged adults. Middle-aged adults, but not older adults, exhibited longer T-unit distances between referents on story retelling than on personal narratives. Both groups performed similarly in the management of intervening information between referents. The presence of African American English features was related to interference but not to referential distance.
**Conclusions:** Older adults demonstrated an effective age-related strategy for simplifying complex story retelling by producing shorter T-unit distances and, thus, less intervening information between referents. These findings suggest that referential distance may be a more important factor in mediating story recall. (For a summary and guidelines for therapy, see Bunce, 1991.)

A crucial aspect of discourse is the process of referring. Efficient discourse production depends on the speaker's ability to indicate who or what they are talking about by using referential expressions to identify a particular entity in the world (Arnold, 2008). The processes and functions of referring in discourse are an ecologically valid reflection of the cognitive–linguistic abilities of normally aging adults as well as those with pathology (Cannito, Hyashi, & Ulatowska, 1988). However, the role of referencing in discourse production has not been systematically examined for healthy aging African American adults. Information concerning the referencing abilities of African Americans, particularly those who may use the African American English (AAE) dialect, may be beneficial to speech-language pathologists (SLPs) along several potentially important clinical dimensions. For example, such information can provide a guidepost to distinguish between normal referencing and referencing that may potentially represent impairment. In addition, it may enhance the interpretation of individual client performance as well as facilitate the development of cognitive–linguistic profiles and patterns in older African Americans who may present with a diagnosis of dementia or other neurogenic disorders. Thus, the normative patterns presented here may provide a foundation for a more reliable analysis and interpretation of that information in adults who do not use Mainstream American English (MAE). As such, referring abilities provide a rich source of linguistic data for both researchers and speech-language pathologists who are interested in the language competencies of adults at the discourse level.

*Reference* is "the process of using a linguistic expression to pick out for one's addressee an individual entity… or particular set of entities" (Griffiths, 1979, p. 106). For example, to specify a particular cat, a speaker may use a variety of referential expressions such as *Fluffy, my cat, the brown and white tabby* or, simply, *he.* A speaker must use referential expressions to convey meaning so that the listener comprehends the topic of discourse (Bunce, 1991). Referential expressions are represented linguistically by three levels of identification (Almor, 2000; Caughley, 1978; Johnson, 2008; Vonk, Hustinx, & Simons, 1992). A *noun reference* (e.g., *President Barack Obama*) is the strongest and most explicit level of identification. A *pronoun reference* (e.g., *he*) is the intermediate level of identification. *Ellipsis,* or *subject*

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*deletion,* characterized by the absence of surface linguistic representation (e.g., "While I prepare the roast, Ø chop the onions"), is the weakest level of identification.

Referential expressions in AAE use forms similar to those of MAE. AAE is a systematic, rule-governed linguistic system characterized by a common core of grammatical and lexical features (Dillard, 1972; Green, 2002; Wolfram & Fasold, 1974). However, some dialectal patterns and surface structure markings of reference in AAE are uniquely different from mainstream referential expressions (Mufwene, 1992). Among these is the overuse of pronominal apposition ("Joey, he drove my car"; Rickford, 1992); the associative plural strategy for pronominal use ("Sonny and them"; Rickford, 1999); reflexive pronouns ("They had theyself a good time"; Rickford, 1999); additions ("We laughed and we sang"; Dillard, 1972; Mufwene, 1992); subject deletions (i.e., ellipses; "Ø come with me"; Mufwene, 1998); consecutivization, where one event is coupled with another by a repeat subject referent, which may be ellipted ("He went and Ø gone and Ø told my teacher I was cheatin'") or expressed ("She ran down the street and she hollerin' and she screamin' like she crazy"; Welmers, 1973); and the use of ellipses, particularly in narrative clauses beginning with "say/said" ("Ø said, Ø got me workin' hard"; Mufwene, 1992).

It is the speaker's responsibility to select appropriate referential expressions to use and when to use them as well as to ensure that each identity of a person, place, or event is unambiguous as it is introduced and tracked throughout the discourse. These decisions are based on semantic, syntactic, and pragmatic concerns as well as cognitive constraints and the ability to retrieve appropriate referential designations for entities (Almor, 2000; Arnold, 2008; Ulatowska, Hayashi, Cannito, & Fleming, 1986). Such concerns are vulnerable to aging and neurogenic pathology (Burke & Shafto, 2008). The extant literature addressing the needs of the mainstream population speaks to a ubiquitous decline of these functions in old age. For example, discourse production in older adults is characterized by difficulty with semantic retrievals (Connor, Spiro, Obler, & Albert, 2004), reductions in referential specificity (MacKay, Connor, Albert, & Obler, 2002), reductions in syntactic complexity (Kemper, 1992), frequent off-topic verbosity (Arbuckle & Gold, 1993), and renderings of extraneous and inappropriate information (Glosser & Deser, 1992). The selection and retrieval of different referential forms provide a window into understanding these cognitive processes. Although no data currently exist on the aging African American speaker or the interaction of AAE with the cognitive processes important for referential communication, it is reasonable to assume that referential processing and production are vulnerable to cognitive aging regardless of race or ethnicity. Therefore, SLPs must be skilled in differentiating the normal characteristics of referencing in discourse from impairment.

The type of discourse influences the selection of referential expressions. The present study is concerned with the *narrative* form of discourse production, or *storytelling,* which encompasses the ways in which speakers link the components of language to build relationships between agents (i.e., subjects), objects, events, and experiences (Bliss & McCabe, 2008). The narrative is a valid and less biased framework in which to evaluate the use of reference in African American adults, primarily because it has the advantage of allowing the speaker to use language in a natural and unrestrained way (Heath, 1986). Narratives inherently reflect the heavy demands of multiple cognitive processes, including memory search and retrieval, encoding and decoding, attentional and inhibitory abilities, automatic processing, and executive functioning (Wright, Capilouto, Srinivasan, & Fergadiotis, 2011). Therefore, narratives should be of particular importance to SLPs when assessing the cognitive–linguistic needs of African American adults, not only because they draw on the ethnic and sociocultural conventions that are implicit in effective communication (Heath, 1986) but also because they can reliably distinguish between those adults with and without language impairment (e.g., Ulatowska et al., 1986).

### *Distance and Interference*

Distance and interference between an initial reference to an entity (antecedent) and its subsequent referring expression (anaphora) guide referential use (Clancy, 1980; Givón, 1983). *Distance* has been defined in the literature as the span between the antecedent and its anaphora (e.g., Clancy, 1980; Clark & Sengul, 1979). *Anaphora* refers back to an entity that has been previously evoked in the narrative (Dell, McKoon, & Ratcliff, 1983). Distance is illustrated in the following narrative excerpt. Note that all examples were extracted from the study transcripts.

> [1]Bob stood there in front of the doorway, smoking his cigar. [2]He was waiting for his buddy (intervening character 1) to appear. [3]A police officer (intervening character 2) came. [4]He walked over. [5]He chatted briefly with him. [6]Bob told the officer about the guy that he was waiting for. [7]He finally appeared.

The antecedent (*Bob*) is introduced in explicit nominal form. The distance between its pronoun anaphora (*his, he*) and the previous mention is short expressions with limited distance (Item 1, intrasentential; Item 2, intersentential). *Bob* is then reinstated in nominal form at a distance (Item 6) from its original nominal introduction.

*Interference* has been defined as the number of competitors for the role of antecedent (e.g., Clancy, 1980; Givón, 1983). In the foregoing excerpt, the antecedent (*Bob*) is introduced and restated using a nominal expression between the intervention of two story characters (*buddy, police officer*). Subsequent referrals of the antecedent may be ambiguous because they can refer back to any of the characters in the narrative (consider Items 4 and 5).

According to Givón (1983), the shorter the distance between a referent and its subsequent anaphora, the more likely the speaker will use an attenuated referential expression (i.e., a general noun expression, pronoun, or

ellipsis). However, as textual distance increases, the referent becomes susceptible to deterioration in the shared consciousness of both speaker and listener. In this case, the speaker must reinstate the referent using a more explicit referential expression. The referent is also vulnerable to deterioration if intervening information is introduced into the narrative segment or if the conceptual representation of the entity is compromised (Almor, 2000). The result may lead to the use of less specific referential forms (Ariel, 1990). Moreover, as the speaker progresses through the narrative, an inappropriate nonreferent may be mistakenly used (Donnellan, 1966; Givón, 1983). Two examples, adapted from Endley (2010), are as follows:

1. "There appeared a man wearing a raincoat standing in the shadow." (nonreferential)
2. "A man appeared wearing a raincoat standing in the shadow." (referential)

In Example 1, *there* is in subject position functioning as a placeholder for a referent, even though it does not refer to anything, and *a man* appears in postverbal position. In Example 2, *a man* is clearly referential. Thus, the interfering referent may lead to the suppression of the entity or may become confused with the entity, leading to ambiguity (Endley, 2010; Gernsbacher, 1990).

SLPs should be mindful that AAE may influence the cognitive constraints of distance and interference in discourse. AAE referential forms are predominantly used at short distances and with no intervening information—for example, "My grandmother, she loved me. She took care of me. She didn't have nobody else with her. She died when I was about four or five." Pronouns and ellipses are commonly used in short referential chains (Johnson, 2008; Welmers, 1973)—for example, "My daddy believed in showing me the better things of life. Ø showed me the fun things of life, Ø took me to the circus, Ø took me to the zoo, Ø showed me a good time." Thus, distance and interference can ultimately determine the form the referent will take on the basis of the speaker's cognitive constraints and the needs of the discourse segment. Interference plays the strongest role in the selection of explicit referring expressions (Clancy, 1980). However, for the purposes of assessment, distance appears to be the most reliable measurement for the selection of referential forms (Givón, 1983; Millogo, 2005).

### *Reference and Aging*

Older adults are capable of dealing with a limited number of explicit and inexplicit referents at a time (Ulatowska et al., 1986). This limitation plays a role in determining referential designations for entities. Establishing and tracking referents require knowledge of the preceding discourse, which is stored in working memory; the processing of current information, which places even greater demands on working memory capacity; prior knowledge of referents stored in long-term memory; and retrieval of appropriate lexical representations for referents (see Chafe, 1976). Referring deficits may be attributed to age-related limitations in working memory and retrieval from long-term memory (Ulatowska et al., 1986). These retrieval failures may result in narrative productions with less specificity. Moreover, the processing of distance and interference may hinder the successful management of references by competing for the already limited cognitive resources of older adults (Burke & Shafto, 2008). Therefore, observing the referencing abilities of older adults illustrates, often dramatically, how a decline in cognitive functioning as a consequence of normal aging interacts with an essentially intact linguistic system (Cannito et al., 1988).

African Americans represent a rapidly growing segment of the older adult population (Administration on Aging, 2010). Besides their vulnerability to major system dysfunction—usually hypertension, diabetes, and cardiovascular disease—resulting in greater disability and morbidity (Manton, Patrick, & Johnson, 1994), African Americans are vulnerable to various socioenvironmental insults such as fewer available medical, social, and psychological coping resources that may affect cognitive–linguistic abilities (Jackson et al., 2011). Those habitually exposed to these conditions may exhibit a more precipitous cognitive deterioration compared with the majority population (Erving, 2011; Lee et al., 2012). For this reason, normally aging African Americans present a unique opportunity to understand the influences of these health concerns on the cognitive–linguistic system.

There are several motivations for studying the referencing abilities of African American adults. Relatively little research has been conducted on the language concerns of this population. In addition, studies of this nature may be used to identify ethnic features in communicative style, which can be used as a normative baseline against which to distinguish language impairment. Referencing can vary by culture, dialect, style, context, and educational attainment. How entities are introduced and tracked in narratives depends on the storyteller and the linguistic expressions that he or she selects to accomplish this task. Stylistic differences in discourse, linguistic differences, and surface structure differences used in marking references within the narrative framework—along with a heightened vulnerability to health and cognitive impairments—make the study of aging African Americans an important and compelling line of research. Considering the sensitivity of referential management to cognitive disturbances and the increased vulnerability of older African Americans to a presumably precipitous cognitive decline, the need for research-informed direction seems especially critical.

Therefore, the purpose of this study was to examine the manifestations of the referential abilities of older African American adults by exploring the influence of distance and interference on the adequacy of referencing in two contrasting narrative types. The protocol in the present study may be used not only as a method of analysis, which included some of the basic analyses from prior studies (e.g., Cannito et al., 1988; Ulatowska et al., 1986), but also as a clinical framework for providing information about the nature of

referencing and its relationship to language competence, performance, and various aspects of memory. Four questions guided the current investigation:

1. Is there an age-related difference in the use of three forms of referring expressions (i.e., noun, pronoun, and ellipsis) in two contrasting types of narrative tasks (i.e., story retelling, personal narrative)?
2. Is there an age-related difference in the amount of distance observed between two expressions of the same referent?
3. Is there an age-related difference in the amount of interference observed between two expressions of the same referent?
4. Does AAE influence the type, distance, or interference of referential expressions?

## Method

### *Participants*

Forty community-dwelling (i.e., not nursing home residents) African American women from the Washington, DC metropolitan area participated in the study. Women were chosen as the focus population for this investigation following a precedent set by Ulatowska et al. (1986) for several reasons. African American women are at higher risk than men for developing age-related chronic disease and report greater use of health services (Erving, 2011; Rosser, 2000). In addition, older African American women are more likely to report lower self-rated health and greater functional limitations, which are associated with a more precipitous cognitive decline compared with their male and mainstream counterparts (Garrett et al., 2013).

Participants were recruited through a variety of channels, including the Foster Grandparent Program of Washington, DC; churches; universities; and referrals. Participants were divided into two groups consisting of 20 middle-aged (ages 45–55 years) and 20 older (ages 65–86 years) adults. Age classification was based on baby boomer status and retirement age (Thane, 1989). All participants were native English speakers and, according to self-report, met the following inclusionary criteria: (a) no history of significant head trauma or neurologic illness, (b) no psychiatric illness or substance abuse, (c) no history of language disorder or learning disability, (d) a minimum of a high school diploma, and (e) normal cognitive functioning as indicated by performance on the Short Portable Mental Status Questionnaire (Pfeiffer, 1975). Data were collected with the approval of the institutional review board of the University of Memphis.

### *Cognitive Measurements*

The cognitive measurements selected for the study were designed to assess various aspects of memory hypothesized to mediate referencing in normal aging. These included verbal working memory, episodic memory, immediate and delayed recall, and lexical retrieval from long-term semantic memory. The Forward Digit Span and Backward Digit Span subtests from the Wechsler Adult Intelligence Scale–Revised (Wechsler, 1981) were used as estimates of short-term and verbal working memory, respectively. The Digit Span subtests are sensitive to aging and have not been found to be influenced by cultural bias (Paolo, Ryan, Ward, & Hilmer, 1996). Lexical retrieval from long-term semantic memory was assessed using the Controlled Oral Word Association Category Fluency Test (CFT; Borkowski, Benton, & Spreen, 1967). The CFT required participants to name as many items as possible belonging to the "animals" cued category. In the present study, two measurements were obtained. One measurement was the total number of items named within the fixed time of 1 min. The second measurement was the number of items obtained when participants were allowed as much time as needed to complete the task. This metric makes use of similar processes involved in the retrieval of referential information. The two story recall subtests from the Arizona Battery for Communication Disorders of Dementia (ABCD; Bayles & Tomoeda, 1993) were selected to assess short-term and delayed story recall as well as episodic memory. Both subtests have been known to be sensitive to older adults' ability to encode linguistic information (Bayles & Kaszniak, 1987).

Independent-samples *t* tests, conducted to determine if age groups differed on these measurements, indicated no significant difference on the Story Recall subtests of the Digit Span or the ABCD. However, significant age-related differences were observed in the number of categorical items generated in the CFT within the 1-min time frame. Moreover, significant age-related differences persisted even when participants were given ample time to respond. However, it is possible that the restrictive inclusion criteria limiting the age range of the two groups may have prevented the identification of differences in the cognitive measurements. Age-related differences may have emerged if a wider age range of participants had been used. The results, along with demographic information, are summarized in Table 1.

### *AAE*

The presence of AAE was derived by examining each narrative for features unique to the dialect. Only those AAE variants that were present in the narratives were included in the analyses. A list of AAE variants along with the results of the Mann–Whitney *U* test indicating differences between age groups and narrative condition is found in Table 2. A single variable called *AAE summary score,* representing dialect density, was created by counting the total frequencies of AAE variants produced in a narrative and dividing that value by the total number of words in the narrative (cf. Craig & Grogger, 2012). High scores on the AAE summary score represented high levels of AAE use, whereas low scores represented a preference for MAE use.

**Table 1.** Participant demographic and cognitive measures.

| Variable | Middle-aged adults | | Older adults | | |
|---|---|---|---|---|---|
| | *M* | *SD* | *M* | *SD* | *p* |
| Age (years) | 50.50 | 2.93 | 71.75 | 7.43 | |
| Education (years) | 15.15 | 2.37 | 13.45 | 1.96 | .02 |
| Income[a] | 5.25 | 1.74 | 3.45 | 1.76 | .00 |
| Health rating[b] | 2.05 | 0.51 | 2.00 | 0.65 | .79 |
| Digit Span Test (total) | 18.15 | 4.09 | 16.20 | 3.38 | .11 |
| Forward Digit Span | 10.55 | 2.04 | 9.30 | 2.03 | .06 |
| Backward Digit Span | 7.35 | 2.98 | 6.65 | 2.52 | .43 |
| Category Fluency Test | | | | | |
| Timed | 18.80 | 4.37 | 13.25 | 3.81 | .00 |
| Untimed | 21.55 | 6.15 | 14.70 | 5.33 | .00 |
| ABCD Immediate Recall | 14.75 | 2.15 | 13.80 | 1.96 | .15 |
| ABCD Delayed Recall | 14.50 | 2.35 | 13.55 | 2.50 | .22 |
| AAE summary score[c] | 2.00 | 0.04 | 7.00 | 0.10 | .02 |

*Note.* ABCD = Arizona Battery for Communication Disorders of Dementia; AAE = African American English.

[a]Scale ranges from 1 (*less than $10,000*) to 7 (*$50,000 and over*). [b]Scale ranges from 1 (*excellent*) to 5 (*very poor*). [c]High scores = high levels of AAE usage.

## Materials

Tasks designed to elicit referential expressions consisted of two narratives. The first narrative entailed the reproduction of a complex story titled *After Twenty Years* (Henry, 1913), modified from the original version (cf. North, Ulatowska, Macaluso-Haynes, & Bell, 1986; Ulatowska et al., 1986). The inherent complexity of this task was intended to uncover subtle age-related cognitive–linguistic changes that occur with normal aging. The second narrative was a spontaneously generated account of a personal experience (cf. Labov & Waletsky, 1997). This task provided a more realistic indication of referential use in everyday discourse. From these elicitations, an indication of the influence of distance and interference was established by obtaining the distribution of referring expressions.

## Procedures

Each participant was tested individually in a quiet room with an audio recorder (Marantz Portable Recorder, Model No. PMD430, Mahwah, NJ) optimally positioned. Narratives were recorded through a low-impedance lavalier microphone (Audio-Technica-ATR 35S, Tokyo, Japan) input into the Marantz recorder for clarity of audio reproduction. After providing informed consent and completing screening and cognitive measurements, all participants performed the two narrative tasks. The O. Henry (1913) story was prerecorded at a relatively slow speaking rate and with normal prosody using Kay Elemetrics CSL Speech Software (Model 4300B, Montvale, NJ). Participants were provided with the written text and were invited to read silently along with the audio presentation. Immediately following the audio presentation, the written text was removed. Participants were instructed to retell the story as thoroughly and as accurately as possible, as if to someone who was unacquainted with the story and its characters. In the second narrative task, participants were asked to provide an account of a personal childhood experience. They were allowed sufficient time to think of a story and to mentally organize it. When the participant was ready, he or she was prompted to begin the narrative. The mean latency period between organizing the story and the onset of narrative production was

**Table 2.** African American English (AAE) variants.

| AAE variant | Middle-aged adults | Older adults | *U* | *p* | Example |
|---|---|---|---|---|---|
| Appositives | | | | | "You know, Nathan, he went and bought me a ring." |
| Story retelling | 19.50 | 21.50 | 180.00 | .44 | |
| Personal narrative | 16.05 | 24.95 | 111.00 | .01 | |
| Subject deletion | | | | | "One evening, Ø come running, say, let's go down in the woods." |
| Story retelling | 19.73 | 21.28 | 184.50 | .59 | |
| Personal narrative | 18.33 | 22.68 | 156.50 | .11 | |
| Past tense forms | | | | | "I finish my work." |
| Story retelling | 18.60 | 22.40 | 162.00 | .17 | |
| Personal narrative | 15.90 | 25.10 | 108.00 | .00 | |
| Copula deletion | | | | | |
| Story retelling | 18.50 | 22.50 | 160.00 | .04 | "He a policeman." |
| Personal narrative | 19.00 | 22.00 | 170.00 | .08 | "You right." |
| Irregular verb uses | | | | | |
| Story retelling | 23.75 | 17.25 | 135.00 | .02 | "I had went there Monday." |
| Personal narrative | 19.23 | 21.78 | 174.50 | .34 | "I seen him before." |
| Multiple negation | | | | | |
| Story retelling | 20.50 | 20.50 | 200.00 | 1.00 | "Couldn't nobody do it." |
| Personal narrative | 18.00 | 23.00 | 150.00 | .02 | "Nobody didn't do it." |
| Consecutivization | | | | | "We was eatin', Ø drinkin', Ø dancing, Ø havin' a good ole time." |
| Story retelling | | | | | |
| Personal narrative | 18.50 | 22.50 | 160.00 | .04 | |

*Note.* The examples listed in the far right column were taken directly from participants' transcripts.

31.70 s (range = 10.39–42.61 s). Neutral prompts (e.g., "And then what happened?" or "Anything else?") were used to expand the narrative.

### *Analysis Procedures*

After the narrative samples were collected, they were prepared for examination following the procedures of discourse analysis derived from prior works of Ulatowska et al. (1986) and Cannito et al. (1988). All narratives were transcribed orthographically, were cleansed by eliminating mazes (i.e., false starts, abandoned utterances, repetitions, and fillers), and then were parsed into terminal units (T-units) using the principles outlined by Hunt (1964). The *T-unit* was defined as a main clause, all subordinate clauses, and other constructions that go with it (Hunt, 1964). The T-unit was selected as the unit of analysis because it is comparable to a discourse sentence, which is comprehensible to the average speaker and may conceptually represent the stream of language production (Geisler, 2004).

The transcripts were then analyzed for surface structure markings of referents. This included each individual entity that spoke, performed actions pertinent to the story, was the topic of a significant amount of conversation, or participated in an action or conversation (cf. Clancy, 1980). Because speakers invariably refer to themselves in pronominal forms, inclusion of speaker self-reference would inflate pronoun counts. Hence, these analyses included only third-person references (Clancy, 1980; Ulatowska et al., 1986).

The first analysis was a measure of the frequency of referential forms. This component of the analysis was derived from the frequency of noun, pronoun, and elliptical references. Following methods described by Clancy (1980), the second analysis was *temporal distance distribution,* defined as the interval that elapsed between two successive mentions of the same referent. Distance was counted in the following manner: Beginning with the noun introduction of a story character, the second noun reference for the same story character was located. The number of T-units between the initial and the second reference was counted and recorded in a table as referential distance. This procedure continued temporally for the entire narrative. Noun referents were then totaled for each T-unit distance from zero T-unit and beyond for each narrative, yielding one value. The same procedure followed for pronouns and ellipses. Consider the following narrative excerpt:

> [1]And then Jimmy came (antecedent). [2]He said it was 20 years ago now. [3]He used to come here to a restaurant. [4]But Jimmy said it's all torn down now.

*Jimmy* was introduced in T-unit 1. The next noun reference to the same entity was located in T-unit 4 and was counted as three T-units away. The initial pronoun referent (*he* denoting *Jimmy*) was located in T-unit 2. The next pronoun reference to the same entity (*he*) occurred at T-unit 3, which was counted as one T-unit away.

The third analysis was *interference,* as measured by the number of other intervening characters that occurred between two successive references to the same story character. Interference counts proceeded in a similar manner (cf. Clancy, 1980). Beginning with the initial noun reference of a story character, the second noun reference for the same character was located. The number of different story characters between the first and second references was counted and recorded as referential interference. These counts were then totaled, yielding one value. Counts progressed in the same manner for pronouns and ellipses. The following is an example:

> [1]There was a guy named Bob and the police. [2]He went up to the police. [3]He discussed with him about this restaurant. [4]He said he used to go to this restaurant about 20 years ago with his friend. [5]He was talking to the police about the good times that him and his friend used to have.

*The police* was introduced in T-unit 1 and was nominalized again in T-unit 2 with one intervening character (*he* denoting *Bob*). *The police* does not occur again until T-unit 5, with two intervening characters: *he,* referring to *Bob,* and *his friend.*

To control for story length, frequency counts were converted into derived scores by dividing the total number of each reference type (i.e., noun, pronoun, and ellipses) by the total number of T-units for each narrative condition and then multiplying by the grand mean for T-units across participants. The grand mean was derived using analysis from SPSS Version 22 (IBM, Armonk, NY). For example:

$$\text{Participant 1} = \frac{\text{Total \# of noun references}}{\text{Total \# of T-units in story retelling}} \times 40\,(\textit{Grand mean for T-units}).$$

These values were then entered into the statistical analysis. In this way, meaningful task comparisons could be made such that each participant's performance was examined against the same story length (i.e., an average of 40 T-units).

### *Reliabilities*

Transcriptions and coding of the narratives from the audio recordings were completed by the first author. To test intrarater and interrater reliability, 20% of the narratives were retranscribed from the audio recordings and recoded by the first author. Three graduate speech-language pathology students, trained in the analysis procedures but blind to the hypotheses and group assignments, transcribed and coded the same selection of narratives. The narratives used for this purpose included a random selection of four story retellings and four personal narratives from each age group, yielding a total of 16 narratives. Analysis of transcriptions included word-by-word agreements and disagreements, T-unit segmentation, frequency of AAE variants, and coding of temporal distance and interference, with separate values obtained for noun, pronoun, and elliptical references. The three student judges completed the analyses of

each narrative independently. Afterwards, the student judges met with the author to review the results. At that time, any discrepancies and procedural misunderstandings were resolved. Point-to-point agreement was calculated for each analysis by dividing the total number of agreements by the total number of agreements plus disagreements and multiplying by 100. These calculations were completed prior to discussion and reconciliation of disagreements by consulting the recordings. Intrarater reliability was 98% for both retranscription and recoding. Intertranscriber agreement for the 16 narratives was 93%. Reliability for T-unit segmentation was 95%, AAE frequency was 92%, and coding of temporal distance and interference was 94% and 92%, respectively.

### *Statistical Analysis*

Descriptive analyses along with three separate 2 × 2 × 3 mixed-model repeated measures analyses of covariance (ANCOVAs) were used in this study. Age group, the between-subjects grouping factor, had two levels (middle-aged adults, older adults). Narrative condition, a within-subject factor, had two levels (story retelling, personal narrative), and reference type, a within-subject factor, had three levels (nouns, pronouns, ellipses). The dependent variables included the frequency of responses obtained from the analyses of the two narrative conditions, which included the frequency of coreferential devices in nouns, pronouns, and ellipses; temporal distances; and interference. The determination of which covariates to use in the analyses was based on conceptual and theoretical grounds. Educational attainment was selected because of interindividual variability within groups. AAE usage was selected because it was important to determine whether its use had an influence on referential frequency, distance, and interference. Follow-up multiple comparisons were made using Tukey's least significant difference. These post hoc procedures were calculated using the adjusted means on the dependent variables. Only those comparisons that were important in responding to the research hypotheses were included in the calculations. An a priori alpha level of .05 was used for all statistical tests.

## Results

### *Frequency of Referring Expressions*

The first research question addressed the issue of whether an age-related difference exists in the use of the three forms of referential expressions. Table 3 presents the mean scores, standard deviations, and adjusted mean scores for the frequency of co-referential options. Examination of the data alone revealed that, overall, participants produced more referential expressions in story retelling than in personal narratives. Also of note was that middle-aged adults produced more referential expressions in story retelling, whereas older adults produced more referential expressions in personal narratives.

The ANCOVA demonstrated that there was no main effect of age or narrative condition and that educational attainment and AAE were not significantly related to the frequency of referential expressions. However, the analysis yielded a main effect of reference form, $F(2, 72) = 4.28$, $p < .03$, $\eta_p^2 = .11$, such that participants produced significantly more pronouns than both noun and elliptical expressions. A significant two-way interaction of age and narrative condition, $F(1, 36) = 6.66$, $p < .01$, $\eta_p^2 = .16$, and a three-way interaction of age, narrative condition, and reference form, $F(2, 72) = 6.22$, $p < .01$, $\eta_p^2 = .15$, were observed. Post hoc comparisons indicated that middle-aged adults produced significantly more pronouns than did older adults in story retelling. No other significant between-subjects effects were uncovered. Within-subject comparisons indicated that middle-aged adults produced significantly more pronouns in story retelling than in personal narratives, whereas older adults performed similarly in both conditions.

### *Effect of Temporal Distance*

The second research question addressed the presence of age-related differences in distance between two expressions of the same referent. Table 3, which displays data for T-unit distances for each reference form and narrative condition, shows that, compared with older adults, middle-aged adults produced longer T-unit distances between noun and pronoun introductions of a referent and its subsequent anaphora. However, older adults produced longer T-unit distances between an initial ellipsis and its successive expression compared with middle-aged adults.

The ANCOVA showed a nonsignificant effect of age, and neither educational attainment nor AAE usage were significantly related to distance. However, there was a main effect of reference form, $F(2, 72) = 31.21$, $p < .00$, $\eta_p^2 = .46$, in which significantly shorter T-unit distances were produced using elliptical expressions relative to noun and pronoun expressions. A two-way interaction was also observed between age and reference form, $F(2, 72) = 4.45$, $p < .02$, $\eta_p^2 = .11$. The critical result was a three-way interaction among age, narrative condition, and reference type, $F(2, 72) = 4.20$, $p = .02$, $\eta_p^2 = .10$. Pairwise comparisons indicated that middle-aged adults produced significantly longer T-unit distances between noun and pronoun references than older adults in story retelling. It is notable that middle-aged adults produced significantly longer T-unit distances between noun and pronoun references in story retelling than in personal narratives, whereas older adults performed similarly in both conditions. Both groups performed comparably in personal narratives.

### *Effect of Interference*

The third research question focused on the presence of age-related differences in the amount of interference as measured by the number of other story characters between two successive expressions of the same referent. Table 3, containing data for the amount of interference for each

**Table 3.** Means, standard deviations, and adjusted means for the frequency, distance, and interference of referential options and African American English (AAE) variants.

| | Middle-aged adults | | | Older adults | | | |
|---|---|---|---|---|---|---|---|
| | Observed | | Adjusted | Observed | | Adjusted | Total |
| Variable | *M* | *SD* | *M* | *M* | *SD* | *M* | *M* |
| Frequency of referring expressions | | | | | | | |
| Story retelling | | | | | | | |
| Nouns | 26.60 | 12.08 | 25.49 | 14.60 | 6.92 | 15.72 | 20.60 |
| Pronouns | 54.35 | 20.30 | 54.31 | 34.05 | 20.96 | 34.09 | 44.20 |
| Ellipses | 3.60 | 2.82 | 3.26 | 3.00 | 2.34 | 3.34 | 3.30 |
| Personal narrative | | | | | | | |
| Nouns | 16.10 | 6.83 | 15.98 | 18.90 | 11.48 | 19.02 | 17.50 |
| Pronouns | 29.15 | 19.03 | 29.68 | 31.20 | 21.28 | 30.67 | 30.18 |
| Ellipses | 3.25 | 2.49 | 3.71 | 3.85 | 3.12 | 3.39 | 3.55 |
| T-unit distance between referring expressions | | | | | | | |
| Story retelling | | | | | | | |
| Noun | 8.77 | 1.80 | 8.46 | 5.62 | 2.53 | 5.93 | 7.20 |
| Pronoun | 7.69 | 1.50 | 7.50 | 5.46 | 1.68 | 5.65 | 6.57 |
| Ellipses | 0.87 | 1.27 | 0.60 | 0.91 | 1.45 | 1.18 | 0.89 |
| Personal narrative | | | | | | | |
| Noun | 6.05 | 3.63 | 5.66 | 4.55 | 2.14 | 4.94 | 5.30 |
| Pronoun | 4.53 | 2.83 | 4.27 | 4.86 | 2.54 | 5.12 | 4.70 |
| Ellipses | 0.78 | 1.12 | 0.94 | 0.96 | 1.24 | 0.81 | 0.87 |
| Interference between referring expressions | | | | | | | |
| Story retelling | | | | | | | |
| Noun | 2.76 | 0.79 | 2.54 | 1.75 | 0.97 | 1.97 | 2.26 |
| Pronoun | 3.87 | 0.96 | 3.64 | 2.90 | 1.15 | 3.13 | 3.39 |
| Ellipses | 0.17 | 0.24 | 0.13 | 0.16 | 0.24 | 0.21 | 0.17 |
| Personal narrative | | | | | | | |
| Noun | 1.16 | 0.85 | 1.11 | 1.35 | 1.05 | 1.40 | 1.26 |
| Pronoun | 1.04 | 0.82 | 0.92 | 1.39 | 1.38 | 1.51 | 1.22 |
| Ellipses | 0.12 | 0.18 | 0.14 | 0.14 | 0.21 | 0.12 | 0.13 |
| Frequency of AAE variants | | | | | | | |
| Story retelling | 0.13 | 0.20 | 0.20 | 0.42 | 0.42 | 0.40 | 0.28 |
| Personal narrative | 0.14 | 0.21 | 0.20 | 0.67 | 0.63 | 0.60 | 0.41 |

reference form and narrative condition, shows that middle-aged adults produced more intervening characters in story retelling, whereas older adults produced more intervening characters in personal narratives.

The ANCOVA demonstrated that AAE was significantly related to interference, $F(1, 36) = 6.24$, $p = .02$, $\eta_p^2 = .15$, such that, overall, older adults produced more AAE variants than did middle-aged adults. AAE significantly interacted with narrative condition, $F(1, 36) = 4.74$, $p = .04$, $\eta_p^2 = .12$, where participants produced more AAE variants in personal narratives than in story retelling. A significant main effect was observed for narrative condition, $F(1, 36) = 19.62$, $p < .00$, $\eta_p^2 = .35$, wherein the story-retelling condition elicited a greater amount of interference than personal narratives, and for reference form, $F(2, 72) = 26.66$, $p < .00$, $\eta_p^2 = .43$, wherein participants produced greater interference between pronoun references compared with other referential forms. Significant two-way interactions were observed for age and narrative condition, $F(1, 36) = 4.57$, $p = .04$, $\eta_p^2 = .11$, and for narrative condition and reference form, $F(2, 72) = 18.92$, $p < .00$, $\eta_p^2 = .35$.

A significant three-way interaction was observed between age, narrative condition, and reference form, $F(2, 72) = 4.25$, $p = .02$, $\eta_p^2 = .11$. Post hoc analyses demonstrated that age groups did not differ for either between-groups or within-group comparisons in the amount of interference for noun or pronoun references. Ellipses behaved differently, exhibiting significantly lower values that did not vary across narrative conditions. The three-way interaction was likely due to the fact that the magnitude of differences between story retelling and personal narratives was markedly greater in the middle-aged group than in the older group, in that middle-aged adults produced less interference with noun and pronoun references in personal narratives compared with older adults.

### *Influence of AAE*

The final research question addressed was whether AAE influenced the type, distance, or interference of referential expressions. A 2 × 2—age group (middle-aged adults, older adults) and AAE expressions for each narrative condition (story retelling, personal narrative)—repeated measures ANCOVA with education in years as a covariate was performed. Table 3 contains means, standard deviations, and adjusted means for the proportion of AAE variants in each narrative condition. Although no main effect or interactions of AAE were observed, the results showed a main effect of

age, $F(1, 37) = 6.93$, $p = .01$, $\eta_p^2 = .16$, wherein older adults produced significantly more AAE variants than did middle-aged adults. Education also influenced the use of AAE, $F(1, 37) = 6.23$, $p = .02$, $\eta_p^2 = .14$. Participants with lower educational attainment (i.e., high school diploma) were more inclined to use the AAE dialect. However, post hoc comparisons revealed that significant educational differences existed only for story retelling, whereas no differences were observed for personal narratives.

A probe into age-related differences in specific types of variants was conducted using the Mann–Whitney *U* test (see Table 2). The results indicated that older adults produced significantly more appositives (*the policeman, he left*) and consecutivizations ("*Bob showed up, Ø stood there, Ø looked around and Ø smoked a cigarette*") in their personal narratives than did middle-aged adults.

## Discussion

The purpose of the present study was to investigate the influence of distance and interference on the adequacy of reference management in age-defined groups of healthy African American adults. Although there were no overall effects of aging for frequency of referring expressions, distance, or interference, results demonstrated three-way interactions among age groups, narrative conditions, and reference forms. The findings can be interpreted only in light of these interactions. With respect to frequencies of referring expressions, a pattern of increased pronoun use compared with noun and elliptical referential forms was observed in both age groups regardless of narrative condition. However, middle-aged adults produced significantly more pronoun expressions in story retelling than in personal narratives, whereas older adults did not differ in their referential use for the two narrative conditions. In the case of distance, older adults produced significantly shorter T-unit distances than did middle-aged adults for both noun and pronoun expressions. Middle-aged adults produced significantly longer T-unit distances in story retelling than in personal narratives for both noun and pronoun references; however, this task effect was not present for the older adults. In the case of interference, there were no significant differences between age groups for either story retelling or personal narratives. Further, both age groups produced significantly greater amounts of interference for story retelling than for personal narratives. The magnitude of difference between tasks for pronoun usage was markedly greater in middle-aged than in older adults. Elliptical references did not demonstrate any differences by age group or task for the dependent variables. Also of note was the finding that AAE usage was significantly related to interference but not to distance. Moreover, older adults produced more AAE variants than did middle-aged adults, and the majority of those variants were produced in personal narratives. The results of this study provide a preliminary normative basis for investigating age-related discourse processing among older African American adults. From these results, the management of reference appears to be a sensitive indicator of age-related changes in cognitive–linguistic ability. In the section that follows, results and potential clinical implications are explored.

### *Research Question 1: Frequency of Referring Expressions*

The first research question addressed the issue of whether an age-related difference existed in the frequency of referring expressions. The results showed that a pattern of increased pronoun use was observed in both age groups and in each narrative condition. However, the overuse of pronouns was expected because there is a natural preference for pronouns over other referential forms in normal discourse (Clancy, 1980; Millogo, 2005). With respect to AAE, the use of appositives ("My father, he . . .), additions ("We dancin' and we actin' crazy"), and consecutivization with repeat pronouns ("When he looked at him in the light, he saw that he wasn't him, said you not him") contributed to its overuse. However, it is unclear whether there is a preference for pronoun use in African American discourse with the inclusion of these forms because older adults used them more than did their middle-aged counterparts. Nevertheless, it was observed, particularly among older adults, that repeated reference to the same entity was largely pronominal, using the aforementioned AAE variants. The significant use of pronoun references, particularly in the more complex story-retelling condition, may have been triggered by attempts at avoidance of noun forms due to failures in retrieving the more explicit designations for entities. When explicit noun references were unavailable or ambiguous in working memory, the speaker defaulted to a pronoun reference. This default behavior was signaled by a pause, use of fillers, or statements such as "What's his name?" during their retellings. Another explanation is the speaker's presupposition that the listener (in this case, the examiner) knew the story, even though the participant was instructed to recount the story as if to someone who was unfamiliar with the story and its characters. As such, it appeared that many older speakers recounted most of the story as old information, thus contributing to the overuse of pronoun expressions.

The analysis found no age-related difference in noun usage. Noun expressions followed the expected patterns such that both age groups used noun expressions to introduce story characters and pronominalized those referents following their introduction. As the narration continued, both groups returned to noun expressions, although that expression was often in less explicit form (e.g., *the guy, my friend*). There were instances when a speaker introduced a character with a pronoun in subject position ("He was inspecting the shops as he went by") and then followed that introduction with a noun phrase apposition ("The policeman did"). This was observed in both groups; however, age differences emerged. Middle-aged adults followed their pronoun introduction (*he*) with an explicit noun expression (*Jimmy*), whereas older adults followed a pronoun introduction with a less explicit or general noun expression (*the man*) or a descriptive designation (*the man smoking a*

*cigarette*). Furthermore, older adults were more inclined to use general noun designations for entities (e.g., *man, person, individual*) over more explicit noun designations (e.g., *Bob, Jimmy*). Further investigation must be conducted in order to elucidate whether this linguistic behavior is characteristic of African American narrative production or is a common strategy among older adults in general.

The complexity of the story-retelling condition elicited significantly greater referential expressions than did personal narratives. This finding was perhaps due to story length and the number of references contained in the original stimulus. Participants had to distinguish between four same-gender characters, extensive dialogue, and a character with a dual identity, which required inferences to interpret. Hence, the large frequency of referential expressions elicited by the story-retelling task may have been an artifact of the original stimulus or an indication that participants had to exert greater cognitive effort to reproduce the story. The story retellings of middle-aged adults were often longer and more informative than were those of older adults. Middle-aged adults devoted more time to establishing and talking about story characters and their actions, which accounted for the increase in their frequency of referential forms. Thus, age effects were established with the complexity of narrative task.

### *Research Question 2: Distance Between Referring Expressions*

The second research question concerned the issue of whether temporal distance had an age-related effect on performance. On the basis of the results, participants in both groups appeared to adequately manage the metacognitive constraints of referential selection, as demonstrated by the use of noun referents at longer distances and the attenuated forms with short distances to their previous mention. Beyond five T-unit distances, noun referents were the predominant referential form in the data. This general pattern reflects a global effect of distance consistent with typical speakers (Almor, 2000; Clancy, 1980; Gernsbacher, 1990; Givón, 1983; Lambrecht, 1994; Millogo, 2005). The finding that older adults produced shorter T-unit distances between noun and pronoun references in the complex story-retelling condition suggests an adaptive strategy to simplify the story-retelling task to a level of the simpler and more familiar personal narrative. This is an age effect that has been documented to occur regardless of whether a story is heard or read and has been observed in both immediate and delayed story recall (Ulatowska et al., 1986; Zacks & Hasher, 1988). As older adults listened to the story and discovered its protracted length and complexity, they may have anticipated referring difficulties and formulated a strategy of circumvention by reducing T-unit distances between referents. The propensity for simplicity and economy was demonstrated by the fact that, for older adults, the distance between an antecedent and its anaphora was often short, generally intrasentential or in the previous T-unit regardless of narrative condition. The referential chain persisted as long as the referent was active and accessible and pronoun references designated the same antecedent. The most common strategy was that of pronoun chains referring to only one character at a time, using the AAE devices of addition and consecutivization. After a character was established, that character remained the focus of the narrative segment and was generally the only character in the segment (e.g., "And then Jimmy came. He said it was 20 years ago. He used to come here to a restaurant. He said it's all torn down now"). In the next narrative segment, the speaker introduced another character, which was the focus of that segment (e.g., "And then a tall man came. He was across the street. And he ran over and introduced himself"). In each case, after the character's nominal introduction, pronoun expressions were used and at distances no greater than two T-units. The strategies used by older adults presumably served dual purposes. First, the use of pronominal expressions reduced the cognitive informational load of specific references to an entity; second, it increased the functionality of specific references in identifying and retrieving the entity (Almor, 2000; Arnold, 2008; Givón, 1983; Lambrecht, 1994).

Older adults in the study were high functioning and exhibited no overt signs of memory impairment. However, the shorter T-unit distances produced between referents in story retelling may have been mediated by deficiencies in general lexical retrieval from long-term semantic memory. This was demonstrated by significant age-related differences in the CFT, where older adults produced fewer nominal items under both timed and untimed conditions (see Table 1). As a consequence, older adults may have attempted to neutralize lexical retrieval deficiencies by reducing T-unit distance in order to avoid deterioration of the referent in memory. For some older adults, when a character was introduced by a proper name ("I'm waiting here for Jimmy"), subsequent mentions were in pronoun form regardless of T-unit distance, and the proper name (*Jimmy*) never appeared again in the retelling. Older adults were able to recall the names of story characters sufficiently to introduce the characters but could not maintain specific names as distance increased, forcing them to default to referential substitutions (i.e., general noun expression, pronoun) or to omit the action completely.

In contrast, middle-aged adults were more proficient than older adults in accurately representing distances of the original stimulus in their retellings. They were able to introduce story characters by their specific names and were equally able to reintroduce the characters with the same names as they re-emerged in the narrative. Hence, middle-aged adults were able to process and maintain longer chunks of information at a time. The longer, more complex T-unit productions required the continuation of the referent for longer distances using pronouns and elliptical references until the speaker felt the need to reinstate the referent in noun form. In addition, middle-aged adults were more inclined to switch between characters more often than were older adults. Switching between characters caused the distance between the referent and its prior mention to increase. This influenced the necessity of fewer pronoun terms and the use of more explicit referential expressions to distinguish between story characters.

### *Research Question 3: Interference Between Referring Expressions*

The third research question addressed the issue of whether interference had an age-related effect on the management of reference. The results showed that older adults in the study did not appear to be significantly disadvantaged in the management of the potential disruptive effects of interference. However, middle-aged adults managed larger spans of intervening information at greater distances compared with older adults. Moreover, middle-aged adults represented the characters as they appeared in the original stimulus. Thus, their longer retellings provided more opportunities for interference. On the other hand, older adults reduced the amount of intervening information conveyed in their retellings. Two characters appeared to be the most favorable amount of information to sustain in memory at a time. This finding suggests the same compensatory strategy that was used in the management of distances between referents. Gernsbacher (1990) wrote that entities become less accessible over time because of interference from other referents that are mentioned in the intervening discourse. Both middle-aged and older adults avoided this pitfall by reducing the number of intervening characters to no more than two in any given segment. In personal narratives, both middle-aged and older adults produced episodes that focused on the actions of one character followed by an episode focusing on the actions of a different character. There were fewer occasions where two or more characters were interacting in a single episode.

Interference did not prove to be very useful in uncovering age-related differences. It should have distinguished age groups because the inclusion of intervening information conveys the implication of increased distance intervals between referents. Moreover, it was assumed that interference required greater amounts of cognitive activity and mediated the status of the referent as old or new information. However, interference did not produce the expected disruptive effect. One possible explanation is that the older adults' story retellings were shorter than those of middle-aged adults, whereas middle-aged adults produced personal narratives similar to or shorter than those of older adults. Another explanation is that older adults did not produce unrelated strings of information. Rather, they produced information pertaining to one topic at a time and used constructions that referred to referents important to the focus of the discourse segment. This accounts for the limited amount of intervening information and the older adults' propensity to place referents in the same grammatical position and the same pragmatic role as when they were last referred to.

## *Influence of AAE*

The results of the study demonstrated that older adults produced more AAE referential variants than middle-aged adults. The majority of those variants were expressed during the personal narrative condition. This outcome was not surprising because it was expected that participants would produce more AAE variants in the generation of more naturalistic discourse contexts. However, not every participant in the study used the AAE dialect. Middle-aged adults—most of whom were federal employees in Washington, DC, and self-reported a middle-class status—rarely used AAE. Older adults, particularly those over age 70 years, used AAE but not to a great extent. Those participants with lower educational attainment (i.e., high school diploma) produced AAE more than their college-educated counterparts. For those who used AAE, certain patterns emerged. For example, pronominal apposition was used primarily by older adults, and to a lesser extent middle-aged adults, in both narrative conditions (e.g., "The policeman, he was patrolling his beat"; "My grandmother, she took care of me"). Pronominal apposition accounted for a large percentage of pronominal use at short distances and with no intervening characters.

Ellipses commonly occurred at the end of referential chains or at the end of episodes within zero to one T-unit distance and with no intervening characters ("That evening, Ø come walking"). Ellipses usage almost exclusively followed AAE patterns. For example, during the story-retelling task, some older adults frequently used ellipses in "say/said" clauses ("Ø say, it's been 20 years since I last saw him"). "Say/said" constructions generally appeared without a subject referent, which is typical of African American narratives (Mufwene, 1998). *Consecutivization,* in which two or more clauses were joined expressing a sequence of events with repeated subject referents or repeated subject deletions (Welmers, 1973), was used primarily by older adults. In most cases, the character was introduced with a pronoun, followed by a string of ellipses referring to the same entity ("He came, Ø talked, and Ø went on his way") or with expressed subject referents ("The policeman, he came and he stopped and he talked to the man and he went on his way"). Middle-aged adults typically used consecutivization with repeat pronoun references in their personal narratives, whereas older adults used repeat subject deletions. Thus, AAE variants always referred back to the same referent, were almost always used within short distances (zero to one T-unit), and were contained within long referential chains.

## *Clinical Implications*

This investigation demonstrated that older African American adults managed the referential system adequately but were somewhat challenged in the presence of complexity, such that they produced fewer explicit referential forms, less distance, and fewer intervening characters as a strategy to circumvent any anticipated referential failures. On the other hand, their personal narratives were generally less complex than their story retelling, which differentiated middle-aged and older adults. Moreover, older adults produced more explicit referring expressions and managed distance and interference without difficulty in their personal narratives. As a consequence, the ease with which personal narratives were produced and the older speakers' partiality

for simpler constructions make this form of narration an ideal tool for cognitive–linguistic assessment.

The apparent overuse of pronoun expressions, even with the inclusion of AAE pronominal variants, was not deemed extraordinary. Rather, the results reveal how the hierarchy of referential forms (i.e., noun > pronoun > ellipses) map onto the cognitive constraints used by speakers to produce coherent and cohesive discourse. In the present sample of healthy African American adults, the distribution of referring expressions was similar to that in other investigations involving the mainstream population and speakers of other languages (e.g., Chen, 1986; Clancy, 1980; Givón, 1983; Lambrecht, 1994; Millogo, 2005). Therefore, clinicians should not consider the overuse of pronouns as an indicator of impairment unless there is a preponderance of pronoun expressions without antecedents in the immediate environment or the discourse is rendered ambiguous because of unclear referencing.

Despite the lack of significant main effects of age, distance in narration is a sensitive indicator of cognitive aging and should be considered in any assessment of cognitive–linguistic ability. Distance appears to have a greater impact not only on memory but also on story processing performance, depending on age and/or the presence of impairment. The assumption is that middle aged-adults are better able to manage the cognitive constraints of referential distance. It remains to be seen whether middle-aged adults show early signs of impairment or perform similarly when compared with younger adults (<45 years of age). However, around 65+ years of age, it appears that older adults may begin to show signs of compromise. SLPs must, therefore, take note of referential choices that are outside the normative patterns of those demonstrated by the current sample. For example, the excessive use of attenuated referential forms (e.g., general nouns, pronouns, or ellipses) in the presence of short T-units and shorter T-unit distances should be considered a possible indicator that an explicit referent is unavailable in working memory and may portend potential working memory and long-term retrieval failures. Along with reductions in T-unit distances, clinicians should consider reductions in story retelling, as these may be potential indicators of early cognitive impairment (Burke & Shafto, 2008; Cannito et al., 1988; Glosser & Deser, 1992; Kemper, 1992; Ulatowska et al., 1986).

Studies have shown that age, gender, education, occupation, socioeconomic status, and sociocultural contexts influence the likelihood of AAE productions (e.g., Craig & Grogger, 2012; Dillard, 1972; Green, 2002; Rickford, 1999). As demonstrated in the present study, many adults rarely produced AAE variants. Therefore, in any clinical encounter with African Americans, the SLP must not assume AAE usage. However, if AAE variants are observed in the discourse component of the clinical evaluation, the use of referential appositions, additions, and consecutivizations should not be regarded as unusual. The presence of dialect must be established through comprehensive assessment. With the normative information provided here, clinicians may be able to form some expectations about the client's use of referential forms as performance changes over time.

## Conclusions

It is useful for SLPs to consider the management of reference in language sampling for several reasons. First, it provides an opportunity to examine the interaction of cognitive and linguistic factors in connected speech. The facility for older adults to manage reference is subject to memory deficits and other related cognitive processes (Ulatowska et al., 1986). Second, reference contributes to coherence and cohesion in discourse production (Bliss & McCabe, 2008). Third, reference appears to be vulnerable to disruption in a variety of neurocognitive impairments (e.g., aphasia, dementia, schizophrenia) in addition to cognitive decline in normal aging (e.g., Bunce, 1991; Cannito et al., 1988; Docherty, Gordinier, Hall, & Dombrowski, 2004; North et al., 1986; Ulatowska et al., 1986; Ulatowska, Allard, & Chapman, 1990). Last, reference provides information on cognitive abilities as well as cognitive constraints on the speaker's assessment of the listener's knowledge of referents at various segments of the discourse (Arnold, 2008).

The present research provides information on the reference management processes associated with normal aging among a unique sample of well-educated, high-functioning African American adults and suggests a well-defined agenda. First, it is important to explore precise characterizations of reference management among individuals who are AAE speakers as well as those who are not in order to survey individual differences in speakers' referential choices. Second, future research should investigate ambiguity in referencing and the conditions in which ambiguity may occur. Last, an exploration of gender differences is vital for compiling a comprehensive cognitive–linguistic profile of normally aging African Americans. These proposals promise to contribute to the currently limited body of research.

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## References

**Administration on Aging.** (2010). *A statistical profile of Black older Americans aged 65+*. Retrieved from http://www.aoa.gov/Aging_Statistics/minority_aging/Facts-on-Black-Elderly-plain_format.aspx

**Almor, A.** (2000). Constraints and mechanisms in theories of anaphor processing. In M. Pickering, C. Clifton, & M. Crocker (Eds.), *Architectures and mechanisms for language processing* (pp. 341–354). New York, NY: Cambridge University Press.

**Arbuckle, T. Y., & Gold, D. P.** (1993). Aging, inhibition and verbosity. *Journal of Gerontology: Psychological Sciences, 48,* 225–232.

**Ariel, M.** (1990). *Accessing noun-phrase antecedents*. London, United Kingdom: Routledge.
**Arnold, J.** (2008). Reference production: Production-internal and addressee-oriented processes. *Language and Cognitive Processes, 23,* 495–527.
**Bayles, K. A., & Kaszniak, A. W.** (1987). *Communication and cognition in normal aging and dementia*. Boston, MA: Little, Brown.
**Bayles, K. A., & Tomoeda, C. K.** (1993). *Arizona Battery for Communication Disorders of Dementia*. Tuscon, AZ: Canyonlands.
**Bliss, L. S., & McCabe, A.** (2008). Personal narratives: Cultural differences and clinical implications. *Topics in Language Disorders, 28,* 162–177.
**Borkowski, J. G., Benton, A. I., & Spreen, I.** (1967). Word fluency and brain damage. *Neuropsychologia, 5,* 135–140.
**Bunce, B. H.** (1991). Referential communication skills: Guidelines for therapy. *Language, Speech, and Hearing Services in Schools, 22,* 296–301. Retrieved from http://lshss.pubs.asha.org/article.aspx?articleid=1777944
**Burke, D. M., & Shafto, M. A.** (2008). Language and aging. In F. I. M. Craik & T. A. Salthouse (Eds.), *The handbook of aging and cognition* (pp. 373–443). New York, NY: Psychology Press.
**Cannito, M. P., Hyashi, M. M., & Ulatowska, H. K.** (1988). Discourse in normal and pathologic aging: Background and assessment strategies. *Seminars in Speech and Language, 9,* 117–134.
**Caughley, R.** (1978). Participant rank and verbal cross reference in Chepang. In J. E. Grimes (Ed.), *Papers on discourse* (pp. 163–178). Dallas, TX: The Summer Institute of Linguistics.
**Chafe, W. L.** (1976). Givenness, contrastiveness, definiteness, subjects, topics and point of view. In C. Li (Ed.), *Subject and topic* (pp. 25–55). New York, NY: Academic Press.
**Chen, P.** (1986). *Referent introducing and tracking in Chinese narratives* (Unpublished doctoral dissertation). University of California, Los Angeles.
**Clancy, P. M.** (1980). Referential choice in English and Japanese narrative discourse. In W. L. Chafe (Ed.), *The pear stories: Cognitive, cultural, and linguistic aspects of narrative production* (pp. 127–202). Norwood, NJ: Ablex.
**Clark, H. H., & Sengul, C. J.** (1979). In search of referents for nouns and pronouns. *Memory & Cognition, 7,* 35–41.
**Connor, L. T., Spiro, A., III, Obler, L. K., & Albert, M. L.** (2004). Change in object naming ability during adulthood. *Journals of Gerontology: Series B: Psychological Sciences and Social Sciences, 59,* 203–209.
**Craig, H. K., & Grogger, J. T.** (2012). Influences of social and style variables on adult usage of African American English features. *Journal of Speech, Language, and Hearing Research, 55,* 1274–1288.
**Dell, G. S., McKoon, G., & Ratcliff, R.** (1983). The activation of antecedent information during the processing of anaphoric reference in reading. *Journal of Verbal Learning and Verbal Behavior, 22,* 121–132.
**Dillard, J. L.** (1972). *Black English: Its history and usage in the United States*. New York, NY: Vintage Books.
**Docherty, N. M., Gordinier, S. W., Hall, M. J., & Dombrowski, M. E.** (2004). Referential communication disturbances in the speech of nonschizophrenic siblings of schizophrenic patients. *Journal of Abnormal Psychology, 113,* 399–405.
**Donnellan, K.** (1966). Reference and definite descriptions. *Philosophical Review, 75,* 281–304.
**Endley, M. L.** (2010). *Linguistic perspectives on English grammar: A guide for EFL teachers*. Scottsdale, AZ: Information Age Publishing.
**Erving, C. L.** (2011). Gender and physical health: A study of African American and Caribbean Black adults. *Journal of Health and Social Behavior, 52,* 383–399.
**Garrett, S. L., Sawyer, P., Kennedy, R. E., McGuire, D., Simon, R. P., Strothers, H. S., III, & Allman, R. M.** (2013). Racial and sex differences in associations between activities of daily living and cognition in community-dwelling older adults. *Journal of the American Geriatric Society, 61,* 2174–2180.
**Geisler, C. A.** (2004). *Analyzing streams of language: Twelve steps to the systematic coding of text, talk, and other verbal data*. New York, NY: Pearson Longman.
**Gernsbacher, M. A.** (1990). *Language comprehension as structure building*. Hillsdale, NJ: Erlbaum.
**Givón, T.** (1983). *Topic continuity in discourse: A quantitative cross language study*. Amsterdam, the Netherlands: John Benjamins.
**Glosser, G., & Deser, T.** (1992). A comparison of changes in macrolinguistic and microlinguistic aspects of discourse production in normal aging. *Journal of Gerontology: Psychological Sciences, 47,* 266–272.
**Green, L. J.** (2002). *African American English: A linguistic introduction*. Cambridge, United Kingdom: Cambridge University Press.
**Griffiths, P.** (1979). Speech acts and early sentences. In P. Fletcher & M. Garman (Eds.), *Language acquisition* (pp. 105–120). Cambridge, United Kingdom: Cambridge University Press.
**Heath, S. B.** (1986). Taking a cross-cultural look at narratives. *Topics in Language Disorders, 7,* 84–94.
**Henry, O.** (1913). After twenty years. In *The Four Million: The Gift of the Magi and Other Short Stories* (pp. 215–220). New York, NY: Doubleday.
**Hunt, K. W.** (1964). *Grammatical structures written at three grade levels: The structures to be analyzed by transformational methods* [NCTE Research Report No. 3]. Tallahassee: Florida State University.
**Jackson, J. S., Hudson, H., Kershaw, K., Mezuk, B., Rafferty, J., & Tuttle, K. K.** (2011). Discrimination, chronic stress, and mortality among Black Americans: A life course framework. In R. Rogers & E. Crimmins (Eds.), *International handbook of adult mortality* (pp. 311–328). New York, NY: Springer.
**Johnson, K.** (2008). *Topics in ellipsis*. Cambridge, United Kingdom: Cambridge University Press.
**Labov, W., & Waletsky, J.** (1997). Narrative analysis: Oral versions of personal experiences. *Journal of Narrative and Life History, 7*(1–4), 3–38.
**Lambrecht, K.** (1994). *Information structure and sentence form: Topic, focus, and the mental representation of discourse referents*. Cambridge, United Kingdom: Cambridge University Press.
**Lee, H. B., Richardson, A. K., Black, B. S., Shore, A. D., Kasper, J. D., & Rabins, P. V.** (2012). Race and cognitive decline among community-dwelling elders with mild cognitive impairment: Findings from the memory and medical care study. *Aging & Mental Health, 16,* 372–377.
**Kemper, S.** (1992). Adults' sentence fragments: Who, what, when, where, and why. *Communication Research, 19,* 444–458.
**MacKay, A. J., Connor, L. T., Albert, M. L., & Obler, L. K.** (2002). Noun and verb retrieval in healthy aging. *Journal of the International Neuropsychological Society, 8,* 764–770.
**Manton, K. G., Patrick, C. H., & Johnson, K. W.** (1994). Health differentials between Blacks and Whites: Recent trends in mortality and morbidity. In D. P. Willis (Ed.), *Health policies and Black Americans* (pp. 129–199). New Brunswick, NJ: Transaction.
**Millogo, V. E.** (2005). The use of anaphoric pronouns by French children in narrative: Evidence from constrained text production. *Journal of Child Language, 32,* 439–461.
**Mufwene, S. S.** (1992). Ideology and facts on African American Vernacular English. *Pragmatics, 2,* 141–166.
**Mufwene, S. S.** (1998). The structure of the noun phrase in African-American Vernacular English. In S. S. Mufwene, J. R. Rickford, G. Bailey, & J. Baugh (Eds.), *African-American English:*

*Structure, history, and use* (pp. 62–89). London, United Kingdom: Routledge.

**North, A., Ulatowska, H. K., Macaluso-Haynes, S., & Bell, H.** (1986). Discourse performance in older adults. *International Journal of Aging and Human Development, 23,* 267–283.

**Paolo, A. M., Ryan, J. J., Ward, L. C., & Hilmer, C. D.** (1996). Different WAIS-R short forms and their relation to ethnicity. *Personality and Individual Differences, 21,* 851–856.

**Pfeiffer, E.** (1975). A short portable mental status questionnaire for the assessment of organic brain deficit in elderly patients. *Journal of the American Geriatrics Society, 23,* 433–441.

**Rickford, J. R.** (1992). Grammatical variation and divergence in Vernacular Black English. In M. Gerritsen & D. Stein (Eds.), *Internal and external factors in syntactic change* (pp. 175–200). New York, NY: Mouton de Gruyter.

**Rickford, J. R.** (1999). *African American Vernacular English: Features, evolution, educational implications*. Malden, MA: Blackwell.

**Rosser, S. V.** (2000). Women's studies: A model for a specialty in women's health. *Transformations, 4*(1), 9–21.

**Thane, P.** (1989). History and the sociology of aging. *Social History of Medicine, 2,* 93–96.

**Ulatowska, H. K., Allard, L., & Chapman, S. B.** (1990). Narrative and procedural discourse in aphasia. In Y. H. Joanette & H. H. Brownell (Eds.), *Discourse ability and brain damage: Theoretical and empirical perspectives* (pp. 180–198). New York, NY: Springer-Verlag.

**Ulatowska, H. K., Hayashi, M. M., Cannito, M. P., & Fleming, S. G.** (1986). Disruption of reference in aging. *Brain and Language, 28,* 24–41.

**Vonk, W., Hustinx, L. G. M. M., & Simons, W. H. G.** (1992). The use of referential expressions in structuring discourse. *Language and Cognitive Processes, 7,* 301–333.

**Wechsler, D.** (1981). *Wechsler Adult Intelligence Scale–Revised manual*. New York, NY: The Psychological Corporation.

**Welmers, W. E.** (1973). *African language structures*. Berkeley: University of California Press.

**Wolfram, W., & Fasold, R.** (1974). *The study of social dialects in the United States*. Englewood Cliffs, NJ: Prentice Hall.

**Wright, H. H., Capilouto, G. J., Srinivasan, C., & Fergadiotis, G.** (2011). Story processing ability in cognitively healthy middle-aged and older adults. *Journal of Speech, Language, and Hearing Research, 54,* 900–917.

**Zacks, R. T., & Hasher, L.** (1988). Capacity theory and the processing of inferences. In L. L. Light & D. M. Burke (Eds.), *Language, memory, and aging* (pp. 154–170). New York, NY: Cambridge University Press.