

**THE SOCIAL DISTRIBUTION OF FUNDAMENTAL  
FREQUENCY CHARACTERISTICS  
IN THE SPEECH OF AFRICAN-AMERICANS**

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**Abstract :** This investigation is designed to provide details of acoustic characteristics in the speech of African-American speakers as they relate to intonation. A prior-analysis perception test revealed listener's greater facility to discern speech differences from the Lower and Upper class speakers from both natural and synthesized stimuli. Analysis of mean F0, and F0 distribution confirms these findings.

**Keywords:** Intonation, African-American English, social class, pitch range, perception.

## INTRODUCTION

It is established that speech signals carry information that may be related to speaker social group. The African-American (AA) group is known for having developed, out of economic and physical isolation, a vernacular characteristic of a social group (Dillard 1972 and 1976). Upward mobility and prestige seeking has led to the adoption of Standard American (SA) forms. Linguists have shown that many can switch to AA Vernacular (AAV) or SA as situation demands. AAV appears to have deep roots in AA culture. It characterizes interactions that pertain to the community (verbal games, demand for active contribution). In order to determine the importance of intonation parameters involved in AA class distinction, a perception test was conducted to evaluate perception of the speakers' class and the importance of F0 variations characterizing classes.

## 1. METHOD

29 AA speakers interviewed for former CBS Evening News were recorded. Speakers were chosen from 4 social categories (based on occupation involving education, income, and membership in social institutions): 2 peripheral (the Inner-City Group and the Upper Middle Class) and 2 intermediate (the Inner-City Educated and the Lower Middle Class) cf. Labov (1990; 209). 77 perception test samples (men=44; women=33) with a 3-second average duration were thus obtained. To produce the synthesized samples, F0 tracks were smoothed by an automatic modeling program using a sequence of target points <ms; Hz> (Hirst & Espesser, 1993). These representations of F0 curves served as inputs to a synthesis system associating the F0 values with duration and intensity values (Dutoit & Leich, 1993). The fixed nasal [m] was reproduced at regular intervals (syllable duration and intensity remaining constant) with the values of the smoothed F0 tracks. 15 European-American subjects were asked to judge from the social class of each speaker the 154 stimuli.

## RESULTS FROM LISTENING TEST

Listeners were able to identify the Inner-City speakers 51% of the time from natural samples and 39% from synthesized samples. Inner-City male speech matched their social class 79% of the time while in 59% of cases, Inner-City women were judged as Middle Class. Among the Middle Classes, female speech was judged as having Upper-Middle Class characteristics more often. Listeners judged Inner-City speech as "more flat", "drawn out", and yet using "more rises", the more standard speech having "more uniformity throughout the sentence". To verify these results, acoustic characteristics such as mean F0, F0 range, and mean low and high ranges were measured.

Table 1: Average Percentages of Correct Class Identification

<b>Natural Samples</b>	<b>Inner-City</b>	<b>Inner-City Educated</b>	<b>Lower Middle Class</b>	<b>Upper Middle Class</b>
Mean	51,00	36,41	25,26	49,87
Standard Deviation	16,39	20,03	14,51	20,67
Confidence Level	5 for 42%	3 for 32%	5 for 39%	5 for 41%
<b>Synthesized Samples</b>				
Mean	39,00	8,79	26,32	24,57
Standard Deviation	25,00	11,07	18,02	19,78
Confidence Level	1 for 51%	1 for 47%	1 for 43%	1 for 46%

## 3. RESULTS FROM ACOUSTIC DATA

2 one-way ANOVA were run to assess the significance of difference in F0 values for speaker perceived class for both male and female speakers. Post-hoc comparisons (Fisher's PLSD) were performed to assess which classes differed significantly ( $p < .05$ ). As far as mean F0, significant difference was found between Inner-City and Upper-Middle Class males ( $p < .0001$ ). Inner-City women also showed the greatest mean F0 values. Values for range are summed up in Fig. 1.

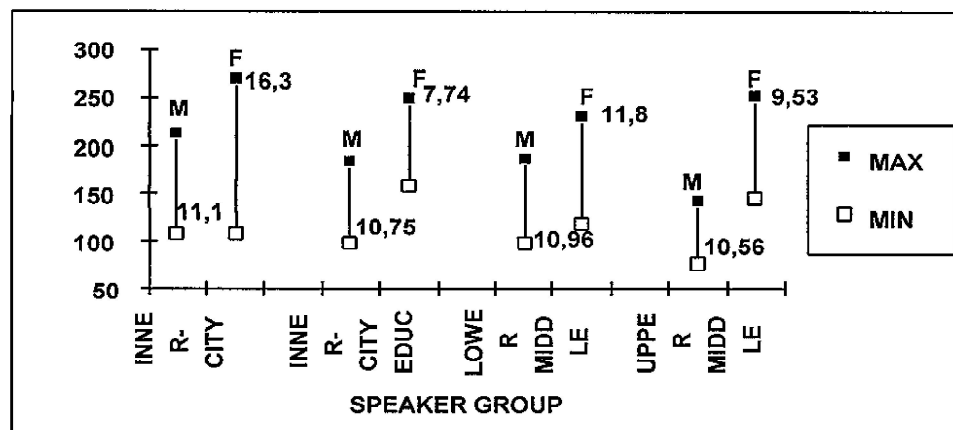


Fig. 1: Max. and min. values for male and female speakers (range in st)

Min. and max. values were higher for Inner-City men. A high degree of significance is noted for differences between Inner-City and Upper Class ( $p < .0016$  for max. values and  $p < .0001$  for min. values) revealing that their respective ranges are shifted upwards and downwards. Upper Class and Inner-City Educated women were perceived as using the highest min. values. Ranges in tones were wider for both Inner-City men and women (11,1; 16,3) and narrower for the Upper Class (10, 5; 9,5) and the Inner-City Educated group. The descriptive data for high and low ranges reveal that both Inner-City men and women have a wider range below than above mean. This experiment besides showing that Inner-City speakers make use (deliberately or not) of a speech that is in conformity with expectations, present data from the Inner-City Educated group that are comparable to these of the Upper Class. This may reveal a tendency toward more conformity.

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