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SOME DETERMINANTS OF STYLISTIC PHONOLOGICAL VARIATIONS.

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THE PURPOSE OF THIS RESEARCH WAS TO EXPLORE SOME OF THE VARIABLES THAT INFLUENCE INTRAINDIVIDUAL PHONETIC VARIATION IN CERTAIN ASPECTS OF AMERICAN ENGLISH SPEECH. FORTY COLLEGE STUDENTS PARTICIPATED IN THE EXPERIMENT. EACH PERFORMED TWO TASKS--(1) READING ALOUD WORDS (16 IN EACH OF FIVE CATEGORIES) FROM FLASHCARDS AS PART OF AN OSTENSIBLE LEARNING TASK AND (2) READING THROUGH THE SAME LIST OF WORDS WITH INSTRUCTIONS TO PRONOUNCE THEM "CLEARLY AND ACCURATELY." TWO OF THE CATEGORIES INVOLVED SUBPHONEMIC OR ALLOPHONIC DISTINCTIONS AND THREE INVOLVED THE RETENTION OR LOSS OF ONE PHONEME. EACH CATEGORY HAD TWO STYLISTIC VARIANTS--A FORMAL ALTERNANT (FA) AND A CASUAL ALTERNANT (CA). A SIGNIFICANTLY HIGHER USE OF FA PRONUNCIATIONS WAS FOUND IN THE SECOND CONDITION (CLEAR PRONUNCIATION) THAN IN THE FIRST FOR ALL FIVE CATEGORIES. THE CATEGORIES INVOLVING SUBPHONEMIC DISTINCTIONS ELICITED MUCH LOWER FA RESPONSES THAN THE CATEGORIES INVOLVING THE LOSS OF A PHONEME, AND THEIR VARIANCE INCREASED FROM CONDITION 1 TO CONDITION 2. THIS WAS ATTRIBUTED TO THE EMIC/ETIC DIFFERENCE. FINDINGS ALSO INDICATED THAT WORD FREQUENCY AND STATUS ARE RELEVANT VARIABLES TO THE CHOICE BETWEEN FA AND CA, AS IS A PERSON'S SPEED OF ARTICULATION. (DO)

Some Determinants of Stylistic Phonological Variations

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An investigation was made of factors that influence the choice of alternate stylistic pronunciations of words in five categories, exemplified by: (a) city, the Formal Alternant (FA) [sitiy] versus the Casual Alternant (CA) [siriy]; (b) positive, FA [pazitiv] versus CA [paziriv]; (c) twenty, FA [twentiy] versus CA [tweniy]; (d) kind, FA [kaynd] versus CA [kayn]; and (e) fists, FA [fists] versus CA [fiss]. Each S first read aloud words--16 in each category--from flashcards as part of an ostensible learning task and then read through the same list of words under instructions to pronounce the words "clearly and accurately." A significantly higher use of FA pronunciations was found in the second condition than in the first for all five categories. Categories (a) and (b) elicited much lower FA responses than Categories (c), (d) and (e) and their variance increased from condition 1 to condition 2. This was attributed to a structural difference setting off (a) and (b) from the rest. Findings also indicated that word Frequency and Status are relevant variables to the choice between FA and CA, as is S's Speed of articulation.

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Some Determinants of Stylistic Phonological Variations[1]

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The purpose of the experiment reported here was to explore some of the variables that influence intraindividual phonetic variation in certain aspects of American English speech. It is well known that there are differences, both dialectal and idiolectal, in the styles of speech among members of the same linguistic community. The concern of this study, however, is not with interindividual differences in speech but with intraindividual variation. A general linguistic treatment of speech styles is provided by Joos (1961), and a sociolinguistic one by Labov (1966).

A number of variables might be postulated as related to the observed variations in an individual's style of speech. One of the most obvious factors is the nature of the communication situation. Thus, for instance, when an individual delivers a formal lecture he is likely to enunciate more carefully than when he engages in a casual conversation with a friend. The two situations, of course, differ considerably in the content of communication and in syntax, but our concern here is only with phonetic differences. The degree of formality of the situation, however, is not the only variable affecting the quality of speech: even in one situation, words of similar phonological shape may be pronounced differently by the same speaker. Such differences in pronunciation seem to depend on certain characteristics of the individual words used. Two variables which may be relevant

in this respect are: (a) the frequency of usage of a word, and (b) its place on a dimension ranging from colloquial to formal. The meaning of this dimension will become clearer in the discussion of the five phonetic alternations chosen for investigation. They are as follows.

(a) In the environment $\acute{S}\_\breve{S}$ (S = syllabic, ´ = primary stress, ˘ = weak stress), /t/ is usually realized as a voiced alveolar flap, [ṙ], a sound very much like the Spanish one-tap [r] in <u>para</u> (for) and <u>pero</u> (but). So, for example, the /t/ of <u>city</u> is usually pronounced with this flap rather than the voiceless alveolar stop [t] which occurs for /t/ in the reverse of the above environment, i.e., $\breve{S}\_\acute{S}$, as in <u>attend</u>. However, in the environment cited for the occurrence of the flap [ṙ] in English, the stop [t] sometimes does occur in a formal style of speech. So that, whereas <u>city</u> is usually pronounced as [siṙiy], in formal speech it is occasionally pronounced as [sitiy], especially when the word is being emphasized by the speaker for some reason.

There has been some controversy over the exact nature of the alveolar flap; e.g., to what extent it is voiced, its duration, its degree of tenseness, and its distribution. For a brief discussion and further references, see Sharf (1960, p. 105). But no one denies that this sound is distinguishable from a clearly articulated [t]. We accept as a working criterion for identification, Francis' (1958, p. 89) characterization of the sound: "In all cases it [the flap] is apico-alveolar and at least partially voiced, though the exact point at which the tongue tip touches the alveolar ridge, the duration of contact and the amount of voice used all vary from region to region and from speaker to speaker."

In the above stylistic alternation, [t] is more characteristic of a

formal style than is [ṙ]; thus [t] and [ṙ] will be called respectively the Formal Alternant (FA) and the Casual Alternant (CA). This is by no means an absolute classification; the FA is only relatively more formal than the CA.

In the above alternation, as well as in the four which follow, slant lines / / are used to indicate underlying phonological representation of a similar nature as that espoused by current generative phonologists (e.g., Chomsky, 1964; Halle, 1962) and earlier by Sapir (1933). This level of representation--referred to by some as "morphophonemic"--entails an abstract characterization of the sound patterns of a language from which all actually realized forms may be mapped by series of phonological rules. The forms that are actually realized in speech are represented here in a "broad" phonetic notation, designated by brackets [ ].

(b) The second phonetic variable involves the same alternants as (a) but in a slightly different environment, ŚŠ_Š. Again, [t] is the FA and [ṙ] is the CA. For example, the casual pronunciation of quality is [kwaliriy], and the more formal pronunciation is [kwalitiy].

(c) The third alternation entails words with /nt/ in the environment Ś_Š. The FA is [nt] and the CA is [n̆], e.g., for twenty, [twèntiy] versus [twen̆iy]. The sound [n̆] is a voiced nasalized flap that may informally be characterized as a flapped [n], with the motion of the tongue very much like that of [ṙ].

(d) The fourth alternation entails words ending in a final consonant cluster /nd/. Here the FA is [nd] and the CA is [n], e.g., for kind, [kaynd] versus [kayn].

(e) The final alternation entails words ending in the cluster /sts/. Here the FA is [sts] and the CA is [s(s)], e.g., for fists, [fists] versus

[fis(s)]. The parenthetic [s] indicates an optional lengthening of the preceding [s]. For future reference, what will later be called "categories (a), (b), (c), (d), and (e)" refers back to the above groupings.

Note that an important structural difference sets off categories (a) and (b) from the rest. The first two categories involve alternate realizations ([t] and [ṙ]) of the same underlying phonological unit (/t/), but Categories (c), (d), and (e) each involve the retention or deletion of one underlying unit. Category (c) does involve an alternate realization of the underlying /n/ ([n] versus [n̆]), but the occurrence of the [n̆] alternant is an automatic consequence of the deletion of /t/. In terms of earlier phonemic theory, (a) and (b) might be said to involve subphonemic, or allophonic, distinctions, whereas (c), (d), and (e) would involve the retention or loss of one phoneme.

We can now return to two of the variables studied in the experiment to be reported. Word Frequency, of course, entails a relative measure of the commonness of occurrence of words in a language. Word Status is characterized as follows. English words, besides having a meaning, also carry a broad range of tones that vary from very casual (or slangy) to very formal (or stuffy). For example:

slang	colloquial	casual	slightly formal	formal	affected
(my)PAD	(my)PLACE	(my)HOUSE	(my)HOME	(my)RESIDENCE	(my)DOMICILE

(The labels "slang," etc., are meant only as a mnemonic guide.) All six words denote the same referent: where I live. But there is a gradual increase in the formality of tone of these words as one goes from left to

right on the above line. Thus, my place has more of a casual Status than does my residence.

It is quite probable that Status and Frequency are in general highly correlated. It should not be surprising that words with a formal tone are relatively infrequent in our speech, since most speech generally occurs in fairly informal situations.

One of the purposes of this experiment was to investigate whether Status and/or Frequency have an effect on the choice of alternants in the above five categories. Observation suggests that frequent words and low Status words are more likely to be pronounced casually than infrequent words and high Status words. For example, under the same conditions, university would be more likely than perspicacity to be pronounced with the CA [ṙ]. (We submit that university is both more frequent and less formal-sounding than perspicacity.)

The situational variable was introduced into the experiment by simulating for the Ss two speech situations differing in degree of formality. The first entails an ostensible learning task which requires from S a degree of attention sufficient to prevent him from consciously monitoring his pronunciation. The second entails an explicit pronunciation task for the same words involved in the first task. In both situations, each word was read by S in citation form in order to control for differences in pronunciation due to sentential distribution of stress, i.e., all words occurred at the center of intonation.

It is not expected that these two situations will elicit S's usual formal and casual styles. They are intended only to elicit two different styles such that one style can be assumed to be more formal, in general, than

the other. Under these circumstances, it will be possible to compare the number of FA pronunciations that occur in each of the five categories in the two different situations, and also to examine the distribution of FA pronunciations relative to the Status and Frequency ratings of the words in which they occur.

Another purpose of this study is to ascertain whether or not the two situations differ in the speed at which the speakers articulate, since a more formal situation may elicit a slower articulatory style than a casual situation. Placement of the formal task second, following the casual task, may eliminate or at least reduce the potential confounding effect of speed. Apart from this, the present study will be concerned with speed of articulation as a subject variable in its own right. An attempt will be made to determine whether people who speak faster produce more formal pronunciations, for the five phonetic categories discussed, than people who speak at a slower rate.

Method

Subjects

The Ss were 19 male and 21 female Cornell University students enrolled in an introductory psychology course. They represent a broad range of dialect areas, with the primary concentration in the East: New York Metropolitan area, 12; other New York State, 9; New Jersey and Pennsylvania, 4; New England, 3; South Midland, 2; Deep South, 2; Northern Midwest, 6; and Far West, 2.

Word List

Twenty words were selected for each of the five categories. These 100 words were rated by 30 females in a Cornell sorority for relative Frequency (17 raters) and Status (13 raters). The raters were instructed to consider both written and spoken usage in the Cornell community, and to rate the words on the list in relation to one another. Thus, if a Frequency rater thought that a particular word was one of the most frequent on the list, she was expected to rate it 5, whereas if she had never seen nor heard it before, she should have rated it 0. Similarly, if a Status rater thought a particular word was one of the most casual, she should have rated it 5, whereas if she thought it was very formal, she should have rated it 1. Intermediate ratings were expressed by 2, 3, and 4. The average rating was calculated for each word on the list. The list was then reduced to 80 words to shorten the length of time needed to run each S. Words were eliminated when it seemed likely that usage would differ significantly by sex (e.g., cosmetics, fighter) or to reduce the number of words in any one category with similar ratings. Frequency was determined in this experiment by student ratings, rather than by the Thorndike-Lorge count, because of the outdatedness of the count and its sole reliance on written sources. In a study like this, commonness of spoken usage is, of course, critical. There is, however, a high overall correlation between the Frequency ratings obtained in this experiment and the Thorndike-Lorge G count ($r = .73$, $df = 79$).

For the experiment proper, the 80 words were randomized and slightly reordered to avoid two words from the same category following one another. Three different random orders were used in the experiment. The final list of words and their Frequency and Status ratings are given in Table 1. To

facilitate exposition, the Status score for each word was subtracted from 5, thus a high score on the Status variable in Table 1 and in subsequent discussions indicates high Status and a low score indicates low Status.

Frequency and Status ratings were significantly correlated for all words ($r = -.69$, $df = 79$, $p < .001$), and for each category ($df = 15$), with the exception of the last: (a) $-.56$, $p < .01$; (b) $-.77$, $p < .001$; (c) $-.65$, $p < .001$; (d) $-.87$, $p < .001$; and (e) $-.28$, NS.

Procedure

Each S took part in two tasks. In the first, the S was told that he should memorize the words printed on flash cards to be presented to him at a quick steady rate by the experimenter. He was instructed to read each word aloud to facilitate his learning and was told that he would be stopped after each third of the list in order to speak into a microphone to record all the words he could remember. Actually, the tape recorder was on throughout the entire experiment. In the second task, the words were presented in the same way, but this time the Ss were asked to concentrate on "clear and accurate" pronunciation of each word, and they were assured that recall of words would not be required.

After an S had completed these two tasks, the E asked him for questions and comments, explained the experiment, and obtained relevant personal information. The Ss were also asked about the tape recorder, and their comments indicated that very few Ss were even suspicious that the tape recorder was running at all times.

The two tasks, learning and pronunciation, were used to create situations in which styles of articulation would differ. In the first, the

Unattended speech task (Condition U), the Ss were concentrating on a difficult learning task, with no reason to believe that pronunciation was the focus of the experiment. In the second, the Deliberate speech task (Condition D), their attention was specifically directed towards pronunciation. Although it is expected that there will be fewer formal pronunciations in Condition U than in Condition D, it must be emphasized that Condition U cannot be equated with casual everyday speech. First, the experimental situation itself is a fairly formal one. Second, the fact that words were presented in citation form also increases the likelihood of formal pronunciation, in that each word is in a position of stress equal to that of the center of intonation of a sentence. Furthermore, the fact that the words were presented visually may also have increased the number of formal presentations.

While one E (LL) was exposing the words to S, the other E (DI) noted which of the two alternants the S produced for each word, and later listened to the tapes to check his notes. Except for 11 items, 6 in Category (b) and 5 in Category (e), which were mispronounced, all words were classifiable as having either the FA or the CA. The mispronounced words were eliminated from the analysis. When an S mispronounced a word in one Condition, that word was also eliminated from the analysis of the second Condition. Two other trained observers each listened to the tapes of six different Ss and made independent tallies of the occurring alternants for each word. Agreement between E and one judge was 94% and between E and the second judge, 92%. The disagreements were distributed among the categories about evenly, and about half were cases in which E had classified a pronunciation as formal when the judge had not, and about half were in the opposite direction. Disagreements in a rating task such as this one must be expected, since in

borderline cases different judges will focus on different features of a sound to decide how it should be labeled, e.g., for Categories (a) and (b), one rater might depend more heavily on voicing whereas another might rely on aspiration or tenseness.

Finally, the tapes were processed through a Brush Recorder Mark II oscillograph which transforms the sound signal into a line on mark paper. Rises of the line above a base level indicate sound. The duration of each word spoken by S could thus be accurately measured. The measurements were in terms of milliseconds, where 25 mm = 1 sec. Because of the high degree of sensitivity of the oscillograph, occasional extraneous noise interfered with the exact measurement of the duration of some words. Because of this, the tapes of seven Ss which were especially noisy were eliminated altogether from this analysis. For the remaining Ss, there were only 21 words which could not be measured because of noise. For these Ss, the average duration per word in Condition U and in Condition D was calculated. In all cases, when a word was eliminated from the analysis of one Condition, it was automatically eliminated from the other Condition.

Results

Of the variables manipulated in this experiment, the change in situation had the strongest effect on the number of FA pronunciations produced by the Ss. The overall mean number of FA's for all five categories of words was 24.32 in Condition U, and 28.22 in Condition D, $t = 13.55$, df = 79, $p < .001$. As can be seen in Table 1, only four out of the 80 words had fewer FA's in Condition D than in Condition U, and similarly, only three

out of the 40 Ss in the experiment gave fewer FA's in Condition D. The effect was also strong for each category considered separately. The *t* values for Categories (a), (b), (c), (d), and (e) are 7.72, 4.66, 6.21, 9.06, and 5.19 respectively (for each test, df = 15 and $p < .001$). It is notable that all categories exhibited this situational effect despite differences among them in other respects. The number of FA's for each word is tabulated in Table 1 for both Conditions.

Insert Table 1 about here

It can be seen in Table 1 that the number of FA's in Category (a) was much smaller than in any of the other four categories within each Condition. All comparisons of (a) with the other four categories in Condition U and in Condition D are significant beyond the .001 level. The smallest difference of all comparisons involving Category (a) was in Condition D for (a) minus (b), and this difference yields a *t* value (df = 39) of 4.91. Even more striking are the differences in number of FA's between Categories (a) and (b) on the one hand and (c), (d), and (e) on the other. The smallest difference of all comparisons involving Categories (a) or (b) versus any of the other three categories was between (b) and (d), and even this difference reached a *t* value of 7.35. The comparisons among (c), (d), and (e) in Condition U and in Condition D do not yield significant differences, except for the difference between (c) and (d) in Condition U ($t = 2.06$, $p < .05$). It is clear that, while the tendency in the first two categories was to give CA pronunciations, the tendency in the last three categories was to give FA pronunciations.

The first two categories also differ from the last three with regard

to how the variation in number of FA's was affected by the situational change. As can be seen in Table 2, the variances of Categories (a) and (b) increased significantly from Condition U to Condition D, while those of Categories (c), (d), and (e) decreased, although only in Category (c) significantly so.

Insert Table 2 about here

It can also be seen in Table 2 that the variance differences among categories changed with the situation: in Condition U the variance of Category (a) was significantly smaller than that of any other category, while in Condition D it was Category (c) which was significantly smaller than all others. Also, in Condition D, the variance in Category (d) was significantly smaller than in Categories (b) and (e). In Condition U, no other comparisons, aside from those with Category (a), were significant.

In order to study the relations among the five categories within and across conditions, the numbers of FA's given by the Ss to each of the five categories in each of the two conditions were intercorrelated and factor analyzed. A principle component solution was used in the analysis and five factors were extracted to account for the 10 variables. The fifth residual matrix contained no correlations higher than .08 and only 4% of the total variance remained unaccounted for after extraction of the five factors. The correlation matrix is presented in Table 3 and the unrotated factor matrix in Table 4. The factor matrix was also rotated but the resulting structure

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Insert Tables 3 and 4 about here

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is less clearly interpretable than the unrotated matrix and hence is not presented here.

Factor I is clearly a general factor, indicating that Ss who tended to pronounce words in a relatively more formal manner in one category also tended to do so in all categories. In other words, this factor reflects the Ss' general predisposition to respond in a more formal or a more casual manner.

Factor II separates the first two categories from the last three. This split has already been indicated by the level of FA responses and by the variance shifts across conditions. It will be further reinforced in the relations of the FA responses with Speed, Status, and Frequency.

Factor III shows negligible loadings for Categories (a) and (b). The other three categories are divided by positive and negative loadings into Category (c) on the one hand and Categories (d) and (e) on the other.

Factor IV separates Category (d) from Category (e), and Factor V separates Category (a) from Category (b).

Following Deese's (1965) lead, we present in Figure 1 a graphic representation of this factorial structure.

Insert Figure 1 about here

It is noteworthy that the situational variable is not reflected in the factor matrix, indicating that the increase in number of FA responses in Condition D left the relative standing of each S largely unchanged. This stability is clearly indicated by the high correlations in Table 3 across conditions within categories (all above .80).

One subject variable, i.e., Speed of articulation, was specifically examined in this study. The average times taken by the Ss to produce the words in Condition U and in Condition D were correlated with their FA scores

in each of the five categories under both conditions. None of the correlations with Categories (c), (d), and (e) were significant. The correlations with Categories (a) and (b) are presented in Table 5. As can be seen, even for these categories, Speed reaches significance only in five out of the eight comparisons.

Insert Table 5 about here

In view of these correlations it was necessary to test whether Conditions U and D differed with respect to Speed. This comparison showed no difference (t = .01, df = 39) between the mean Speed per word per S in Condition U (16.42 mm, 25 mm = 1 sec) and the mean Speed in Condition D (15.88 mm). It is thus clear that although slower speakers tended to produce more FA's than faster speakers, the contribution of the situational variable was independent of this effect.

So far we have discussed the effects of the situational, categorical, and subject variables on number of FA responses. It remains now for the results of the two word variables, Status and Frequency, to be reported. Because of the variance differences among the categories, a nonparametric statistic, the chi square, was used to assess the relation between these variables and the number of FA responses in each category under each condition. For purposes of this analysis, the 16 words in each category were divided into equal groups, those eight having the highest Status ratings in one group and those eight having the lowest Status rating in the other--and similarly for Frequency. The proportion of FA's in the High half was compared with the proportion in the Low half for each category and each condition, for Status and Frequency. The results of this analysis are displayed

in Table 6. As can be seen, Status and Frequency are significantly related to number of FA responses for Categories (a) and (b) in both Conditions, and for Category (d) only in Condition U and at a relatively low level of significance.

Insert Table 6 about here

Discussion

The results single out the situational variable as the strongest and most pervasive of the variables considered here. The Ss, when confronted with explicit directions for clear and accurate pronunciation in Condition D, increased markedly, as might be expected, their use of the formal alternants over the level of these alternants in the ostensible learning task of Condition U. The Speed analysis indicates that the effect is directly attributable to the instructions and not mediated by differences in rate of speaking in the two conditions. That the shift was elicited relatively uniformly for all five categories lends empirical validation to our combining these categories as concomitants of style. That is, there seems to be justification for saying that the FA's defined for each of the five categories are in fact related as aspects of formal style, and that the CA's are related as aspects of casual style. The striking difference between the two conditions in number of FA's establishes the situational variable as one of the major factors controlling choice of style. This conclusion accords well with common observation. For instance, one of our Ss, a radio station announcer, noted that he differentiated between his "FM" and "AM" pronunciations. The "FM" style is, in the present five categories, closer to

the actual spelling than the casual one, and for this reason may be given by Ss when asked for "accurate" pronunciation.

The situation was manipulated in this study rather obviously by means of instructions; it remains to be determined what aspects of everyday situations lead speakers to self-instruct themselves to engage in a formal or casual style.

While the generality of the situational effect shows that all five phonological categories constitute, on one level, a unitary class, other results reflect differences among the categories and lead to refinements in the notion of style. First, it was found that the number of FA's elicited for Category (a) in either condition was significantly smaller than for all other categories, and that--even more so--Categories (a) and (b) differed from (c), (d), and (e) in the same respect. The latter difference is probably related to the structural difference, discussed in the Introduction, that sets off (a) and (b) from the others. That is, the two alternants of both Categories (a) and (b) differ from each other only in that each involves an alternate realization of the same underlying segment. But members of the pairs of alternants for Categories (c), (d), and (e) differ from each other by the presence or absence of one phonological segment; i.e., for each of these three categories, the casual alternant involves the deletion of an underlying segment that the formal alternant retains. The casual alternants of Categories (c), (d), and (e) thus omit an underlying phonological segment while those of (a) and (b) merely give it a different phonetic realization than the formal alternants. Because of this, it is possible that the casual alternants of (a) and (b) are reacted to as more acceptable than those of (c), (d), and (e). Although there doesn't seem to be any obvious structural

grounds for a preference of the casual alternant of (a) over that of (b), such a preference seems nevertheless to exist and to be reflected in the smaller number of FA's in (a) than in (b). The formal pronunciation in Category (a), such as [sitiy] for city, seems more aberrant in American English than the formal pronunciation in Category (b), such as [pazitiv] for positive. Most Americans would tend to react to the former, but not the latter, as sounding somewhat British. Also, the mean Status rating of Category (b) words (2.8) is significantly higher (t = 13.2, df = 12, $p < .001$) than the Category (a) mean (1.8).

The comparisons of category variance in Table 2 yield further evidence in support of the above contentions. In Condition D, as per directions, the S was directly concerned with finding what he thought to be the more precise or "correct" pronunciations. The variances in number of FA's produced for Categories (a) and (b) were significantly greater, under this condition than when S's attention was not directed towards pronunciation; but the variances of (c), (d), and (e) decreased from Condition U to Condition D (except for (c), not significantly). It would seem then that, when consciously concerned with the well-formed or "correct" pronunciation, Ss tended to have a more clear-cut notion of what was more normative for Categories (c), (d), and (e) than they did for Categories (a) and (b). This difference may be attributed to the observation, made above, that in the case of Categories (c), (d), and (e) only the formal alternant realizes the underlying phonological segment, whereas in Categories (a) and (b) the underlying segment is expressed by both alternants in different ways. It seems reasonable, therefore, to assume that Ss will almost exclusively consider the formal alternants of (c), (d), and (e) as well-formed, while they may consider

the casual alternants of (a) and (b)--and not only their formal alternants--also as well-formed.

That Category (a) has by far the smallest variance in Condition U supports the contention that the formal alternant of (a) was generally reacted to as unacceptable. The Ss seem to have agreed in their preference for the casual alternant in the case of (a) in Condition U. In Condition D, however, Ss were not primarily guided by their personal preferences but by what they considered to be the proper or normative pronunciation.

That the variance of (e) is highest everywhere (U and D) may be due to the difficulty in pronouncing the [sts] cluster. That is, there may have been some Ss who intended, like the majority, to produce this formal cluster, but failed, in some words, to articulate fully the sounds they intended to produce, and instead produced the CA pronunciation ([s(s)]). The pronunciation difficulty would introduce an additional source of variation. The fact that the variance of (e) is significantly higher than that of most other categories only in D, where Ss were directly concerned with "correctness," lends support to this interpretation. It is also supported by the comments of several Ss who indicated that this cluster sometimes caused them to be tongue-tied. The finding that (c) had the smallest variance in Condition D is probably due to a "ceiling effect," the mean number of FA's in this category (37.6) being closer to the maximum possible (40) than in any other category. Thus, the small variance of (c) in Condition D is attributed to a "ceiling effect" and the small variance of (a) in Condition U to a "basement effect."

The ceiling effect seems also to have affected the Status and Frequency results. As can be seen in Table 6, both Status and Frequency were

consistently related to the number of FA's only in Categories (a) and (b). The high level of formal responses in the last three categories may have prevented Status and Frequency from exhibiting their effects. In fact, Status and Frequency did show significant relations to FA's in (d)U, which had the smallest number of FA responses among the last three categories.

The Speed variable also seems to have singled out Categories (a) and (b). As is shown in Table 5, Speed is correlated with FA's in five out of the eight possible cases in Categories (a) and (b), but it is not correlated with any of the twelve possibilities involving Categories (c), (d), and (e). Again, the ceiling effect may be an inhibiting factor here. Since the duration of the casual alternant [ṙ] is shorter than that of the formal alternant [t], it is not surprising that Ss who spoke at a faster rate tended to choose the casual alternant more often than those who spoke at a slower rate.

By way of summary, consider how the results of the factor analysis tend to reaffirm the patterns described above. Factor I, the general factor, lends more credence to our grouping of the five category alternants with respect to style, in that it reflects, as noted above, the disposition of Ss to respond in a more formal or more casual manner in all five categories. The split between Categories (a), (b) and (c), (d), (e), indicated by Factor II, is supported throughout the analysis; (1) in the magnitude of FA responses, (2) in the variance shifts across conditions, (3) in the relation of FA responses to Status and Frequency, and (4) in the relation of FA responses to Speed. This split corresponds to the difference in the structural relation between the members of the pairs of alternants in (a) and (b) versus (c), (d), and (e).

The remaining three factors, splitting these two major groups into

the individual categories, reflect the unique characteristics of each category, as outlined in the above discussion. The absence of a situational factor in the matrix further corroborates the generality of this effect across all five categories.

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Footnote

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Table 1

Words Used in Experiment, their Frequency, Status Ratings, and Number of FA Pronunciations in Conditions U and D

Category (a), ŚtŚ			# FA's		Category (b), ŚŠtŠ			# FA's	
Word	Status	Freq.	in U	in D	Word	Status	Freq.	in U	in D
fatty	.5	2.3	0	6	university	2.2	5.0	1	7
kitty	.1	2.4	1	5	positive	2.1	4.2	25	29
water	1.2	4.8	7	11	personality	1.8	4.8	6	13
sitter	.5	2.9	5	14	executive	2.5	3.8	11	14
notice	1.7	4.6	4	7	ability	1.9	4.8	12	18
better	.9	4.6	5	10	punitive	3.5	2.7	36	34
spaghetti	1.1	3.5	1	3	prerogative	3.2	3.5	13	16
little	.9	4.4	3	9	janitor	1.8	2.8	24	23
thirty	1.3	4.1	0	8	laxative	2.1	2.6	21	23
unwitting	2.7	2.4	7	12	capitol	2.2	3.0	8	13
poultice	3.4	1.0	39	40	mendacity[a]	3.9	1.3	3	3
neuter	2.1	2.3	2	13	levity	3.0	1.9	15	18
belittle	3.0	2.6	5	10	felicitous[a]	3.8	1.9	20	27
furtive	3.2	2.1	21	29	purgative	3.5	1.4	27	28
strata	3.5	2.1	4	6	heritage	2.8	2.8	34	36
neuritis	2.8	1.6	2	7	proclivity	3.8	1.2	8	13
Totals	28.9	47.7	106	190	Totals	44.1	47.7	264	315
Means	1.8	3.0	6.6	11.9	Means	2.8	3.0	16.5	19.7

Table 1 (cont.)

Category (c), ŚntŠ			# FA's		Category (d), nd#			# FA's	
Word	Status	Freq.	in U	in D	Word	Status	Freq.	in U	in D
winter	1.6	4.7	35	38	mind	1.5	4.8	31	34
panties	.7	3.2	31	39	transcend	3.2	3.0	35	37
mental	1.8	4.5	36	38	hand	1.1	4.6	27	34
integrate	2.2	4.7	33	36	round	1.3	4.5	30	37
twenty	1.4	3.9	33	37	found	.8	4.4	27	37
gentle	1.6	4.2	33	37	end	1.1	4.5	32	37
wanting	1.6	4.1	35	38	stand	1.0	4.4	29	36
center	1.5	4.1	33	34	find	1.1	4.5	32	36
phantom	2.8	2.0	36	36	behind	1.0	4.4	27	34
printed	1.6	4.1	35	38	descend	2.2	3.6	30	33
flaunting	2.8	2.6	38	38	remand	3.3	1.2	32	38
slanted	2.2	3.4	36	39	defend	1.8	4.1	31	37
scented	2.2	3.1	35	39	confound	2.8	2.4	33	35
dental	2.1	2.5	36	39	abound	2.7	2.5	33	37
ventilate	3.2	2.5	31	36	amend	2.6	2.5	35	38
mantle	3.2	2.2	37	39	gland	1.8	2.4	32	37
Totals	32.5	55.8	553	601	Totals	29.3	57.8	496	577
Means	2.0	3.5	34.6	37.6	Means	1.8	3.6	31.0	36.1

Table 1 (cont.)

Category (e), sts#

Word	Status	Freq.	# FA's in U	# FA's in D
ghosts[a]	1.2	2.6	30	36
detests[a]	2.5	3.9	33	38
assists	2.3	4.4	34	33
requests[a]	2.4	4.2	36	35
contrasts	2.1	4.1	32	36
hoists[a]	2.0	1.9	35	36
fists	1.3	2.8	33	36
lists	1.3	4.2	34	35
guests	1.6	4.1	33	37
pests	1.5	2.6	35	36
roasts	1.6	3.3	32	36
posts	1.5	2.9	30	35
bequests	3.3	1.5	34	36
inquests	2.8	1.6	30	35
invests[a]	1.9	3.6	33	38
molests	2.9	2.8	33	35
Totals	32.2	50.5	527	573
Means	2.0	3.2	32.9	35.8

[a]Each of these words was mispronounced between one and four times. The values for the number of FA's here are adjusted to include all 40 Ss by assigning the group mean to the missing Ss.

Table 2

Comparison of Category Variance Within and Across Conditions

	Variance		t Values				
	Condition		Category				
Category	U	D	(a)	(b)	(c)	(d)	(e)
(a)	5.72	17.58	-6.38*	-3.25*	-3.51*	-3.06*	-4.70*
(b)	13.28	20.63	.63	-3.31*	-.65	-.23	-1.60
(c)	16.35	4.97	-4.39*	-4.96*	6.73*	.47	-1.18
(d)	14.34	10.66	-1.63	-2.10*	2.72*	1.64	-1.51
(e)	22.44	20.05	.40	-.13	5.14*	2.68*	.75

Note.--The t values in the cells on the main diagonal (underlined) are for categories across conditions. The t values above the diagonal are for differences between categories within Condition U, and below the diagonal, within Condition D. The df for every comparison is 38. Significant t values are starred, for $t \geq 2.03$, $p < .05$; for $t \geq 2.71$, $p < .01$; for $t \geq 3.57$, $p < .001$.

Table 3

Intercorrelations Among the Five

Phonetic Categories in the Two Conditions (U, D)

Variable	1	2	3	4	5	6	7	8	9	10
1. (a)U	*	.54	.25	.27	.19	.82	.53	.23	.16	.13
2. (b)U		*	.21	.23	.10	.55	.91	.21	.02	-.01
3. (c)U			*	.50	.54	.35	.29	.88	.47	.52
4. (d)U				*	.49	.35	.31	.43	.84	.55
5. (e)U					*	.29	.26	.38	.53	.88
6. (a)D						*	.63	.31	.29	.24
7. (b)D							*	.29	.17	.16
8. (c)D								*	.45	.43
9. (d)D									*	.68
10. (e)D										*

Note.--df for each entry is 39.

Table 4

Unrotated Factor Matrix of Intercorrelations

Presented in Table 3

	Factors				
Variable	I	II	III	IV	V
(a)U	.57	-.58	.15	-.09	.48
(b)U	.50	-.74	-.04	.10	-.38
(c)U	.76	.23	-.54	.03	.08
(d)U	.76	.26	.23	-.44	-.22
(e)U	.71	.59	.22	.50	.02
(a)D	.69	-.52	.14	-.07	.38
(b)D	.63	-.64	.02	.14	-.37
(c)D	.70	.18	-.65	-.08	.04
(d)D	.71	.45	.26	-.38	-.10
(e)D	.71	.52	.25	.33	.03
Percentage of total variance	46.15	23.40	9.86	7.50	7.21

Table 5

Correlations Between Speed and Number of FA's in Categories (a) and (b), under Conditions U and D

	Number FA's in			
	(a)U	(a)D	(b)U	(b)D
Mean Speed in U	.55**	.48**	.33*	.22
Mean Speed in D	.49**	.12	.30	.47*

* $p < .05$, ** $p < .01$

Table 6

Relation Between Status and FA's, and Frequency and FA's,

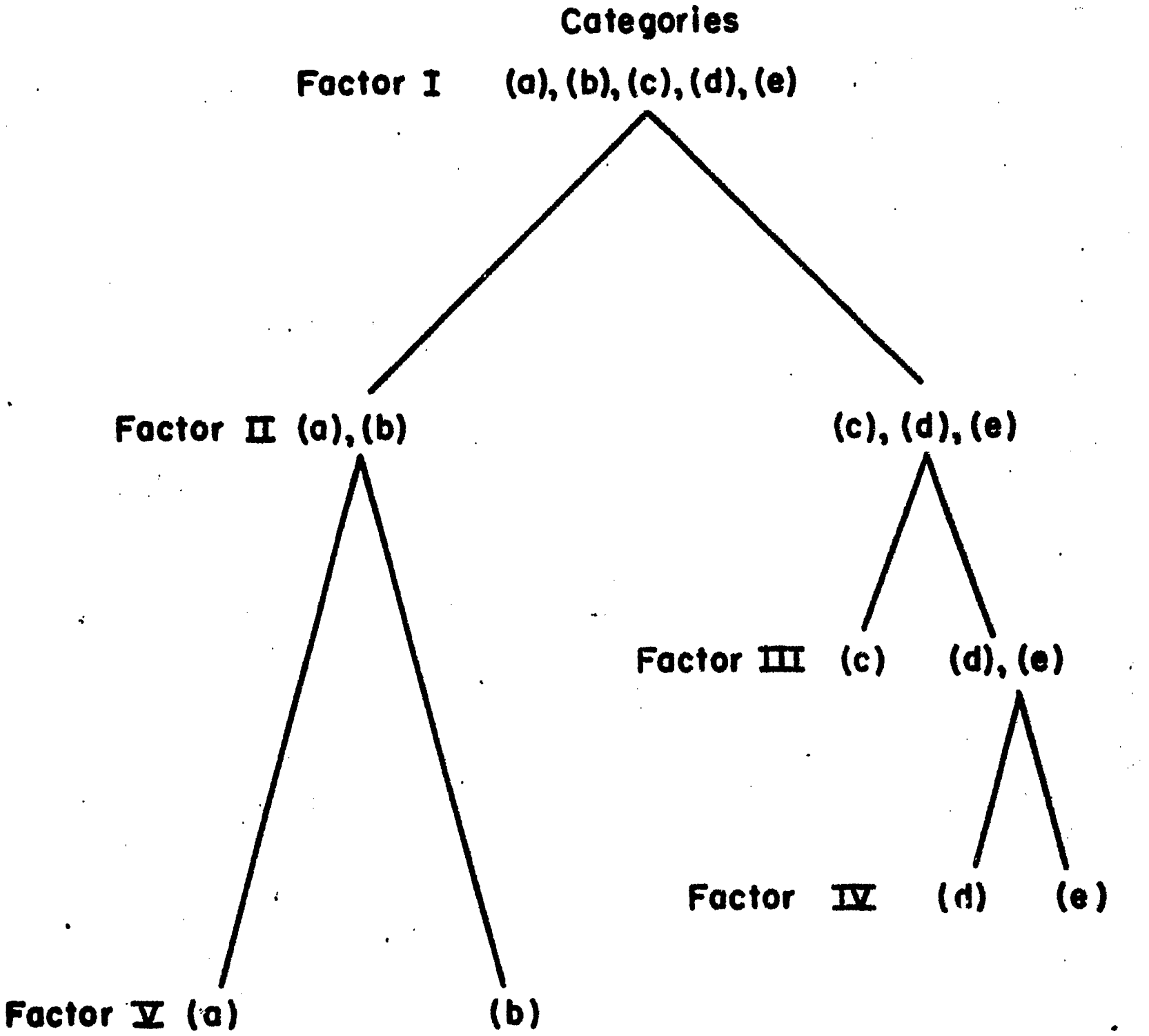
in the Five Categories Under Both Conditions

	Status Ratings				Frequency Ratings			
	Proportion of FA's[a]				Proportion of FA's[a]			
	8 Lo	8 Hi	Chi^2	p	8 Hi	8 Lo	Chi^2	p
(a)U	.07	.26	43.46	.001	.09	.24	23.92	.001
(b)U	.34	.48	14.08	.001	.31	.52	27.05	.001
(c)U	.85	.88	2.00	NS	.85	.88	2.00	NS
(d)U	.73	.82	6.06	.02	.73	.82	6.06	.02
(e)U	.81	.83	2.00	NS	.83	.81	2.00	NS
(a)D	.21	.39	25.18	.001	.23	.37	15.84	.001
(b)D	.44	.55	7.69	.01	.42	.57	15.12	.001
(c)D	.85	.88	2.00	NS	.93	.95	2.00	NS
(d)D	.89	.91	2.00	NS	.89	.91	2.00	NS
(e)D	.90	.89	2.00	NS	.90	.89	2.00	NS

[a]Each entry in these columns is the ratio of the number of FA responses to the total number of responses, which was 320 (8 words X 40 Ss) in virtually all cases.

Figure Caption

Fig. 1. Graphic representation of factor matrix in Table 4. The lower the factor in this hierarchy and the smaller the angle, the smaller the percentage of the total variance accounted for by the factor (not proportionately so, only suggestively). The actual percentages are given in Table 4.


Categories
Factor I (a), (b), (c), (d), (e)
Factor II (a), (b)
(c), (d), (e)
Factor III (c)
(d), (e)
Factor IV (d)
(e)
Factor V (a)
(b)