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The information in third-person /s/: acquisition across dialects of American English*

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(Received 23 March 2005. Revised 25 July 2006)

ABSTRACT

The production of third-person /s/ on English verbs seems to be ahead of comprehension. Mainstream American English (MAE) is contrasted with African American English (AAE), in which /s/ is rarely supplied. Two studies explored what information children get solely from /s/ on the end of a verb. Sixty-five MAE- and 65 AAE-speaking four- to seven-year-olds participated in one of two experimental picture-choice comprehension studies. Neither group of four-year-olds could use the /s/ to determine if the event was generic rather than past tense on a verb (e.g. *cuts/cut*), or whether it was a verb or a noun compound as in *The penguin dresses/The penguin dress*. MAE-speakers do not use the information in third-person /s/ alone until age five, and not reliably until age six years. In keeping with AAE production, AAE-speaking children do not use the information in /s/ at all in this age range.

[*] Many thanks are due to the people who helped on this project. We are very grateful to Barbara Pearson, who organized much of the testing and data entry, the graduate students in Communication Disorders who assisted, and to Paul Speckels, who drew brilliant pictures for Study 2. We would also like to thank audiences at the Boston University Language Development conference and to the U.Mass./U.Conn./Smith workshop for their invaluable feedback on earlier versions. This work was partly supported by NIH NIDCD Contract #No1 DC 8-2104 to Harry Seymour, Thomas Roeper and Jill G. de Villiers. Address for correspondence: Jill G. de Villiers, Psychology Department, Smith College, Northampton, MA 01063, USA. e-mail: jdevil@smith.edu

INTRODUCTION

English has a disappearing subject–verb agreement system. In Mainstream American English (MAE),¹ apart from the forms of the copula, the last remnant of a once-rich agreement system is the /s/ marker of third-person singular on ‘present tense’ verbs. However, many dialects of English, including African American English (AAE), do not have the third-person /s/ marker in connected speech (Rickford, 1999; Green, 2002*a*). Evidence from several studies of adult AAE speakers suggests that it is absent between 75% and 85% of the time (Myhill & Harris, 1986; Wolfram & Schilling-Estes, 1998; Baugh, 1999).

There is also dispute over the nature of the verb form to which /s/ attaches in MAE. Modern English may not have a real ‘present tense’, as it uses the present progressive to denote ongoing action (Enç, 1990; Sauerland, 2002). Instead, the third-person /s/ marker typically attaches to a verb form to mark ‘generic’ aspect (Carlson & Pelletier, 1995). Since AAE has other forms that mark aspect (i.e. the habitual *be* marker as in *He be working at Ford*), different distinctions may exist for AAE and MAE (Jackson, 1998; Green, 1995, 2002*a*, 2002*b*; Jackson & Green, 2005).

Remarkably, children acquiring MAE produce the third-person /s/ morpheme at 90% criterion in MAE obligatory contexts by about 36 months (Brown, 1973; de Villiers & de Villiers, 1973), a fact that has made third-person /s/ a popular choice of item on language assessment tests. However, in recent data from five-year-old AAE-speakers, the form is seen in only 30% of MAE obligatory contexts (Johnson, Coles, Ramos, Seymour & Hall, 1996). Hence, AAE-speaking children are at an increased risk for being identified as language impaired because many language assessment tests include MAE speech patterns that regard third-person /s/ as an obligatory marker.

One question is whether comprehension tests could shed any light on the status of /s/ in the two dialects (Johnson, 2005; Johnson, de Villiers & Seymour, 2005). For example, AAE tends to reduce final consonant clusters, (e.g. saying *tes* for *test*) (Washington & Craig, 1994). Perhaps the third-person /s/ is not produced in speech because it typically creates a consonant cluster at the end of words, but it may still be present as a morphological marker in the underlying form. If that is the case then AAE speakers may respond differentially to third-person /s/ even when they omit it in speech. The objective was to develop a comprehension test of third-person /s/ that would be appropriate for use with MAE and AAE child speakers. However, our data have led us down a different path.

[1] We use Mainstream American English instead of Standard American English in recognition that it too is a dialect, and to avoid the connotations that come from the term ‘non-standard’.

What have previous comprehension studies shown about third-person /s/? A paper by Soderstrom, Wexler & Jusczyk (2002) exploited the head-turn methodology with 19-month-old toddlers to test their sensitivity to agreement morphology, namely /s/. The taped stimuli either preserved or deleted agreement morphology, e.g.:

- (a) At the bakery a team bakes bread.
- (b) At the bakery a team bake bread.

Children who were well below the age of productive mastery proved sensitive to the difference between (a) and (b), that is, they were observed to look longer towards the loudspeaker that was emitting correct MAE agreement (9.8 versus 8.2 seconds). As many other reports show, very young children can be aware of 'what sounds right' in the language long before they are talking in that way themselves (Santelmann & Jusczyk, 1998; Gomez & Gerken, 1999). However, it is well known that head-turn studies do not reveal the *basis* for the sensitivity. A toddler who shows awareness that something sounds familiar may not yet know what linguistic information the form carries. Soderstrom *et al.* (2002) do not prove what the children are sensitive to, as the children also preferred (c) to (d) in the following:

- (c) At the bakery, a team not bakes bread.
- (d) At the bakery, a team not bake bread.

This could mean that the children may just prefer verbs with /s/. Suppose children were tested with plural agreement, (e) or not (f):

- (e) At the bakery, the cooks bake bread.
- (f) At the bakery, the cooks bakes bread.

If children were to prefer (f), it would suggest they dislike input with unmarked verbs. Unfortunately this variant was not tried.

Rice, Wexler & Redmond (1999) investigated grammaticality judgments that included contrasts in third-person /s/ with both six-year-old typically developing children and children with specific language impairment (SLI). The task involved judging sentences that omitted obligatory third-person /s/, such as *Maybe he like Pepsi better* or *He look happy now*. The data are not broken down specifically by responses to third-person /s/, as opposed to omitted auxiliary *be*, because the focus was on combining them into an 'optional infinitive' category of response. However, the data suggest that the younger typically developing children (average age 4;1) judged the bare forms unacceptable 92% of the time. This conforms to the evidence on production of third-person /s/ at this age in MAE, but it does not speak to the question of the comparative interpretation of third-person /s/.

Several existing language assessment tests attempt to assess the comprehension of the third-person /s/ in school-aged children. To hide the plurality

on the noun, researchers have followed the lead of Fraser, Bellugi & Brown (1963) in using words with a homophonous plural, such as *sheep* or *deer*. For example, in the *Oral and Written Language Scales* (Carrow-Woolfolk, 1996), children are presented with the sentence:

The sheep eats the grass.

and then the four picture choices are: (a) one sheep standing, (b) two sheep eating grass, (c) one sheep standing and one sheep lying on the ground and (4) one sheep eating grass (the correct answer). Fellbaum, Miller, Curtiss & Tallal (1995) studied the comprehension of this type of stimuli, and found that typically developing children aged 6;0 succeeded on an average of only four out of six such items. In a small-scale study, Leonard, Miller & Owen (2000) showed comparable levels of performance (71%) on third-person /s/ in nine children aged 4;0 and 5;0 in the same type of task. However, children do not know these irregular plurals until quite late, and so the design did not seem ideal. In our pilot work with this type of sentence, children said things such as, 'You mean one or two sheeps?'

In two recent studies (Johnson, 2005; Johnson *et al.*, 2005), the plurality of the subject was disguised not by using irregular (rare) plurals, but rather by masking the noun plural phonologically using verbs that began with an /s/, in the following way:

Show me: The cat sleeps in the bed.

The cats sleep in the bed.

Show me: The student sweeps the floor.

The students sweep the floor.

These stimuli were recorded with natural intonation at a normal speaking rate, with no pause after the noun. The child selected from a pair of pictures, such as several cats versus one cat, sleeping on a bed. In one study (Johnson *et al.*, 2005), the subjects were 63 MAE-speaking children aged 3;0–6;11. The results showed, surprisingly, that even MAE-speaking children did not use the third-person /s/ verb ending to monitor the number of the subject until age 5;0 or 6;0. This suggests that the low performance in previous studies such as Fellbaum *et al.* (1995) may not be due only to the use of irregular plurals in the stimuli.

In Johnson (2005), the participants were 30 AAE-speaking children aged 4;0–6;11. These young AAE speakers corroborated the result suggested by studies of AAE spontaneous speech: this marker is not comparable to the form in MAE, even in comprehension. Not even the oldest AAE-speaking subjects showed any sensitivity to the /s/ ending as a clue to subject number. Notice that this result rules out alternative accounts that might ascribe the lack of an overt /s/ in speech to the phonological component of AAE. It was clearly not true that the final /s/ was omitted in ongoing speech but

understood in the comprehension test. Johnson (2005) discusses the question of the other possible uses of third-person /s/ in adult AAE grammar that might account for its variability.

The results of the previous work do not speak to the possibility that third-person /s/ marks something other than subject number for either younger MAE-speaking participants, or AAE-speaking participants. The task in Johnson *et al.* (2005) could be argued to be inadequate because it used pictures of static situations in which the verb form is not well motivated. If the /s/ marks verbs that carry generic aspect rather than a present tense, then the static pictures may not represent semantically ideal uses. Even though young children's books, especially early readers, are full of the third-person /s/ used in this way, such picture choices may not provide the most natural test of the child's grammatical knowledge. The purpose of the two studies described here is to further explore children's comprehension of third-person /s/. The specific research question for Study 1 was: Do AAE- and MAE-speaking children comprehend third-person /s/ as an indicator of generic aspect?

STUDY 1

In the first study, a task was developed to evaluate whether children recognize the meaning conveyed by the verb with third-person /s/ as a generic aspect, in contrast to past tense. As a contrast, verbs were selected that remain unmarked in the past tense, such as *cut*, *hit*, *let*, etc. In this way, the child had to attend to the /s/ ending to determine its tense/aspect:

He cuts the bread. (generic)

He cut the bread. (past tense)

Previous research has shown that children do use unmarked forms like *cut* and *let* as past tense. In fact, it has been found that children resist overextending /ed/ to these irregular verbs since the verbs already end with a /t/ (MacWhinney, 1978; Bybee & Slobin, 1982). We can therefore test if children are sensitive to the subject /s/ agreement as an indicator that the verb does NOT mark past tense, but generic activity. Notice, however, that there is a complication in setting this up. If an event is generic (e.g. *the bird flies*), it presumably happens often, so it has probably happened in the past. Which situations can distinguish this from a single past tense reading?

One kind of generic aspect may be distinguished from habitual aspect, in that a generic activity is one assigned to an object or animate being, even though it might never have occurred (Green, 2002a; Terry, de Villiers, Kim & Fond, 2002). Thus, one can say of a newly packaged, hot-off-the-assembly-line dishwasher, *it washes dishes*, or of a newly hatched bird, *it eats partly digested worms*. In contrast, a habitual form like invariant *be* in AAE

TABLE 1. *Participants by age and gender across the two dialect groups in Study 1*

Dialect group	Four-year-olds	Five-year-olds	Six-year-olds
AAE	N = 15 Mean age 4;4 3 girls, 12 boys	N = 9 Mean age 5;6 4 girls, 5 boys	N = 14 Mean age 6;3 11 girls, 3 boys
MAE	N = 11 Mean age 4;4 8 girls, 3 boys	N = 11 Mean age 5;4 7 girls, 4 boys	N = 9 Mean age 6;5 5 girls, 4 boys

is used for repeated events in the past, e.g. *He be fighting*. This makes it possible to have an utterance such as, *He fight, but he don't be fighting* in AAE (Jackson *et al.*, 1996; Jackson, 1998; Jackson & Green, 2005). Notice, though, that the subject agreement is not needed on *fight* in AAE. As a result, the situations have to contain a subtle contrast between an event that occurred a SINGLE TIME IN THE PAST, and a generic activity that HAS NOT YET OCCURRED, but is a property associated with the characters.

METHOD

Participants

A total of 69 participants took part in this study. Thirty-eight four-, five- and six-year-old African American and 31 four-, five- and six-year-old European American children were selected from urban preschools and elementary schools in central Connecticut and western Massachusetts, respectively. Table 1 presents the participants' descriptive information. Gender was not completely balanced as a product of the composition of the classes and which parents agreed to allow their child to participate.

The African American participants came from schools located in a working-class neighborhood. Previous research has indicated that working-class African American speakers are most likely to show stronger dialect features (Labov, 1969; Dillard, 1972; Washington & Craig, 1994; Washington, Craig & Kushmaul, 1998). The African American participants were confirmed to be speakers of AAE through analysis of a 5–10-minute spontaneous speech sample. The sample was coded for the presence or absence of phonological and morphosyntactic features of AAE (Washington & Craig, 1994; Seymour, Bland-Stewart & Green, 1998) by an African American speech-language pathologist familiar with the dialect. Children were selected to participate in the study if they were judged to be AAE speakers, that is, if they displayed several phonological and syntactic features common to AAE (Washington & Craig, 1994; Seymour *et al.*, 1998), which was also the dominant dialect of their community.

It was not possible to sample European American children from the same schools to match socioeconomic status (SES), because they get daily exposure to AAE from their peers. For that reason we sampled European American children from more homogeneous communities that use MAE. The European American participants came from two preschools and elementary schools in two different towns in western Massachusetts, in which the language of the community is MAE. We tried to minimize class differences by choosing schools in rural, working-class communities.

All children had been screened in the schools for language, speech and/or hearing problems and were considered typically developing. No child in the study was reported to have any learning or language difficulties nor did they display any attentional, lexical or conversational problems during the testing.

Research design

To test the children's understanding of zero-marked versus /s/ verbs, past completed action was contrasted with generic action (*cut/cuts*). In this study we distinguished between generic CAPACITY and HABITUAL actions² by ensuring that the action was assigned as a job, but had never actually been done by that character. We could not allow a habitual reading, or else that reading would be available also for a sentence such as *Who cut the bread?* We limited ourselves to the capacity reading of the generic to compare with the simple past.

In a specially designed story, the members of a family were each assigned a chore to do by their sick grandmother, but they had never actually done the chores. To help out, the household pets each did one chore instead. That made it possible to ask:

Who just cuts the bread?

Versus:

Who just cut the bread?

We decided to highlight the form using the ambiguous adverb *just*, because pilot testing with five-year-old MAE-speaking participants suggested they were not getting any contrast from *cut/cuts* alone. Using *just* seemed to sharpen the contrast between an agent who did the action only immediately before, versus one who has done it at any time in the past. In the case of *just cuts*, the character was assigned a single chore, but had never actually carried it out. In this case *just* takes on its other meaning of 'only'. As an additional precaution that both meanings would be available, we also checked several longitudinal spontaneous language transcripts in English in the CHILDES

[2] Thanks to an anonymous reviewer for making the distinction between capacity and habitual generics clearer to us.

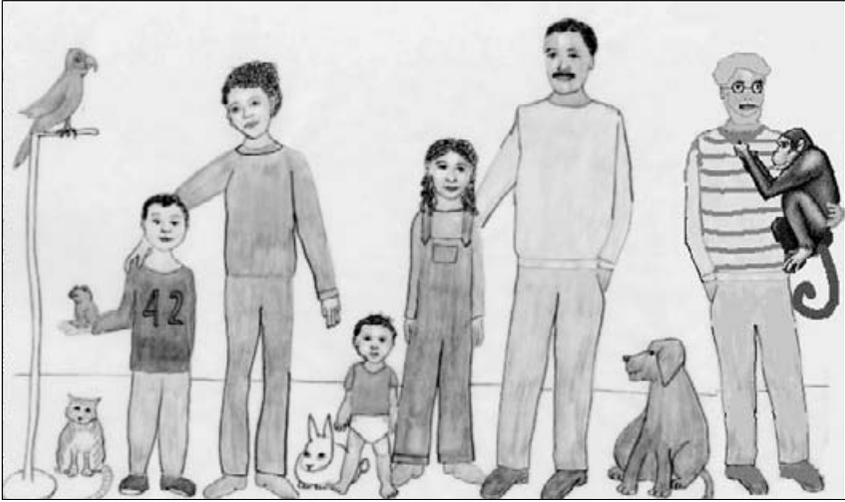


Fig. 1. Example of picture story presented to participants in Study 1.

database (MacWhinney & Snow, 1985) to confirm that both meanings of *just* were present in the speech of and input to English-speaking children by age 4;0. Children were observed to use *just* in both ways prior to age 4;0, so we considered it appropriate to use the form in the stimuli. Adult informants in pilot work and in several audiences have agreed that the meaning is better contrasted in this way. However, the meaning of *just* is still decided by the verb ending.

Procedure

A story was read to each participant as follows:

See this family? [See Figure 1] The grandmother has been doing all the jobs in the house and now she's sick with a cold and can't do them any more. So she gave each member of the family a job to do.

She told the little boy, 'Your job is setting the table for dinner.'

She told the mom, 'Your job is putting frosting on cakes.'

She told the baby, 'Your job is fitting puzzle pieces in puzzles.'

She told the girl, 'Your job is letting the bird out of its cage.'

She told the dad, 'Your job is cutting the bread.'

She told the grandpa, 'Your job is hitting the nails in the wall.'

So each person has just one job. Remember?

But the family had never had jobs before, so they were not looking forward to it. They complained but they knew their grandma needed the rest. The next day they had to start their jobs.



Fig. 2. Example of an individual close-up picture presented to participants in Study 1.

Guess what? See all the pets that the family have? They heard the family and decided to help out the first time because they loved them. So right before the family woke up, the pets each did a job for one person in the family. They just finished in time.

See? Think you can remember all that? The pictures will help you.

Now, here are my questions. Look at the pictures and tell me which one I'm talking about. For each one I might be talking about the family, or the pets. Ready?

The large picture displaying the characters in the story was left in full view and the participant was then shown six individual close-up pictures, one at a time (see Figure 2 for an example), that depicted the family member who was assigned to do a specific chore looking askance at the pet who has clearly just done the chore in question. The experimenter said, 'Wow, look at this!' then paused, let the child look closely and asked, e.g.:

Who just cut the bread?

or:

Who just cuts the bread?

TABLE 2. *Counterbalanced stimuli presented to the participants for Study 1*

Set A	Set B
Which one just set the table?	Which one just sets the table?
Which one just cuts the bread?	Which one just cut the bread?
Which one just let the bird out?	Which one just lets the bird out?
Which one just fits the puzzle pieces in?	Which one just fit the puzzle pieces in?
Which one just puts frosting on the cake?	Which one just put frosting on the cake?
Which one just hit the nail in?	Which one just hits the nail in?

The stress pattern for each was the same, with full articulation of *just*. The child either spoke the answer or was encouraged to locate the character (person or animal) on the large picture by pointing. Each child received six questions, three with verbal /s/ and three without verbal /s/, counterbalanced across two different sets A and B (see Table 2). The counterbalancing ensured that any biases in preference for one answer or another were removed.

RESULTS AND DISCUSSION

This study tested whether children would interpret the meaning carried by third-person /s/ as a generic marker (*Who just cuts the bread?*) as in MAE, namely, the person who was assigned the chore but has not yet done it, when contrasted with the bare past tense (*Who just cut the bread?*), in which the expected response is the one who completed the task.

Each child had three opportunities to match the generic choice to the third-person /s/, and three opportunities to match the singular past event to the bare past tense. This is the MAE ACCURACY SCORE. Yet a particular child might be biased towards choosing a generic answer, or a past tense answer. This is the BIAS SCORE. Put together, a particular child might get all the third-person /s/ 'right' and all the bare tenses 'wrong', because he/she chooses only generic answers. For this reason the best analysis is a SENSITIVITY measure that considers hits as well as false alarms.

The first analyses of variance (ANOVA) determined whether gender of the participant or the set used (A or B) made any difference in the overall responses. Previous research has indicted that gender may influence AAE dialect density, with young African American males producing more dialect features than their female peers (Washington & Craig, 1998). No significant differences were found for gender of the participant and set presented; therefore the data were collapsed across gender and set. Then separate ANOVAs were run for each dialect group, with age group as the within-subjects measure.

In the first set, MAE accuracy was the dependent measure and tense (third-person /s/ versus bare past) was the repeated measure, with age group

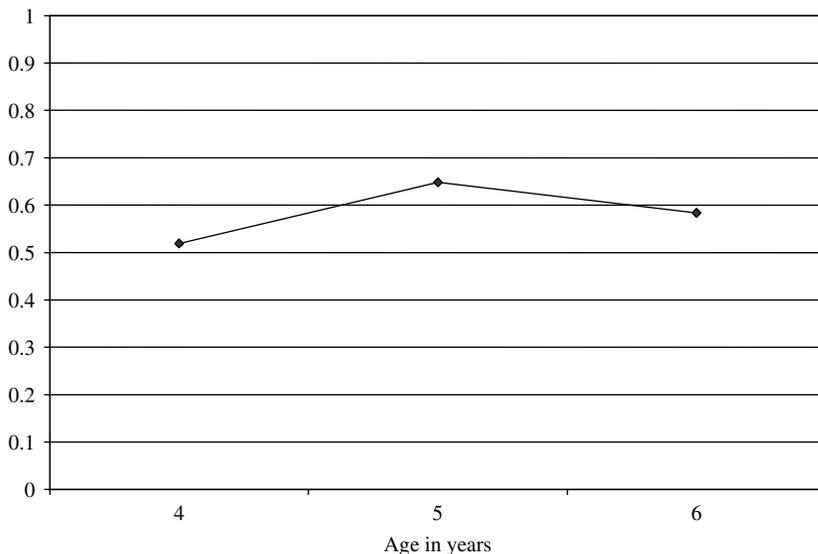


Fig. 3. MAE-speaking children's sensitivity to generic /s/ in Study 1.

(4;0, 5;0 and 6;0) as the within-subjects variable. The results for BOTH dialect groups showed no significant difference in accuracy across tenses and neither was there any significant change in accuracy by age.

The second set of analyses considered sensitivity. For each participant, a ratio was computed with the number of third-person /s/ correct over the total number of generic answers. This ratio approaches 1.0 if the child is sensitive to /s/, and is at only 0.5 if they answer indiscriminately. This was computed separately for third-person /s/ and bare past tense. See Figures 3 and 4 for the graphs of sensitivity for each dialect. Since 0.5 is the point of indiscriminate usage, it is clear that neither group is sensitive to verbal /s/, a finding confirmed by ANOVAs. ANOVAs using the arcsine transformed³ sensitivity ratio as the dependent measure showed no difference in sensitivity by tense, and no growth with age for either dialect. Further *t*-tests against the basic value of 0.5 showed no significant departure of the data from this chance level of any age group from either dialect. In fact, the results are worse than these statistics reflect, because a proportion could be calculated for a given child only if the child responded with that kind of answer, else the denominator would be zero. Thirty-five of the participants responded exclusively with one type of answer, essentially showing no sensitivity to either form. Seventeen of these responded only with past tense, eighteen

[3] The arcsine transform allows the use of proportions in ANOVAs without violating the assumptions. The data are transformed by the formula $p^i = \arcsin(\sqrt{p})$.

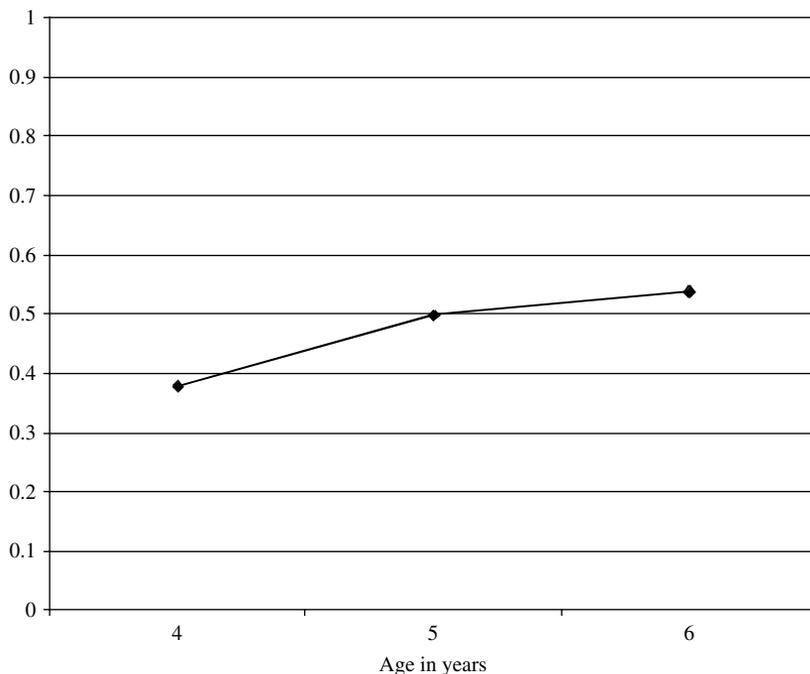


Fig. 4. AAE-speaking children's sensitivity to generic /s/ in Study 1.

with generics. In sum, the experiment shows no children of either dialect being sensitive to the information carried by third-person /s/ as a marker of this type of aspect in the age range four to six years.

Study 1 was designed to improve on the previous study of comprehension of third-person /s/ (Johnson *et al.*, 2005) by motivating the use of generic /s/ within the context of simple stories. In keeping with MAE usage, the present stories used third-person /s/ more appropriately on verbs carrying generic aspect rather than as a present tense marker. However, the results show no improvement in the children's overall sensitivity to the third-person /s/ when it was used as a generic marker. We might have expected dialect differences based on the previous studies, but since the MAE-speaking children performed at chance and made no discrimination of the present stimuli, there were no dialect differences observed in the pattern of responses. Even five- and six-year-old MAE-speaking children, who showed sensitivity to verbal /s/ as a clue to number agreement by age 5;0 and 6;0 in Johnson *et al.*, seemed oblivious to /s/ as a tense/aspect marker in the present study.

Although it seemed initially that the design might bias children to attend to the salient just completed act, this concern proved to be unwarranted.

If children had just been choosing the one who *just cut* for example, the past forms should have been understood better than the /s/-marked forms. Since there was no difference in accuracy, children clearly chose both kinds of answers, though with no attention to the verb marker that was designed to distinguish them. In addition, the children who chose one kind of response and then stuck with it were evenly divided between choice of the past versus the generic answer.

There are interesting implications for the language development of MAE-speaking children, who apparently are very late to understand or make use of this third-person /s/ marker alone in comprehension, even though it is part of their productive competence from about age 3;0. Both the studies, Johnson *et al.* (2005) and the present Study 1, suggest that young MAE-speaking children do not make use of the /s/ marker, either for deciding on the number of the subject, or for distinguishing between generic and bare past tense. This could lead one to question if there could be some other competence with third-person /s/ that the current studies are not capturing.

In AAE, it has been proposed that third-person /s/ might mean something different because the whole tense/aspect system is configured differently (Myhill & Harris, 1986; Green, 2002*a*). However, the issue is not settled. If either the AAE- or MAE-speaking children considered /s/ to be habitual, then there would have been no available answer for them in this study. That is, *Who cuts the cake?* is true of Grandma, but *Who just cuts the cake?* is not true of Grandma, as she does other chores. There is then no other answer. However, the unmarked form can also be habitual: *Who cut the cake?* could have been Grandma on many occasions, but *Who just cut the cake?* could not. The latter question has an easy non-habitual answer: the character who did it. If AAE-speaking children were confused about /s/ because they wanted it to be habitual, they should have done badly on verbs marked with third-person /s/, but well on the unmarked form, for which there was an available non-habitual answer. This is not the observed pattern: neither form was answered correctly.

The second study addresses the question of whether children recognize /s/ as a verb marker, even if they cannot yet use /s/ alone to decide what it marks in terms of tense/aspect or number.

STUDY 2

In this study, we asked whether MAE- or AAE-speaking children could distinguish between (a) a generic event and (b) noun–noun compound description pairs such as (see Figure 5):

- (a) The penguin dresses.
- (b) The penguin dress.

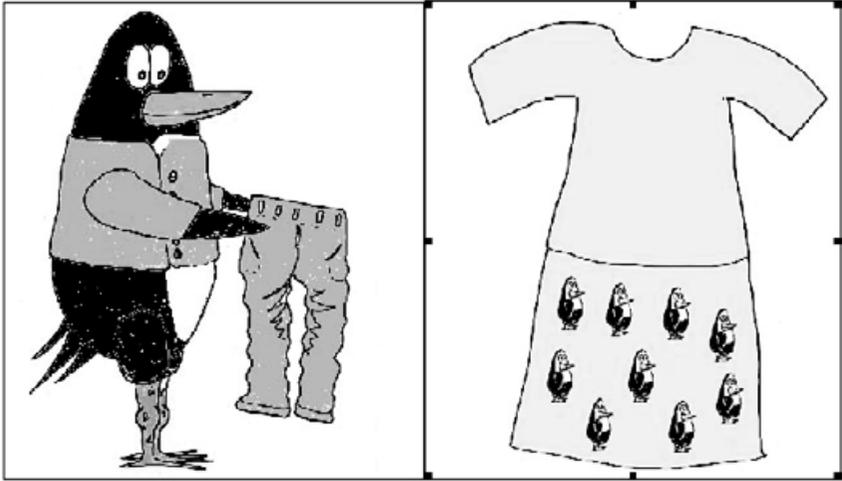


Fig. 5. Example of a generic event description (*the penguin dresses*) and noun-noun compound (*the penguin dress*) presented to the participants in Study 2.

Of course, (a) is ambiguous since it could refer to a plural, but the situations were arranged so the plural was not a plausible interpretation, i.e. there was only one dress in the noun picture. If children in either dialect register the /s/ as a VERB marker, even without knowing what it means, they should be able to use it to distinguish these two cases.

METHOD

Participants

A total of 60 children served as participants in this study. Twenty-seven four-, five- and six-year-old AAE-speaking children were selected from preschools and elementary schools in central Connecticut. Thirty-three four-, five- and six-year-old MAE-speaking children were chosen from preschools and elementary schools in a town in western Massachusetts. The selection criteria described in Study 1 were also used for Study 2 (see Table 3 for the descriptive information on the participants).

Research design

Twelve pairs of pictures were drawn with the intent to depict generic events, for example *the penguin dresses* had a penguin wearing some clothes and holding others (see Figure 5). This was to ensure that the third-person /s/ marked a generic event: the event of dressing was not actually happening at that moment. No plural interpretations were available. Two sets were

TABLE 3. *Participants by age and gender across the two dialect groups in Study 2*

Dialect group	Four-year-olds	Five-year-olds	Six-year-olds
AAE	N=6 Mean age 4;5 5 girls, 1 boy	N=13 Mean age 5;6 5 girls, 8 boys	N=8 Mean age 6;3 4 girls, 4 boys
MAE	N=11 Mean age 4;5 5 girls, 6 boys	N=12 Mean age 5;5 7 girls, 5 boys	N=10 Mean age 6;4 5 girls, 5 boys

constructed with counterbalanced examples, so each participant received six /s/-marked and six zero-marked stimuli. Each child received one set as in Table 4. The expected MAE response to a verb in third-person /s/ form, such as *the monkey boxes* would be to choose the creature who does an activity, e.g. a monkey dressed up to box. In contrast, the expected MAE response to the noun compound *the monkey box* would be to choose an object with a quality captured by the first noun, e.g. a box shaped like a monkey.

Procedure

Because of the unusual and amusing nature of the stimuli, it seemed necessary to expose the child to the stimuli in advance of the test itself, but without requiring the crucial contrast in form. A book was constructed in which pairs of pictures were shown, but the critical pair were not adjacent. Thus, the child might see a picture of *the penguin dresses* paired with the picture of *the car flies*, and be asked to choose which one shows *the penguin dresses*. In this way, all the forms were presented, events paired with events and noun–noun compounds paired with noun–noun compounds. The child had the chance to hear the stimuli linguistically encoded, and to laugh and comment about them, before the real testing began. The participants saw and heard all 24 stimuli. No child showed any difficulty in picking out the appropriate picture in this part of the task, showing that they had the necessary lexical and attentional skills.

Then we warned the child: ‘Now it gets a bit trickier, so pay attention!’ In the test itself, the book shown to the child had the critical stimuli adjacent, e.g. *the penguin dress* versus *the penguin dresses* (see Figure 5). The child could have remembered the forms from the pretest, and in fact we hoped so, but it would still be necessary to process the third-person /s/ to tell the forms apart. Each child received 12 picture pairs and heard 12 linguistic forms from one of the two counterbalanced sets A and B designed to control for particular preferences (see Table 4).

TABLE 4. *Sets of stimuli counterbalanced in Study 2*

Set A	Set B
The alligator bites	The alligator bite
The boat sinks	The boat sink
The lobster catches	The lobster catch
The spider looks	The spider look
The baby swings	The baby swing
The monkey boxes	The monkey box
The baby shampoo	The baby shampoos
The orange drink	The orange drinks
The penguin dress	The penguin dresses
The queen stamp	The queen stamps
The car fly	The car flies
The dog run	The dog runs

Two further pairs were presented but not analyzed because they involved a change in the vowel as well as the ending: *the bird bath/the bird bathes*, and *the baby seat/the baby sits*.

We used the same stress pattern for both forms, with stress equally distributed between the two words. In this way the stress pattern could not be used as a cue. A group of 40 MAE-speaking undergraduate students in a linguistics class judged the stimuli appropriate when spoken this way and were in 100% agreement about which stimulus was being indicated.

RESULTS AND DISCUSSION

Study 2 looked at whether children could distinguish noun–noun compounds (*the penguin dress*) from a generic event description (*the penguin dresses*) by recognizing the third-person /s/ as a verb marker. Each child had six opportunities to interpret the third-person /s/ as a generic verb marker, and six opportunities to interpret the bare singular as marking a noun compound. This is the MAE accuracy score. At the same time, a particular child might be biased towards choosing a generic action as an answer, or a compound as an answer. This is the bias score. Hence a particular child might get all the third /s/ ‘right’ and all the bare forms ‘wrong’,⁴ because he/she only chooses verb-type answers. Again, the best analysis of this is a sensitivity measure that considers hits as well as false alarms.

The first analyses of variance tested whether gender of participants or the set of sentences used (A or B) made any significant difference in the responses. No significant effects were found and so data were collapsed across gender and sets. Then separate ANOVAs were run for each dialect group, with age group as the within-subjects measure.

[4] The terms ‘right’ and ‘wrong’ are in quotes because they reflect MAE judgment.

In the first ANOVAs, MAE accuracy was the dependent measure and part of speech (verb with /s/ or bare noun) was the repeated measure. The results for the MAE-speaking children show no significant difference in MAE accuracy score between third-person /s/ and bare forms, and no interaction with age. However, there is a significant main effect of age ($F(2, 30) = 7.62$, $p < 0.002$, eta squared = 0.337), with older children being more accurate than younger children. Post hoc Scheffé analyses reveal that it is the six-year-olds who are significantly better than the five-year-olds ($p < 0.022$) and four-year-olds ($p < 0.003$), but four- and five-year-olds do not differ from each other. For the AAE-speaking children, the equivalent ANOVA revealed that there were no significant differences in MAE accuracy score between the parts of speech, nor any trends with age.

The second set of analyses considered sensitivity. For each participant a ratio was computed of the number of third-person /s/ interpreted as verbs over the total number of verb answers. This ratio approaches 1.0 if the child is sensitive to /s/ as a verb marker, and is at only 0.5 if they answer indiscriminately. Likewise, for the bare form, the ratio was the number of times the bare form was interpreted as a noun compound over the total noun compounds chosen. Sensitivity was thus computed separately for third-person /s/ and bare forms.

ANOVAs used the arcsine transformed sensitivity index as the dependent measure, with age group as the within-subjects measure and part of speech as the between-subject measure. ANOVAs were run for each dialect separately. The results reveal that the MAE children are sensitive to the /s/ morpheme, since they are more LIKELY to respond by choosing a verb in the presence of /s/ than in the presence of a bare form. There is a significant effect of age ($F(2, 30) = 7.86$, $p < 0.002$, eta squared = 0.344), and a post-hoc Scheffé test reveal that the six-year-olds are notably more sensitive than the four-year-olds ($p < 0.003$) and five-year-olds ($p < 0.018$), who do not differ from each other. There is no difference in sensitivity by part of speech, nor interaction of part of speech with age.

To determine if the sensitivity differed significantly from chance performance of 0.5, a one-sample *t*-test was conducted. Results of the one-sample *t*-tests confirmed that the sensitivity to the unmarked form was greater than chance for the five-year-olds ($t(11) = 3.04$, $p < 0.011$) and six-year-olds ($t(9) = 8.806$, $p < 0.000$) but not for the four-year-olds. Identical results pertain for sensitivity to /s/: significant sensitivity for five-year-olds ($t(11) = 2.93$, $p < 0.013$) and for six-year-olds ($t(9) = 7.2$, $p < 0.000$), but not significant for the four-year-olds.

The ANOVA results for the AAE-speaking children reveal no sensitivity to the third-person /s/ nor to the bare form at any age. That is, all the AAE-speaking children responded at chance levels, confirmed by one-sample *t*-tests against the 0.5 level for each age. Figure 6 and 7 show the

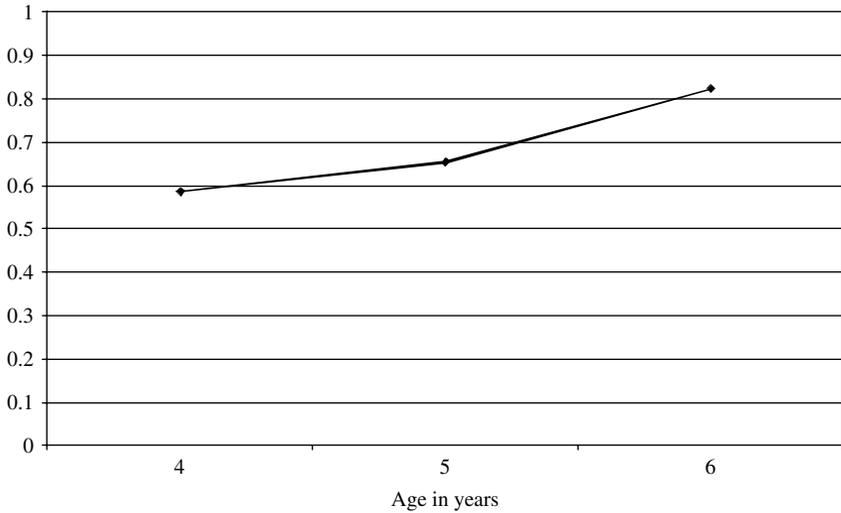


Fig. 6. MAE-speaking children's sensitivity to third-person /s/ as a verb marker.

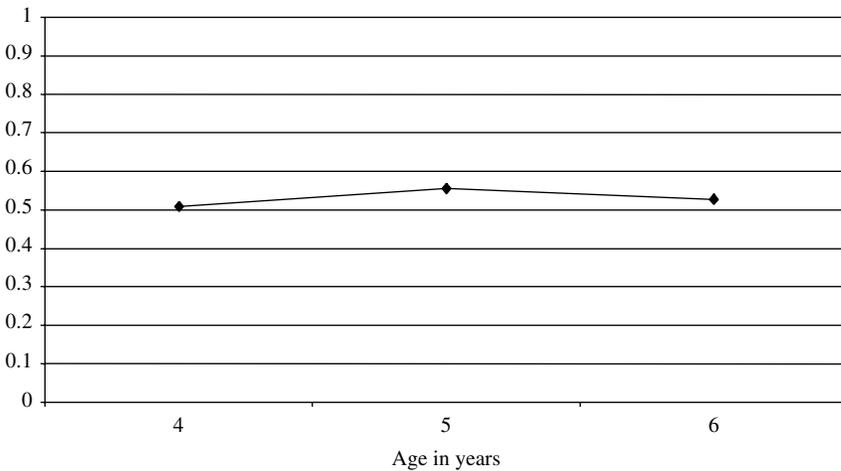


Fig. 7. AAE-speaking children's sensitivity to third-person /s/ as a verb marker.

proportion of verb answers to /s/ stimuli out of the total times a verb was chosen as the answer, for each dialect group. Figure 8 shows the histogram of sensitivity scores for the AAE-speaking children and it reveals a perfect normal distribution around a mean of 0.52. In other words, it is not the case that the group of AAE speakers contains one subgroup who clearly discriminate the forms and another subgroup who do not.

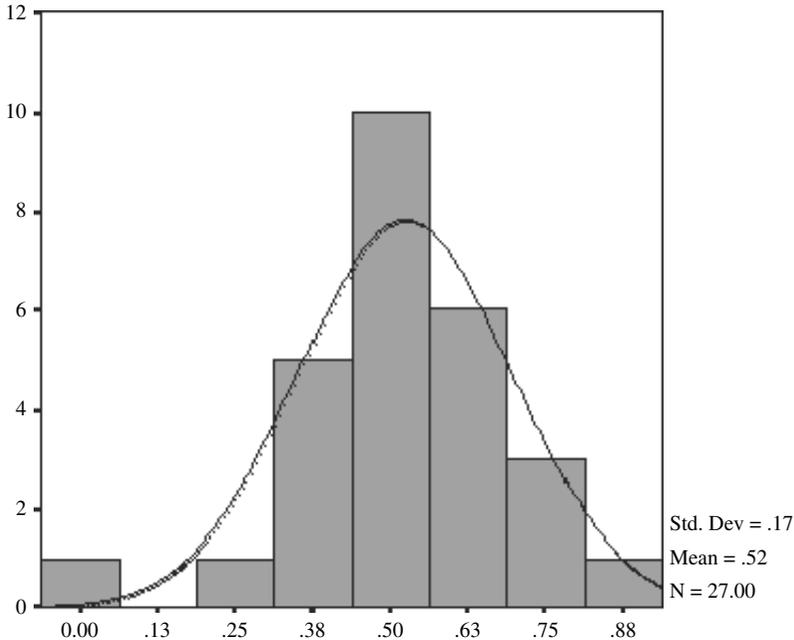


Fig. 8. Histogram of sensitivity scores for the AAE-speaking children in Study 2.

Finally, Figures 9 and 10 plot for each dialect group the three different kinds of sensitivity that have been explored: subject number agreement from Johnson (2005) and Johnson *et al.* (2005), generic versus past from Study 1 and verb versus noun from Study 2. In each case, 0.5 is indiscriminate responding and 1.0 reflects perfect adult MAE sensitivity.

The goal of Study 2 was to examine whether or not AAE- and MAE-speaking children would comprehend third-person /s/ as a verb marker. It is apparent that there is some developing sensitivity to third-person /s/ among five- and six-year-old MAE speakers, but not among four-year-olds. AAE-speaking children aged 4;0 to 6;0 show no sensitivity to the information in third-person /s/ in this study. The findings from the present study support, in part, the findings from Johnson and colleagues (Johnson, 2005; Johnson *et al.*, 2005). Although Johnson and colleagues were examining comprehension of third-person /s/ as an indicator of subject number, a general trend can be seen between the three studies: MAE-speaking children demonstrate some sensitivity of third-person /s/ at older ages while AAE-speaking children demonstrate no sensitivity to third-person /s/ at any age.

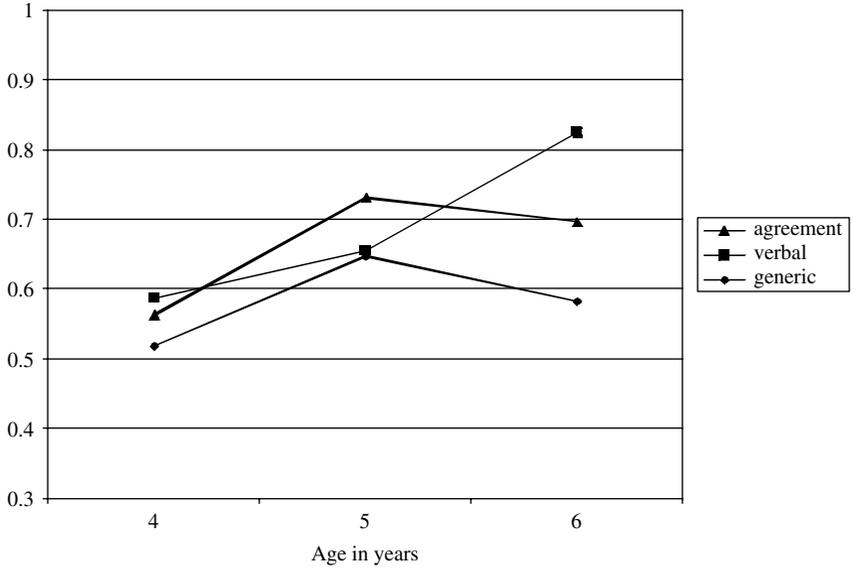


Fig. 9. MAE-speaking children's sensitivity to third-person /s/ in three studies.

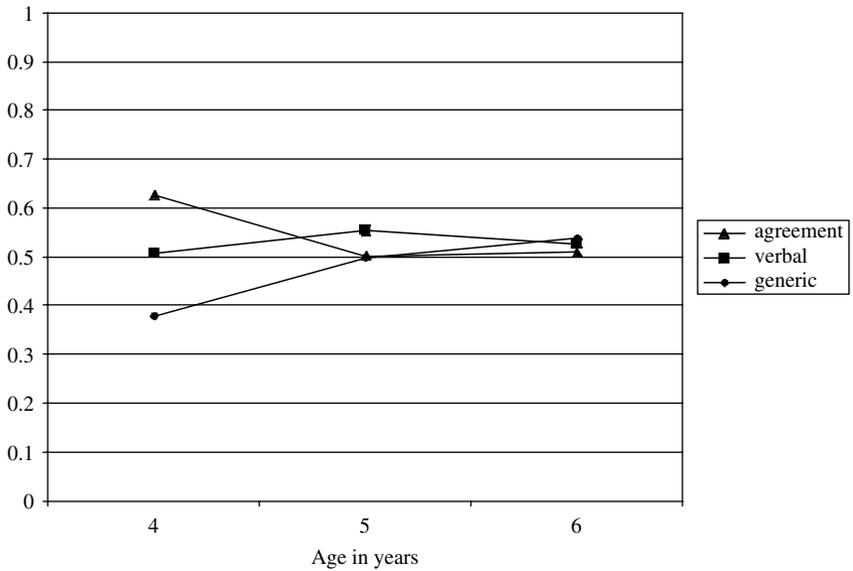


Fig. 10. AAE-speaking children's sensitivity to third-person /s/ in three studies.

GENERAL DISCUSSION

The two studies confirm the finding in Johnson (2005) that AAE-speaking children in this age range do not have third-person /s/ in their comprehension grammar, regardless of the task used. That is, whether it is used to mark subject number, generic aspect versus past tense on unmarked verbs or as an indicator of a verb instead of a noun, AAE-speaking children aged 4;0 to 6;0 do not use the /s/ as a cue. This is in keeping with their production, in which third-person /s/ is used only rarely, matching adult AAE (Washington & Craig, 1994; Baugh, 1999; Rickford, 1999; Green, 2002*a*). The possibility still remains that /s/ could carry information about habituality, or that it could carry information about person (first versus third) but not number or tense/aspect. These studies of comprehension remain to be done. Until they are, the strong implication is that third-person /s/ should not be used on language assessment batteries for AAE-speaking children (Johnson, 2005; Seymour, Roeper & de Villiers, 2003*a*; Seymour, Roeper & de Villiers, 2003*b*).

MAE-speaking children show a more mixed pattern. Though previous research has found that typically developing MAE speakers competently produce third-person /s/ in its obligatory contexts in spontaneous speech from about age 3;0, they show neither accuracy with it nor sensitivity to it as a marker of subject number agreement in their comprehension grammar until age 5;0 or 6;0 (Johnson *et al.*, 2005). The present studies varied the conditions of testing and stimulus design to maximize the chance of discovering what else children might think /s/ means. Four-year-olds do not seem sensitive to /s/ as a marker of subject number (Johnson *et al.*, 2005), nor generic aspect (Study 1), nor as a clue to verb versus noun status (Study 2). Five-year-old MAE speakers detect /s/ as a marker of subject agreement, AND as a clue to pick out a verb from a noun, but not as an indicator of generic aspect. Six-year-olds also understand it as a subject agreement marker, and as a verb marker, but not as a marker of generic aspect versus past tense. However, they are also notably more ACCURATE than the five-year-olds, not just SENSITIVE to the marker. AAE-speaking children are not sensitive to the third-person /s/ in any of these experiments, in keeping with their low rate of production of third-person /s/, matching adult AAE.

It should be noted that we deliberately did not draw the comparison in LEVEL of performance between MAE and AAE in these studies because of the difficulties of matching the populations. In order to be sure that we have African American children who are authentic AAE dialect speakers with relatively little family exposure to MAE, it is advisable to sample from lower SES working-class populations. It is not possible to sample European American children from the same schools to match SES, because they get daily exposure to AAE from their peers. For that reason we sampled European American children from more homogeneous communities that use MAE, but it is probable that their social class is also higher on average.

To the extent that social class predicts verbal ability, and verbal ability predicts success on these tasks, the study is vulnerable to the criticism that the AAE subjects may just be on a different developmental time course than our MAE subjects. In partial defence against that claim, we point to the lack of ANY discernible age trend for the AAE speakers across any tasks. Although the criticism may still stand, we felt that if this caveat about comparability is kept in mind, it is still meaningful to examine the patterns across the different dialect groups. It is increasingly clear from many studies that when non-contrastive areas of language are considered, children who speak AAE show equivalent performance to MAE speakers of the same age and SES (Seymour, Bland-Stewart & Green, 1998; Seymour & Pearson, 2004).

A few questions remain:

- (1) Is the third-person /s/ absent at all levels of the AAE-speaking child's grammar? We see that it is equivalently absent in (a) production and in (b) comprehension for detecting:
 - (i) number
 - (ii) generic aspect, and
 - (iii) verb versus noun–noun compound.

So when it does appear in AAE speech, does it mean something altogether different? Or is the sporadic use just 'code-switching' into MAE (Wolfram and Fasold, 1974)? For example, could the variability we see in comprehension just reflect the variability seen in production: it's just 'optional'? The logic of our design was that if children were using the third-person /s/ optionally in production, then they might show differential sensitivity in comprehension. A zero morpheme should be ambiguous, but the /s/ should have a clear interpretation, as long as it is conditioned by something. We did not find this pattern yet for AAE speaking children.

Perhaps we need a clearer indication from production of the semantics of AAE usage before comprehension experiments can shed light on the grammars. As a consequence, comprehension as well as production tests of third-person /s/ are highly unsuitable for diagnosing disorder in AAE speaking children.

- (2) Why is the MAE-speaking child so poor at comprehending any of these features of third-person /s/, when they are producing it flawlessly at a younger age?

We suggest two alternatives, and some methodological suggestions for future work. First, it may be that the cue of third-person /s/ is a redundant one and hence easily ignored. Roger Brown (1973) wrote:

There are in English a few nouns that do not change form for plural number (*sheep* and *deer*). With either of these nouns as subject the contrast between a marked and unmarked verb (*The sheep graze* or *The*

sheep grazes) is potentially informative about the number of the subject. Again however, the case is rare, and there is some doubt that children would be able to take advantage of this potential information. There is then no semantic exclusively associated with the third person, and the information that is associated with it is almost always redundant. (p. 389)

Brown argued that it was the redundancy of the third-person /s/ that might result in its being a fragile clue for children learning MAE. If so, it would be natural to ask what happens in languages in which the cue is not redundant. For instance, languages such as Spanish and Italian drop the subject pronoun, leaving the verb ending as the only clue to subject number. What happens in these languages if children are tested with just the verb forms? There is now evidence that children speaking Dominican Spanish behave like MAE-speaking children (Pérez-Leroux, 2006), seriously questioning the cue-redundancy argument.

Second, Chomsky (1995) offers a theoretical mechanism within the Minimalist Program. Chomsky claims that number agreement on the verb in MAE may be checked off in syntax, and then not survive at the level of Logical Form. In other words, the information disappears after the agreement is checked and before meaning is computed. Hence, even for MAE speakers, the /s/ verb inflection alone might be a fragile cue to the number features of the subject. With no Logical Form representation, perhaps its meaning is not available to ordinary processing (Johnson *et al.*, 2005).

The question is, what else in grammar might behave this way? Are there other purely formal agreement markers that would also show this unusual developmental pattern, of production of a form before comprehension? The implications are profound. It must be remembered that the stimuli used in our experiments are extreme cases where all other cues have been stripped. In typical learning situations, there are many redundant cues, or the child presumably would not be able to learn to produce the forms correctly in the first place (Theakston, Lieven & Tomasello, 2003). For example, not all verbs start with an *s*, so the plurality (or not) on the subject noun is faithfully available (*the cat plays/the cats play* versus our *the cat sleeps/the cats sleep*). Secondly, the generic /s/ is more usually set against a past tense /ed/ (*the cat chased/chases* rather than our *the cat let/lets*). Finally, many verbs do not have a noun homonym, or have a transitive form, so the child can tell the meaning of *the penguin eats fish* without entertaining the noun compound alternative (compare our *penguin dress/penguin dresses*). The child must learn the conditions for PRODUCING the third-person /s/ from these richer environments, but that does not mean the same thing as understanding the information that it carries alone.

But in cases like ours, how does even an adult grasp the meaning? The possibility arises that in a case such as this, the participant of the experiment must ask, ‘How would I distinguish these two?’ and use their own productions to compare to the model being presented. The task essentially becomes a metalinguistic, reflective task, which is only within reach for the most advanced children, namely the six-year-olds, and for adults. The MAE-speaking children can do this because the third-person /s/ is within their productive grammars; the AAE-speaking child does not use the third-person /s/ productively, so such a strategy would not help. Perhaps on-line processing studies with adult MAE speakers can shed some light on whether the third-person /s/ marker has a special status compared to other morphemes that might survive to Logical Form. An Optimality analysis may prove useful in accounting for these data, as it seems to do for the substantial discrepancy in production versus comprehension of Principle B of Binding Theory (Hendriks & Spenader, 2004; de Villiers, Cahillane & Altreuter, 2004).

Especially if the tasks do entail a metalinguistic reflection, then differences in methodology across the studies need some further empirical attention. The verb–noun contrast required some subtle and highly novel interpretations, so the children actually saw and had a chance to respond to all the descriptions before they put them in contrast. This may have led to higher performance on that task compared to the others. Performance on the picture selection task in Johnson *et al.* might be enhanced if the children were led through a similar pretest with the subject number contrast, e.g. first contrasting completely different scenes:

The duck swims. versus *The cat sleeps.*

before ever trying:

The duck swims. versus *The ducks swim.*

For the case of the generic/past, Study 1 necessarily entailed the context of a story, as static picture contrasts would be ambiguous. This might have increased the performance load, though there was a parallelism to the events and a context that was not hard to follow. Again, possibly leading the children first through a rehearsal with obvious contrasts might enhance sensitivity to the finer contrasts. Given these differences in procedures and tasks, the differences in sensitivity of the MAE-speaking children to the different contrasts cannot yet be attributed to the linguistic contrasts involved. Our goal here was simply to pursue children’s sensitivity to third-person /s/ by whatever means, and across methodologies. The children seem to know less than their production would attest, and this requires rethinking some basic ideas.

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