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Proceedings of the 3rd Annual Meeting of the Berkeley Linguistics Society (1977), pp. 566-576

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I. Introduction

Traditionally, in the study of phrase stress, there is a basic approach that has been followed: first, devise a target sentence; second, ask a question to which the target sentence is seen as an answer (to create a context for the target sentence). Then, assign stress to the sentence, based on intuitions about how the sentence should be said. We can see such an approach in the work of Chafe (1976), Bolinger (1972), Jackendoff (1972), and Schmerling (1973), to name a few. However, this methodology is adequate only insofar as native speaker judgments about stress reflect the stress patterns in actual use. The assumption has been that they do. This paper is concerned with testing this assumption through three separate but related experiments.

The relationship between stress use and stress judgment is first investigated in these experiments. First, I examined the use of stress in spontaneous conversational discourse and matched the observed patterns of use with native speaker judgments. The judgments were observed first in the responses of a group of naive speakers and then in the responses of a group of linguists. As I have pointed out in an earlier paper (Lehman f.c.), the examination reveals that, within a discourse context, there exists a broad gap between judgments about stress and the use of stress.

Second, the sentences from the conversation were removed from context and grouped as isolated sentences. Judgments about sentences in isolation show an even larger gap with the stress patterns exemplified in actual use.

Third, the isolated sentences were given to speakers to read aloud to check the oral assignment of stress. These results were compared with the discourse assignments, as well as with the assignments made in the other experiments. Here again gaps in agreement are noted.

Another issue addressed involves the strategies used in assigning stress. It is suggested that when naturalistic discourse is examined, none of the tradtional semantic distinctions offered in the literature suffice to explain what stress does in a discourse utterance; for example, stress is not merely an indicator distinguishing given/new information (Chafe 1976). Stress cannot be explained in terms of polarities. It is also shown that the strategies used by the respondents in all cases differ from those used by the actual speech participants. By investigating the assignment of stress in each separate experiment, it is possible to see these different strategies and especially to see how strategies for a conscious assignment of stress are different from those used in unconscious assignme

In this paper, stress 'use' will refer to the assignment of stress in speech (i.e. by reading aloud or by participating in a conversation). This occurs in the original conversation, i.e. the

discourse stress assignment (DSA), and in the reading of isolated sentences (ISA-R). Stress 'judgment' will refer to the conscious decisions of people in marking stress by underlining the words they think they would assign stress to. This occurs in the written stress assignment to the actual discourse context (CSA) and in the written assignment to the isolated sentences (ISA-W). 'Judgment' then, as used here, refers to conscious assignment of stress and 'use' to unconscious assignment.

The concern here was only with primary stress -- defined (admittedly, rather loosely) as the word in an information sequence that receives 'pitch prominence' relative to the other words in the utterance. Although it has been shown that stress is a complex of factors (Bolinger 1958; Liberman & Sag 1974), it has also been shown that pitch is the most prominent cue to stress.

II. Context Stress Assignment (CSA)

First, a 15-minute telephone conversation of two female college students (A & B), previously transcribed according to conventions of conversational analysis (Jefferson & Schegloff), was retranscribed with the major stresses marked. The resulting transcription was checked by a second party.

Second, a portion of the transcription (3 minutes) without stress marking was given to 46 native speakers, including 40 college students and 6 linguists, who were asked to underline the word(s) in the sentence or phrase which should receive the most prominent stress. A discourse sequence was specifically chosen instead of isolated sentences in order to provide a continuing context for those reading it. The discourse provided a continuity not present in sentences in isolation. In addition, two of the respondents also read the transcription aloud first, so that their reading version could be compared to the actual conversation and to their own written stress assignment.

The results show two main points: 1) there is little correlation between judgments about stress and its use in actual discourse; and 2) there is little commonality of response among those assigning stress, with one general exception.

In a short portion of the transcription given to the participants, there were 21 primary-stressed words as used by the actual speakers of the spontaneous discourse. The overlap of participants' assignment (i.e. the 40 students) with these actually-stressed words averaged 40%, i.e. those assigning stress marked 8.4 of the same 21 words that the actual discourse participants marked by speech stress. In other words, 60% of the time, they did not believe stress should be assigned where the participants put it.[1]

Six native English-speaking linguists were asked to mark stress on the transcript to see if they showed the same sort of gap between judgment and use. Results show that linguists are better: they average 56% overlap, which means that only in 44% of the cases do they think stress should be assigned somewhere other than where the speakers put it. This figure does not include one respondent who marked 110% more primary stresses than the speakers and who indicated

later a strong conviction that the stress assignments made matched the original closely.

The following examples show the type of matching between respondents and actual speakers that occurred. For example, in the discourse, line 49 appears as:

1. But it was fun. Y'sound very far away.

In the responses, we find the following number of responses assigned to each word:

5 4 2 14 8 10 8 7

1'. But it was fun. Y'sound very far away.

Only 3 out of 40 correctly matched the actual use in the entire sequence. While fun does receive most responses in the first sentence, almost as many are scattered among the other words. In the second sentence, away receives the least number of stress assignments.

In line 55 of the text, grandmother is the word stressed by the actual speaker. Yet in looking at the responses, we see that almost every word in the utterance received at least a few stress assignment

2. 3 0 17 2 0 4 10 3 21

Ohh my mother wanted to know how's yer grandmother

Although grandmother did receive 21 total responses, only 8 (or 20%) of the respondents accurately matched the conversation, i.e. only marked grandmother. The two nouns receive the majority of responses (38), while 22 assignments are scattered among the other words.

When we look at the results of stress assignment by the experiment participants, one thing stands out: there seems to be little that they agree on. If they do not match stress assignment with the actual speakers, we might expect that they would at least match each other. That is, perhaps they are paying attention to one particular feature in order to determine the placement of stress. Thus, while they do not overlap with the actual speakers, they might overlap wit each other. But as the examples provided above indicate, this is no so.

Those assigning stress do not overlap heavily with each other, but they do show certain tendencies: first of all, there is a tende for the respondents to focus on words with a high degree of semantic content. Respondents tended to assign primary stress to nouns, adjectives, adverbs, verbs (not be) and quantifiers, where they were available for assignment. It suggests that respondents marked items they considered informationally significant,[2] i.e. they selected what they believed were the most informative items in the utterance from the speaker's point of view.

This strategy may not conflict with what actual speakers do. In fact, in looking at the transcript, the majority of items actuall receiving stress are discourse new. But if the strategies used by the respondents and actual speakers correspond, why then do we find such a gap between assignments by the two groups?

I suggest two sources for this lack of correspondence, the first dealing with the extent to which respondents make use of the

same context as the speakers (Keenan & Schieffelin 1976).

The utterance context, to a large extent, determines what is significant information. The notion 'context' can include, among other things, speaker's intentions, discourse history, nonverbal context, and background knowledge shared by speaker and hearer. While the actual interlocutors had access to these dimensions,[3] the respondents in the experiment had access only to the discourse history, and this is what I will focus on. I suspect that even though they had access to discourse history, they did not always consider it in assigning stress to an utterance. For example, in lines 29-31, A and B discuss the tough courses that A is taking, as example 3 shows:

3. 28. A: 'have a lotta tough courses
29. B: Oh I c'n imagin whatcha told me whatchua takin'
30. A: Oh::: God, I've so much work
31. B: Mm

The topic of tough courses is then dropped and picked up again in l. 77. At this point, the focus is on B's tough courses. After several exchanges, A says:

3'. 83. A: I have the- I have one class in the evening

If we consider only the immediately prior exchanges, almost any word in 83 can be considered new information. However, taking into account the earlier exchange in 28-31, only the information that A's class is in the evening is new. The responses of those assigning stress indicate that many did not draw on the earlier context, as the following example shows:

3''. 3 0 1 4 2 19 7 1 0 18
83. I have the- I have one class in the evening

Twice as many stress assignments are not on evening as are.

That they do not draw on the earlier sequences is probably a function of the fact that they were assigning stress by reading silently on a line-to-line basis. The real time involved in performing this task is much greater than the actual speaking time between lines 28 and 83. Thus, information that is still in the consciousness of the speaker and hearer (Chafe 1976) may not be in the consciousness of the respondent in the experimental task. We could expect then that reading the discourse aloud will produce a closer correspondence to the DSA.

To check this, I looked at the stress assignment of two native speakers who assigned stress by reading aloud.[4] They did in fact average a significantly higher overlap than those performing only the written task. In reading, the respondents matched 71.5% of the original stress assignments. This is nearly double the average correct responses in the written task. Further, when these same speakers performed the written task, the number of correct matchings dropped dramatically. Where on the reading they had 71.5% overlap, on the written, their average dropped to 54%.

Besides lack of attention to discourse history, a second source for the lack of correspondence of speaker and respondents is the lack

of access to discourse future (Keenan and Schieffelin 1976). A speaker stresses an item because that is what he wants to orient future talk toward.[5] Consider the next example:

4. 49. A: But it was fun. Y'sound very far away.
50. B: I do?
51. A: Yeah
52. B: No I'm not
53. A: Ya home
54. B: No
55. A: Ohh my mother wanted to know how's yer grandmother
56. B: Uhh I dunno I guess she's alright she went to the uh hospital again today
57. A: Mm hmmm

In l. 55, almost any part of the sentence could be stressed as it is all discourse new. However, grandmother gets stressed because that is what the speaker wants the hearer to attend to in the following utterance. In line 56, B responds accordingly and A accepts it in l. 57.

A case where speaker intentions are not recognized is seen in example 5. We have said that speakers stress items that they want the hearer to attend to, that they want to orient future talk toward. In l. 88, B does not respond with the right uptake to A's intentions. B's response to 88 is just a repetition of speech -- not exactly what A is looking for: she wants a response to the fact that it's a joke. Hence, rather than stressing biggest which is new information in 89, A stresses joke again.

5. 87. A: And it's like a Mickey Mouse course. It's a joke. It's speech.
88. B: Speech/
89. A: It's the biggest joke going it really is I figure I'm gonna thtart talkin with a lithp and by the end//of the term I'll get an A because I haveta improve
90. B: Hhahhh

This indicates that we may not be able to consider stress assignment only in terms of polarities, such as given/new, old/new, presupposed/asserted and so on. Instead, perhaps it is necessary to set up a continuum which refers to the extent that any information is in the consciousness of the hearer.

What this experiment shows is that an adequate theory of stress must take into account the discourse use of stress, first of all, because there is a gap between judgments about stress and actual use of stress, and second, because the strategies used by those assigning stress to a written transcript may be different from those of the interlocutors.

III. Isolated Stress Assignment-Written (ISA-W)

If there is such a problem with mismatching stress assignments when respondents are given the discourse, we might expect an even greater mismatch to occur when people assign stress with no context.

On the other hand, we might expect greater agreement among those assigning stress, an approximation to a 'normal' stress pattern, in the traditional sense. In order to test this, turns 25-92 were divided into three approximately equal groups, with one-word turns omitted. Then, any very long utterance was further divided to insure that the numbered sentences would look like sentences on the page. An effort was made to preserve some of the conversational feeling by not eliminating items as well, y'know, so and uh. This resulted in three groups of 17 sentences each. These three groups were randomized on individual sheets labeled A, B and C. The pages were randomly administered to classes of college students who were given the same instructions as those who had marked the discourse context sentences. Twenty native speaker responses were analyzed for each group (A,B,C).

The results of the ISA-W reveal:

1) a very low level of agreement with the actual discourse, lower than that of the CSA;

2) agreement with the CSA regarding types of words assigned stress regularly and those avoided;

3) some agreement with each other, revealing certain factors that seem to play a role in increasing probabilities for agreement.

The agreement with the original discourse participants' use of stress ranged from 29% on B, 30% on A to 37% on C. In all cases, this is below the percentage of agreement of the CSA. That is, when those assigning stress read silently the sentences in context, they more closely approximate the actual spontaneous conversation. However, the ISA-W are at most 9-11% below the 38-40% average found for the CSA, not a very great difference.

The closeness of the C-group results with the CSA can partly be explained by the fact that 10 out of 17 'sentences' are of 6 words or less, and as will be shown, this strongly increases the chance of agreement. When these sentences are eliminated, the agreement is 28% for group C, showing an extremely close correspondence between the 3 groups.

The variance with the CSA makes sense: the discourse context provides access to discourse history, which in turn allows the reader to understand the role of certain words (e.g. emphasis, contrast, old information). This might not be clear at all in isolated sentences.

Out of all the words that occur and thus could be marked for stress (i.e. 408), 65% (259) were marked for stress by at least one person. This percentage is fairly consistent for all groups. In other words, on A, with 121 words, 79 (65%) received at least one stress assignment, while 42 were unmarked. On B, 60% were marked and on C, 68%.

The words which can receive stress tend to be content words, i.e. nouns, adjectives, adverbs, and verbs (not be). Those words not receiving stress are usually prepositions, conjunctions, articles, forms of be, and to a lesser extent, personal and possessive pronouns. This reflects the same break-down which occurred in the CSA.

Within constructions, there is some evidence that these content words may be ordered with respect to each other. For example, in every case but two of adjective-noun sequences, the adjective

received more assignments than the noun.[6]

There were 34 words in the sentence series to which at least 50% of the participants assigned stress; in other words, on 34 words, at least 10 out of 20 people assigned stress. Interestingly enough, only 41% of these 34 words were the same words marked by the discourse participants. Analyzing these words may provide features of sentences and/or words which are most salient for stress assignment, at least in isolated sentences.

There are several factors which seem to increase the chances of agreement in ISA-W. While some of these are related to the formal or structural properties of sentences, there are also some contextual criteria which appear to work simultaneously.

First, when the 'sentence' is short, there is more likelihood of agreement. For example, 19 out of 34 words which showed over 50% participant agreement occurred in sentences of 5 words or less. When a sentence is longer, more possibilities seem to be recognized and more divergence occurs. In theory, this is not a necessity: with a two-word utterance, each could conceivably receive half of the stress assignments; with ten words, only one or two might receive stress if a particular feature is what determines stress placement.

Second, the stressed words belong to particular classes, i.e. content rather than non-content, and follow a certain hierarchy within the content group. That is, if two words occur, the one which is a content word will receive more stress assignments than the one which is not. If two content words appear, the one which is 'higher' on the scale alluded to earlier will receive stress.

Third, stressed words also tend to occur at transition relevance places (TRP) (Sacks, Schegloff & Jefferson 1974), i.e. at any place where the present speaker's turn could end and another's begin. Traditionally, it has been noted that stressed words occur near the end of a sentence, an obvious TRP. However, those assigning stress consciously have a strong inclination for placing stress near TRPs within the sentence at clause or phrase boundaries.[7]

However, these properties are not sufficient to explain the assignment of stress by these participants. The reader's perception of the speaker's use of intensity, emphasis and contrast also plays an important role. Thus, an item which is in the middle of a long sentence may still acquire many stress assignments if it can easily be interpreted, for example, as emphasis. An example of this follows

6. 55. A: Ohh my mother wanted to know how's yer grandmother
1 4 3 1 11 0 3 1 1 0
56. B: Uh I dunno I guess she's alright she went to
0 3 8 0
the hospital again today

In the actual spontaneous discourse, neither guess nor again received stress assignment, yet they receive the most stress assignments by those participants in the ISA-W, as shown here. In the actual discourse, alright, hospital and today received stress. It appears that even in those cases where sentences are given in isolation a context seems readily available for those assigning stress. Even

more, the context called up is marked for emphasis/intensity/degree.

IV. Isolated Stress Assignment-Reading (ISA-R)

The previous sections look principally at people's judgments about stress in both context-embedded and isolated sentences and compare these to the original discourse. The next step then was to evaluate what happens when participants simply read the isolated sentences.

Participants were taken into an empty room where a tape recorder was set up. Each reader was seated and asked to read the sentences; no time limit was specified and the experimenter simply left the room when the tape recorder was turned on. The tapes were then analyzed for primary stresses.

The results show: 1) stress assignments agree with the DSA to a higher percentage than either of the other experiments did; 2) there are fewer words marked as receiving stress by at least one reader; and 3) there is more agreement with each other than on either of the conscious assignments.

Those reading the isolated sentences aloud mark the same words with stress as the discourse participants 68% of the time. This is a significant increase over the agreement of 29% and 40% on the ISA-W and CSA respectively, and points out even more strongly the difference between judgments about stress and actual use of stress.

On the ISA-W, stress was assigned by at least one person to 65% of the words. The amount of variation falls considerably in the reading assignments: only 38% of the words are marked for stress. Although the same types of words are marked as on earlier experiments, the reading participants are much more selective in the use of stress. The differences in choices can be seen by comparing the following sentence for each experiment:

DSA:	So	I	got	some	lousy	courses	this	term	too
	1	3			10	2	1		6
CSA:	So	I	got	some	lousy	courses	this	term	too (20 participants)
	3	3			10	3	2		6
ISA-W:	So	I	got	some	lousy	courses	this	term	too (20 participants)
					2	7			9
ISA-R:	So	I	got	some	lousy	courses	this	term	too (10 participants)

Notice the extreme similarity between those assigning stress consciously (CSA & ISA-W) both in choice of words and in number of assignments. A similar situation exists between those assigning stress unconsciously (DSA & ISA-R); there is a close correspondence with the words actually marked. In fact, only two stress assignments appear misplaced (on lousy) in the ISA-R.

Although in all cases the words to receive most stress are the adjective-noun combination, the overwhelming tendency of those assigning stress consciously is to mark the adjective, the exact opposite of SPE's predictions for English. On the other hand, those reading the sentence tend to mark the noun in this case, but not in all. Throughout the discourse, stress is about evenly divided between noun

and adjective in such combinations (i.e. 40% on noun, 45% on adjective, 15% on neither).

As the above example shows, over half of those assigning stress agree on two words in this sentence, the same two words marked by discourse participants. In reading aloud, the participants also showed agreement with each other. First, they spread their responses across fewer words: only 38% of the words which occur receive at least one stress assignment. Out of these, 39% (24) are marked by half of those reading the sentence. Figure 1 compares the written assignments on the isolated sentences with the oral reading assignments on the isolated sentences (i.e. judgment vs. use).

	ISA-R	ISA-W
Agreement with discourse	65%	29%
% of words receiving stress by at least one person	38%	68%
% of words marked by at least half of those assigning stress	39%	13%

Figure 1

V. Results

These experiments consistently show several things. First, there is a gap between judgments about stress and use of stress, as figure 2 indicates. All judgments about stress, in isolated or contextual sentences, by naive speakers or by linguists, are lower in agreement with the DSA than are the actual uses of stress.

	ISA-W	CSA_{naive}	CSA_{ling}	ISA-R	(CSA-R)
Agreement with DSA	29%	40%	56%	68%	71%
	JUDGMENT			USE	

Figure 2

Second, having access to the context does not seem to make a significant improvement in stress assignment agreement with the discourse; use is a much more significant factor. It is important to note that this is not the same as saying that context is not important to stress assignment. The facts seem to indicate just the opposite. Those involved in the actual conversation know how to use the context; those reading for stress assignment do not.

Third, those assigning stress outside the actual conversation pay attention primarily to the semantic and emotional informativeness of a word, i.e. they show a preference both for content words, and for words expressing emphasis, intensity, contrast and so on.

VI. Implications

While the importance of context for stress assignment has been noted in the literature, it has been mainly with a view of context derived from 2-sentence pairs; thus, context comes from the sentence preceding the sentence in which stress assignment is to be determined. Such a method severely limits our focus, and it is clear that phrase stress assignment has not been satisfactorily handled by recent theories which employ this methodology. A systematic investigation of the actual relationship between context and stress has been almost completely avoided. The only way to do this adequately is to consider stress assignment and use within discourses, for the function of stress may not be clear from the immediately prior sequence, but may need to consider a sequence 5 (or 20 or 40) turns prior or later.

One reason stress assignment has been studied out of context has to do with the notion of performance (Hymes 1972). While it can refer to'actual use', it also usually implies an 'imperfect manifestation'of the system. Traditionally, then, rules arrived at by studying performance have been considered suspect. However, with stress, performance is crucial, since stress is primarily a performance phenomena: it appears only in actual spoken language use.[8] Nor can we consider stress use to imperfectly reveal the underlying system; instead, it is in looking at the written assignments or in listening to sentences read aloud out of context that 'strange', even 'ungrammatical' uses of stress are noted, and not in conversation.

While data from performance has been avoided, data from intuitions has been sought after. The idea has been that the data of linguistics should not be the utterances spoken by the individual, but rather his/her intuitions about language. This methodology was, of course, much easier, since linguists could utilize their own intuitions or those of one or two other speakers and from this formulate general rules (Labov 1972). If however speakers do use stress correctly, then it is intuitions which are suspect, since the experiments have shown a large gap between judgments and use. As Hinds (1976) points out, "What is really being objected to is the fact that by by-passing data and relying completely on intuitions to produce data, it is quite possible that the object described is not a real language at all."

Thus, a closer analysis of stress use may help clarify the notions of competence and performance. At least with some phenomena, including stress, it may be performance which actually reveals a clearer manifestation of the underlying system and helps to clarify what is meant by competence.

Notes

I am grateful to Elinor Keenan for all her suggestions.

[1] For 20 respondents, the percent of corresponding responses were calculated for the entire transcript. Here there was almost 38% agreement, or 29.25 out of 77 possible matches. Thus, the figure for percent of agreement remains fairly consistent.

[2] In a separate experiment, I asked one group to mark 'most important word'; the average agreement rose to 50%. When another

group was asked to mark 'stress', the percent of agreement fell back to 38%. Thus, stress is more than just most important information to respondents.

[3]Even interlocutors did not have access to nonverbal context, since they were on the phone.

[4]The reading of the context-embedded sentences and unconsciously assigning stress (CSA-R) needs further investigation to substantiate these figures, but the implication is interesting and perfectly in keeping with the other findings of this paper.

[5]Another experiment is needed where subjects listen to the conversation first, to be aware of the direction it takes, and then assign stress, to see if this increases percentage of agreement.

[6]One exception occurred with the phrase same old shit, where shit received more stress assignments.

[7]Within the context of the entire discourse or even within the context of the turn, it is often impossible to understand markings of stress as occurring at TRPs. When the sentence is approached linearly and in isolation, this is clearer:

14 2 4 3 1
I haven't y'know- she wasn't home by the y'know when I left fer
1
school today

Within the actual discourse, I haven't is almost immediately repaired; it seems to be the beginning of a statement like I haven't heard... and not I haven't (period), as those reading the sentence seem to infe

[8]Stress can be shown in writing by underlining, but this is uncom

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