Situational Variation in Intonational Strategies

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Abstract

This paper will use data from two large corpora of spoken American English to analyze variation in prosodic strategies. In this paper the relative importance of cognitive and interactive determinants of intonational choices will be reconsidered, as well as the importance of register (Biber 1995) and stance and footing (Goffman 1981) to the choice of prominent or reduced not*, especially when the speaker is doing a repair (Sacks 1992). The paper shows not only that a quantitative study of prosodic variables is possible, but that register and stance and footing influence a speaker's prosodic choices. The study finds that if we consider Biber's Dimension 1 (the variation from informative to interactive situations), all things being equal, negatives, which carry important information, will be prosodically prominent more consistently in informative situations. However, the paper will also show that stance and footing must be distinguished from each other: when speakers are in an interactive situation which requires a non-supportive/adversarial stance, the repair negatives -- and even the purely informative but not face threatening negatives -- will be prosodically prominent more consistently than they are when the interactive stance is not adversarial, and the repair tokens will be more consistently prominent than (even) informative tokens. In addition, the distinction between purely informative, interactively supportive, and remedial footing must also be taken into consideration. This paper provides evidence that while linguistic choices are theoretically shaped by the cognitive needs of the hearer, in interactive situations social concerns predominate over such cognitive 'needs'.*

1. Introduction

Biber (1995) defined register as linguistic choices mediated by the social situation. In his studies he used specific syntactic and morphological variables to calibrate situational variation. He then performed multivariate cluster analysis to determine the dimensions along which the social situation is most likely to influence language variation. The bipolar register dimension that his multidimensional scaling studies have found to account for the greatest amount of variation in his data is referred to as Dimension 1. The morphological and syntactic variation that Biber used to determine his dimensions appears to be most strongly correlated with the variation from Informative to Interactive situations, and that contrast became Dimension 1.

Table 1 shows the morphosyntactic variables that linguistically define this register dimension, which Biber characterizes as varying from a more informative to a more interactive pole. Yaeger-Dror (1985) had already shown the importance of an informative-interactive continuum for the analysis of prosodic variation in the use of negation, and had suggested reasons why this particular situational continuum would be of critical importance for such an analysis. The convergence of the two studies is not fortuitous.

Table 1: Morphosyntactic variables correlated with Dimension 1 (adapted from Biber 1995)

Informative	**weightings**	**Interactive**	**weightings**
nouns	-.8	private verbs.	.96
long words	-.6	*that* deletion	.9
prepositions	-.5	**contractions**	.9
type/token ratio	-.5	present tense	.86
attributive.adjs.	-.5	2nd person prons.	.86
place adverbs.	-.4	*do*-pro-verb.	.8
passives	-.4	**'analytic NEG'**	.8
		1st person/*it* prons.	.7
		be-verb	.7

Those situations that Biber found to be informative include, for example, government documents, academic prose, and press editorials. Yaeger-Dror (1985) has found that this dimension also includes isolated sentence reading, and read news broadcasts. Situations at Biber's interactive register pole include both face-to-face and phone conversations; and Yaeger-Dror's results support that conclusion as well.

Tottie (1991) found that most negatives in English are what she refers to as '*not*-negatives'; our earlier studies therefore were limited to an analysis of *not*-negation, and the analysis here will also be limited to the study of variation in the use of *not*-negatives in different interactive registers of American English. All *not*-negatives (henceforth *NEG),* whether realized as *not* or *n't* will be analyzed. Note that both Biber (1995) and Yaeger-Dror (1997) found that *not*-negation and contractions are favored in interactive situations.

Yaeger-Dror (1985, 1996) showed that prosodic emphasis on *NEG* is quite different in Informative and Interactive situations. In informative situations, critical information will be spoken with F_0 prominence (Cutler et al. 1997). This can be referred to as the Cognitive Prominence Principle. For example, since *NEG* carry critical information, they will be pitch prominent almost categorically in sentence reading style (O'Shaughnessy and Allen 1983) or read radio news (Hirschberg 1990, 1993).

In Interactive situations -- and even pseudo-interactive situations like read dialogue -- negatives can be perceivable as a repair of a previous turn, given that repairs are often face threatening (Brown and Levinson 1978), and that such use of negation is socially dispreferred (Schegloff, Jefferson and Sacks 1977).[1] Previous studies have shown that *NEG* are more likely to be reduced both morphologically (to *n't:* Yaeger-Dror 1997) and prosodically (Yaeger-Dror 1985, 1996, 2002; Kaufmann 2002). The claim that prosodic realization of *NEG* is

[1] There have been many recent discussions of different interpretations of 'preferred' and 'dispreferred' in the CA literature; see Pomerantz, 1984.

strongly influenced by Sacks' 'preference for agreement' will be referred to here as the Social Agreement Principle.

While early conversational theory considered only situations in which the Social Agreement Principle was quite strong, more recent studies have chosen situations that test the 'envelope' of when speakers will 'prefer' agreement (and neutral *NEG*) over prominent repair (with prominent *NEG)* (Yaeger-Dror 2002). It now appears that prominent repairs are more common among speakers who are younger (Goodwin 1983, Sheldon 1998, Goodwin, Goodwin and Yaeger-Dror 2002), or who are from specific ethnic groups (Schiffrin 1984, inter alia). Not surprisingly, there is greater cross-cultural variability in academic situations (Blum-Kulka et al. 2002, Kakava 2002, Liberman 2000, Takano ms.), and recent interactions are noticeably less constrained by the Social Agreement Principle than they would have been twenty or thirty years ago (Tannen 1998, Heritage 2002). The present study will attempt to systematically discuss some of the factors that favor this apparent weakening of the Social Agreement Principle.

Previous studies of disagreement have focused on the bipolar contrast between informative and interactive corpora, to demonstrate the contrasting domains within which the Cognitive Prominence Principle and the Social Agreement Principle are primary. The present study will contrast data from an Interactive corpus, in which the Social Agreement Principle is critical, with data from one in which this principle is neutralized or inverted.

2. Data

For the supportive situation, this study has chosen polite phone conversations on neutral topics between strangers made available by the Linguistic Data Consortium (LDC). Situations in which the Social Agreement Principle is inverted will be classified as adversarial situations. It has been suggested that children's game playing interactions (Goodwin et al. 2002) and classroom interactions (Kakava 2002) may be adversarial, but for the present study Presidential Debates (PD) have been chosen as unambiguously adversarial. The two corpora shown in Table 2 will be compared. Each analysis required the use of the transcript and analysis of the sound-file of the corpus.

The Switchboard Corpus (SWB) was gathered by Texas Instruments in the mid 1980's and has been transcribed carefully; the data are available from LDC (www.ldc.upenn.edu). The speakers were strangers and the interactions were generally very polite (Yaeger-Dror, Hall-Lew and Deckert 2002). Both transcriptions and NIST sound files were made available for this study, but only a subset of the SWB corpus was analyzed, as shown in Table 1. Three conversations from phone calls in which both parties were from a given region were chosen for analysis. The regions represented were New England and Northern Cities (NE/N), New York City (NYC), North (NM) and South Midland (SM), and South (S).

The Presidential Debate Corpus (PD) was collected by our research group, from those presidential archives that have made both sound and text files available to the research public. There were presidential debates in the 1960, 1976, 1980, 1992 and 2000 elections, but sound files were available for only some of these (e.g., the Kennedy/Nixon debate of 1960 and the Gore/Bush debate of 2000). Thus, while several regions are represented in the SWB calls, only three are included in the presidential data: the Northeast, California, and the South. Other demographic variables are unavailable for comparison in this corpus (since presidential debates appear to be limited to well-to-do middle-aged males).

Table 2: The interactive data to be analyzed for this study

Text type	**Source**	**Date**	**Region**	**# words**	**# *not***	***not*/100wds**
Supportive phone	SWB	80's	US	34,669	535	1.543
			ne/n	8,539	122	1.429
			n mid	6,131	72	1.174
			nyc	5,298	104	1.963
			s	4,119	68	1.651
			s mid	5,467	86	1.573
			w	5,115	83	1.623
Adversarial PD	JFK4	1960	ne: MA	18,032	189	1.048
	RN4	1960	NW: CA	18,648	212	1.137
	GF3	1976	nc: MI	12,548	95	0.757
	JC4	1976	s: GA	15,146	125	0.825
	RR2	1980	nc: IL	10,742	80	0.745
	GB13	1992	ne: CT	15,060	218	1.45
	RP3	1992	s/w: TX	15,137	191	1.26
	BC3	1992	s/w: AR	14,305	151	1.06
	GB22	2000	'w':TX?	14,120	163	1.15
	AG2	2000	s: TN	14,043	103	0.73

* The regions are coded as ne = North East, n = North, nmid = N. Midland, nyc = New York City, s = South, smid = S. Midland, w = West. Standard designations are used for states: AR = Arkansas, CA = California, CT = Connecticut, GA = Georgia, IL = Illinois, MA = Massachusetts, MI = Michigan, TN = Tennessee, TX = Texas.

3. Analytical variables and research design

The *NEG* from these two registers were compared. Given the number of syntactic and prosodic variables that complicate analysis of data from interrogative and imperative sentences *(cf.* the discussion in Yaeger-Dror ms.), only those *NEG* that occur in declarative sentences are coded here. Given the limited range of demographic information that is usable at this time, the coding for demographics will not be discussed in this paper. The sound files were converted to WAV or AIFF digitized files for analysis. Both sets of digitized sound files were analyzed using the Pitchworks program, and coded for the following variables.

3.1 Pitch accent

Pitch accent was coded and was classified as the dependent variable.[2] Table 3 shows the choices of pitch contour that were coded for the present study. The coding was derived from the ToBI system, but with modifications necessitated by variation found in the corpus *(cf.,* Beckman and Ayers ms., Pitrelli et al. 1994, Horne 2000, and Syrdal et al. 2001, for a discussion of ToBI and its categorization of pitch accents.) To determine how often pitch prominence occurs on negatives, and how that prominence is realized, all of the choices in Table 3 were coded, but raised pitch, H, and its permutations, were all considered 'applications' for purposes of variable rule analysis.

3.2 Morphological realization

Morphological realization of the *NEG* is also relevant to the analysis. Whether the *not* was full or contracted was coded, since contraction is also a form of prosodic reduction. There were three coded choices: Full *(The Soviet Union may not agree to an inspection system.* Nixon PD), *not*-contracted *(If you go to a doctor who isn't in the network*...swb4b), or Aux-contracted *(That's not bad either.* SWB3001a). Analysis of the importance of morphology to the understanding of reduction is discussed elsewhere (Yaeger-Dror 1997, van Kemenade 2000, Yaeger-Dror et al. 2002).

Table 3: Data coding for fundamental frequency for this study

Code	Significance	Comments	App. Value
• N	Neutral	no amplitude or F_0 prominence	-P
• A	Amplitude	louder than surrounding words	-P
• H	High	most common prominence type	+P
• R	Rising	occurs frequently	+P
• ^	Rise+fall	occurs frequently	+P
• F	Falling		+P
• L	Low	< .1% incidence	-P
• v	Fall-rise	< .1% incidence	-P

[2] Mere word-by-word transcription of the data, which requires no acoustic expertise, takes approximately 15 minutes for every minute of text (Brian MacWhinney, p.c.). The most experienced analysts of prosodic data find that prosodic analysis "commonly takes from 100-200 times real time. That is, a 10 second utterance would require from 17 to 33 minutes to label" (Syrdal et al. 2001: 135). Thus, while large amounts of data are now available for analysis, the present corpus has been carefully limited to relatively small samples from two radically different situations.

3.3 Relevant environmental prosodic information

Relevant environmental prosodic information was also coded, as shown in Table 4. Since this variable was significantly correlated with the primary analysis, it will be discussed in detail.

Obviously, in conversational English we do not generally place two ‘focal’ accents close to each other. This factor group was added primarily to take into consideration that a prosodic prominence might occur immediately preceding or following focus would prevent focus on *not,* while no-nearby-focus (N) would permit focus on *not.* In addition, in the PD [debate] corpus, often both (B) preceding and following prosodic prominence occur, and in that corpus the ‘B’ factor also favors prominence on *not.*

Table 4: Data coding for near-by prominence (These can be heard at http://www.u.arizona.edu/~malcah/.)

Code	Significance	Source
• N	No adj. accent focus	NixonPD
• L	Left-focus	SWB2998b
• R	Right-focus	NixonPD
• B	Both	NixonPD

3.4 The turn stance and footing

The turn stance and footing are also relevant (Goffman 1981). In the debate, a speaker can be in the adversarial position, in a neutral to supportive position (the moderator slot), or even a pseudo-informative position (the rôle affected by Perot in the 1992 debates). In fact, it is not the situation *per sé,* but a given speaker’s stance or role within the situation that we generally consider relevant. For example, in the Bush/Rather interview analyzed in 1989 (Schegloff 1988/1989*),* Bush shifts from interviewee to adversary, so within a given stance, a speaker can present different footings for specific turns. For present purposes, turns are coded for both stance (or situation) and footing.

This underlying pattern has been expanded in the coding to include the options available in Table 5. In the debates, negatives are generally used either to convey neutral information or to repair a previous speaker’s turn. In SWB, a quarter of all tokens are used supportively, but this is not the case in the debates. Although tokens of ‘I dunno’ are not included in the study (since they are always reduced), there are also many other ways to hedge your sentence using negative phrasing, so ‘hedges’ must be coded separately as well.

Not can also be used in self-corrects, and there are a surprisingly large number of self-corrects in the debate, but detailed discussion of self-correction data will be left for a later study.

Another category -- self-protect -- was initially incorporated into the coding scheme to permit analysis of our Japanese corpus. However, the American political debaters also frequently use a self-protective stance.

Table 5: Data coding for 'turn footing'

Code	Significance	Sample sentence	Source
• I	Informative	*If you go to a doctor who isn't in the network....*	SWB4b
• S	Supportive	*I know, they don't write anything like they use'to.*	SWB 2281a nm
• R	Remedial	*nah, they won't pay for it..*	SWB 2061bn
• C	Self-correct	*They really don't-* *They're not able to control . . .*	Kennedy PD
• P	Self-protect	*I don't wanna deny them their rights!*	SWB 2709n
• H	Hedge	*If I'm not mistaken...*	SWB 2709n

The authors verified that their coding rules were consistent: all tokens were rechecked by the first author in conjunction with the other two to insure consistent coding. The only inconsistencies that had to be resolved were 'turn stance' and some variations within raised options (particularly High versus Falling) in the pitch accent coding. When all these coding problems were resolved, the data were run through the Goldvarb program developed by David Sankoff (Rand and Sankoff 1991).

4. Analysis

All declarative *NEG* (whether of *not or n't)* in the SWB and PD corpora were coded for all the factors discussed in Section 3; first the number of tokens from different groups will be compared, and then the data will be analyzed using Goldvarb.

4.1 Number of *NEG* tokens used

First, let us consider the number of raw *not*-negations in a given corpus. Table 6 shows the number of negatives used per hundred words for each of the speakers. Using this method, we discover that there are more declarative negatives used in the SWB interactions than in any of the political debates.

However, the mere fact that there are a certain number of negatives is not a clear indication of how adversarial the speaker is. When we isolate informative and remedial use of negation, the numbers change radically. Table 7 compares informative and remedial *NEG* tokens in each 100 words spoken in each corpus, to show that while both groups of speakers use negatives informatively -- approximately .4 per 100 words -- remedial use of negation is much less frequent in SWB (.13 per 100 words) than in most of the debate material (.6 per 100 words); the difference is significant (p ≤ .05). There is also a tendency for Republicans to use more remedial negatives than Democrats.

Table 6: Number of *not*-negation tokens in each corpus analyzed, and ratio of *NEG*/100 words

Situation	**Corpus**	**NEG**	**# Words**	**N/100 wds**
Supportive	18 (SWB) calls	493	34,669	1.422
Adversarial	4 JFK debates	189	18,032	1.048
Adversarial	4 Nixon debates	212	18,648	1.137
Adversarial	2 Gore debates	103	14,043	0.733
Adversarial	2 Bush debates	163	14,120	1.154

Table 7: Comparison of *NEG* in Informative and Remedial turns

Situation	**Corpus**	**I-*NEG***	**R-*NEG***	**# wds**	**I/100wd**	**R/100wd**
Supportive	SWB	165	45	34,669	.476	.130
Adversarial	K	101	70	18,032	.560	.388
Adversarial	N	120	73	18,648	.644	.391
Adversarial	G	45	41	14,043	.320	.292
Adversarial	B2	57	81	14,120	.404	.574

Table 8: Percentage of *NEG* in each footing for which examples are given in Table 5

Corpus	***N***	**Footing Support**	**Hedge**	**Inform**	**Self-Correct**	**Self-Protect**	**Remedial**
SWB	493	.255	.172	.296	.105	.079	.091
K/N	401	.027	.220	.551	.000	.042	.357
B/G	267	.011	.019	.382	.004	.116	.457

4.2 Ratio of *NEG* used with different footings to the total number of *NEG* in a corpus

Table 8 shows that while the percentage of neutrally informative negatives in debates is not very different from that in SWB conversations, there is a great disparity between percentages for supportive and remedial *NEG* in the two registers: remedial tokens are much more frequent than informative tokens in debates, but much less frequent in SWB conversations. In fact, remedial use of negation is so rare in the SWB corpus that it was not worth displaying the speaker-by-speaker comparison. In contrast, while supportive tokens almost don't occur at all in debates, they are almost as frequent as informative tokens in the

SWB conversations.[3] Chi squares of the differences between supportive, informative, and remedial tokens show that all are significantly different ($p \leq .002$), except the difference between Supportive and Informative in SWB.

4.3 Prominent *NEG* used with a given footing

Table 9 reveals that both informative and remedial *NEG* are prominent in debates, and non-prominent in conversation.[4] We conclude that the Cognitive Prominence Principle is not supported, while the Social Agreement Principle is supported. In supportive interactive situations (like SWB), only a small minority of remedial *not* tokens are prosodically prominent, and even in informative turns ('Inform'), the *NEG* tokens are not generally prominent; in fact, they are not even significantly more prominent than they are in remedial turns. In contrast, in political debates, where the preference for agreement -- our Social Agreement Principle -- is expected to be inverted, more than half of all remedial tokens are prominent, and almost half of all informative tokens are prominent as well. If the Cognitive Prominence Principle were dominant, informative tokens should be prominent in both situations, but they are not even significantly more likely to be prominent in the debate. *NEG* are more likely to be prominent in remedial turns in the debate and less likely to be prominent in remedial turns in SWB, which is entirely consistent with the Social Agreement Principle. Consequently, it appears that the Social Agreement Principle is dominant in the registers that can be categorized as interactive (either favoring or disfavoring *NEG* occurrence and *NEG* prominence depending on whether the situation is supportive or remedial rather than on the importance of the information being conveyed).

Table 9: *NEG* which are prosodically prominent (+P), or not (-P)

Corpus	**Footing**	***N***	**-P Neutral**	**+P Prominent**
SWB	Inform	146	.822	.178
SWB	Remedial	45	.867	.133
K/N	Inform	221	.507	.493
K/N	Remedial	143	.490	.510
B/G	Inform	102	.598	.402
B/G	Remedial	122	.582	.418

[3] Of course, the B/C (Bush/Clinton/Perot) debates did include a number of (pseudo)supportive tokens, where one candidate would appear to support another. In most cases, the underlying intent was for one candidate to display support of the line used by the (apparently) weaker candidate, as a way to co-opt his voters. However, this did not occur in the debates being analyzed here.

[4] Note that for this table, -P includes the **l** and **v** tokens along with those that are not prominent at all.

Chi squares of the differences between prominence tendencies in SWB and PD are significant (p ≤ .000005) for both informative and remedial tokens. The debates are not significantly different from each other, nor is the within-corpus difference between remedial and informative prominence significant for any of these corpora. Thus, as we have seen in previous studies, in supportive situations, even informative *NEG* are unlikely to be prosodically prominent, while in adversarial situations, even remedial *NEG* are likely to be prominent.

4.4 Different prominence types

Looking at the data in greater detail in Table 10, we find that, contrary to Bolinger's (1978) claim that cross-linguistically negatives will be negatively prominent, tokens with L prominence are quite rare in either debate or conversation.

We also find that the particular styles of political rhetoric appear to have changed over the last forty years causing different prominence-choices to be dominant. For example, Kennedy and Nixon appear to prefer a simple H, while Gore and Bush do not use that prominence type as often and use rising (R) or falling (F) contours instead.

Table 10: *NEG* with each prominence-type, as found on Table 3

Corpus	Footing	*N*	-PN	-A	-L	-v	+PH	+R	+F	+^
SWB	Inf	146	.808	.007	.007	0	.041	.048	.034	.055
SWB	Rem	45	.867	0	0	0	.044	0	.022	.067
K/N	Inf	221	.425	.081	0	0	.335	.036	.059	.009
K/N	Rem	143	.427	.063	0	0	.392	.035	.049	.007
B/G	Inf	102	.588	0	0	0	.098	.118	.127	.059
B/G	Rem	122	.582	0	0	.008	.197	.123	.082	.008

4.5 Prominence types in different situations

Hirschberg (2000) compares ToBI coded prosodic prominence in three different informative registers: airline call-in requests to a computer recognition system, read transcripts of these interactions, and read sentences. Note that two of these registers are only pseudo informative, but that none of them is transparently interactive, except in the Gilesian sense that the speakers may accommodate to their hypothesis of what the researcher would like to find. As such, they will all be categorized as informative. Her percentages are for the number of a certain prominence type out of all prominent tokens. The present study has only looked at prominence (or lack of prominence) on negatives in declarative sentences of interactive corpora, and therefore the comparison is not exact. However, a first approximation of how prominence is achieved in different registers can nevertheless be proposed using these data, and the approximation is shown in Table 11.

Note that in the Informative corpus, 77-85% of all pitch accents were simple H, while less than 5% of the accented tokens were rising or falling. In the interactive corpora, 45% of all pitch accented *NEG* in declarative sentences were H in the K/N debates in informative turns, while only 24% were H in more recent debates, and 22% were H in the SWB supportive-interactive informative turns. In contrast, even in informative use of negation, rising, falling and rise-fall tokens were much more common in our corpora than in Hirschberg's. Clearly, the type of pitch accents chosen when reading or talking to a computer provides much less prosodic complexity than those used to signal a potentially dispreferred position in an interactive situation.

Table 11: *NEG* with each prominence (+P) type, Hirschberg's data compared with present corpus

+P	**H/berg Read**	**H/berg Inf**	**SWB Inf**	**SWB Rem**	**K/N Inf**	**K/N Rem**	**G/B Inf**	**G/B Rem**
H	**.85**	**.77**	.22	.33	**.34**	**.39**	.24	**.47**
L	.08	.16	.04	.00	.00	.00	.00	.00
R	.04	.00	**.26**	.00	.04	.04	**.29**	.29
v	.00	.00	.00	.00	.00	.00	.00	.02
F	.00	.00	**.19**	.17	.06	.05	**.31**	.20
^	.00	.00	.30	.50	.01	.01	.14	.02

To the extent that SWB speakers appear to favor one prominence type, it would be the rise-fall (^) intonation. The more oratorical presentation of debate used in the K/N corpus were more likely to use simple H, but not even the more recent more pseudo-conversational G/B debate corpus has percentages equivalent to those used by Kennedy and Nixon.

5. Multivariate statistical confirmation of the evidence

Table 12 presents the results of the Goldvarb statistical analysis of prosodic choices made by the SWB phone conversationalists. Men are neither less nor more likely to emphasize negatives than women, but Southerners (pooling, for the moment, the South with South Midland and South West) are slightly less likely to emphasize a negative than speakers from the North. Moreover, as we projected, comparing turn footings, across speakers, only supportive negatives *(You're not fat!)* and self-protective negatives *(I didn't do that!)* favor prominence.

In contrast, Table 13 presents the results of the Goldvarb on the Kennedy/Nixon political debate data. Obviously, when remedial turns are preferred, remedial tokens are more likely to be prominent. While adjacent contrastive focus also has a different influence in the political debate, the contrast is more likely to be based on the fact that debates, especially the early debates, relied heavily on oratorical techniques, favoring (for example) a series of pitch accents in a row, while conversations eschew such techniques. Consequently, narrow comparison of preferred prominence types is beyond the bounds of the present study, and will not be discussed in detail here.

Table 12: Goldvarb results for SWB > 0.500 favors prosodic prominence; < 0.500 favors neutralization (N=493.)

Factor Gp	Favoring application	Disfavoring application
Form	--	--
Focus	Rt. focus: 0.550, None: 0.582	Lft. focus: **0.236**, Both: **0.407**
Footing	Supportive: **0.60**, Self-protect: 0.808	Remedial, Self-correct: 0.38 Hedge: 0.402, Inf.: 0.455
Region	N: 0.590	S/W: 0.457

Table 13: Goldvarb results for Kennedy/Nixon debates > 0.500 favors prosodic prominence; < 0.500 favors neutralization (N = 419)

Factor Gp	Favoring application	Disfavoring application
Form	-Full: 0.561 Aux-contr: 0.574	*Not*-contr: 0.416
Focus	Lft. & rt.: 0.585 none: 0.563	-- lft. or rt.: 0.200
Footing	Remedial: 0.557	Inf.: 0.46, Hedge: 0.38, Supportive: 0.22, Self-correct: 0.18
Speaker	Nixon: 0.556	Kennedy: 0.437

[The number of tokens for G/B was too small to permit multivariate analysis.]

6. Conclusions

The present study has demonstrated that pitch accent patterns definitely vary with register. The primary focus of the investigation was on the use of negatives as carriers of information and disagreement between co-participants in an interaction. Such a study would not have been feasible at all before the recent advances in technology that have made it possible to store large corpora for analysis, and to carry out statistical and acoustic analysis of such large corpora. Only these advances have made it possible to supersede the analyses that were made in the 1980s based on smaller corpora, which often were composed of isolated sentences or news broadcasts.

Although speech analysts and cognitive scientists have maintained that negatives should be pitch prominent, their data have been based on informative registers or read sentences. The evidence demonstrates that purely informative negatives used in informative situations (like those used by Hirschberg) are most likely to be prominent, and therefore support the Cognitive Prominence Principle, but even adversarial interactive data cannot be construed as supporting this principle.

Analysis of actual human interactions reveals that in conversations in American English, where repair sequences are dispreferred, more than 80% of the time *NEG* tokens carry no pitch accent at all in either informative or repair turns at talk (see Table 10). The evidence also strongly supports our hypothesis that when humans interact with each other the Social Agreement Principle is more influential than cognitive imperatives in determining prosodic prominence. Remedial tokens will be prominent more consistently than informative tokens in adversarial situations, and less frequently in supportive situations, but the likelihood in both cases will be correlated with expectations based on the Social Agreement Principle. Thus, both situation and footing are significant factors in the analysis of prosodic variation.

To summarize, prominence on negatives is likely to occur in informative situations, and is even higher in read speech. Prominence is least likely in interactive/supportive situations, but even here, speakers' footing should not be ignored. In supportively interactive situations in American English, like those used in friendly conversations, remedial negatives are most likely to be non-prominent, and even informative turns do not favor prominence much more strongly. In adversarial registers, like political debates, the probabilities are inverted. Remedial tokens are more likely to be prominent than informative negatives, even if the occasion appears to be informative as well as interactive.

7. Where do we go from here?

We are lucky today to have the ability to compare data from different registers. We have the necessary software to process not just the concordances and statistical results that are needed for studies of large text corpora, but even the digitized sound from large speech corpora. The studies which can be carried out today on our desktop could not have been carried out on the mainframe a few years ago. We are all taking advantage of the increased versatility that permits such studies.

It is only recently that text and sound data for adversarial situations have become available, and even now (as our acknowledgements show) it is only available with the help of political archivists. While the sound files are still relatively difficult to find, many of the text files for such corpora can be accessed merely by downloading them from the Web.

The present study only considered prosodic factors, but it would be simple to incorporate some adversarial text corpora for 'classic' register analysis, to determine whether they are as different from supportive interactions in syntax as they are in prosody. Obviously, the footing of individual turns would have to be coded as well.

The present study was initiated because negatives in read sentences were so different from those used in conversational interaction, or even in read dialogue. At the time, and even today, those who create industrial applications for speech assume that read sentences only differ from interaction in minor ways. However, these researchers now need to project what people will say (and how they will say it) in an expanding array of different situations. It is our job to collect and analyze data from a larger and larger pool of interactive settings in order to isolate the variables that will be relevant for future analyses of speech.

These studies will be useful not just for our own theoretical research, but for the applied fields of automatic speech recognition and synthesis, as well as for organizing the studies of foreign languages so that learners will sound more like actual conversationalists, and less like classroom assignments.

This issue is of particular interest in the present case: preliminary evidence has shown that native speakers of different languages do not have the same rules for emphasis on negation. One conclusion of Yaeger-Dror (2002) is that French speakers are perceived as confrontational by Americans partly because they do not reduce the prominence on negatives in informative turns, but only in remedial turns, while, as we see here, Americans reduce *NEG* in informative turns as well. On the other hand, the French were much more sparing of prominence in political debate than the Americans. Obviously, many opportunities for misunderstanding arise in intercultural communication, and a more nuanced approach to foreign language learning would doubtless have an effect not only on classroom presentation but on cross-cultural communication in general. It is clear that careful analysis of negation in different cultures will have an impact on language teaching, on how well people from different cultures communicate in the real world, and on how computer systems interpret speech, as well as on linguistic theory.

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References

Beckman, M. and G. Ayers (ms.). 'Guidelines for ToBI labeling'. http://www.ling.ohio-state.edu/phonetics/E_ToBI/

Biber, D. (1995). *Dimensions of register variation.* Cambridge: Cambridge University Press.

Blum-Kulka, S., M. Blondheim and G. Hacohen (2002). 'Traditions of dispute'. *Journal of pragmatics,* 34 (10/11).

Bolinger, D. (1978). 'Intonation across languages', In J. Greenberg (ed.), *Universals of human language II.* Stanford: Stanford University Press, pp. 471-524.

Brown, P. and S. Levinson (1978). 'Universals of language usage'. In E. Goody (ed.), *Questions and politeness.* Cambridge: Cambridge University Press.

Cutler, A., D. Dahan and W. van Donselaar (1997). 'Prosody in the comprehension of spoken language'. *Language and speech,* 40: 141-201.

Goffman, E. (1981). *Forms of talk.* Oxford: Blackwell.

Goodwin, M. (1983). 'Aggravated correction and disagreement in children's conversation'. *Journal of pragmatics,* 7: 657-677.

______ , C. Goodwin and M. Yaeger-Dror (2002). 'The shape of opposition moves within children's games'. *Journal of pragmatics,* 34(10/11).

Heritage, John. (2002). 'The limits of questioning: Negative interrogatives and hostile question content'. *Journal of pragmatics,* 34 (10/11).

Hirschberg, J. (1990). 'Accent and discourse context'. *AAAI,* 82: 952-7.

___ (1993). 'Pitch accent in context'. *Artificial intelligence,* 63: 305-340.

___ (2000). 'A corpus based approach to the study of speaking style'. In M. Horne (ed.), *Prosody: Theory and experiment.* Boston: Kluwer.

Horne, M. (ed.) (2000). *Prosody: Theory and experiment.* Boston: Kluwer.

Jefferson, G. (2002). 'Is *No* an acknowledgment token?'. *Journal of pragmatics,* 34(10/11).

Kakavá, C. (2002). 'Opposition in modern Greek discourse'. *Journal of pragmatics,* 34(10/11).

Kaufmann, A. (2002). 'Negation and prosody: An analysis based on the London-Lund corpus'. *Journal of pragmatics,* 34(10/11)

Liberman, K. (2000). 'Thinking as a public activity: The local order of Tibetan philosophical debate'. *The Tibet Journal*, 25.

Linguistics Data Consortium (LDC) (1997ff.). 'Sound and text lg. corpora.' Including, *inter alia*, Air Traffic Control (ATC), Radio News (BUR), Switchboard (SWB) and 'Marketplace' (MTP).

O'Shaughnessy, D. and J. Allen (1983). 'Linguistic modality effects on fundamental frequency'. *JASA,* 74: 1155-71.

Pitrelli, J. M. Beckman and J. Hirschberg. (1994). 'Automatic ToBI prediction and alignment to speed manual labeling of prosody', 123-126. Yokohama: ICSLP.

Pomerantz, A. (1984). 'Agreeing and disagreeing with assessments'. In J. Atkinson and J. Heritage (eds.), *Structures of social action.* Cambridge: Cambridge University Press. pp. 57-101.

Rand, D. and D. Sankoff (1991). 'Documentation for the Goldvarb program'. CRMA Technical Report: http://ella.slis.indiana.edu/~paolillo/projects/varbrul/soft/

Sacks, H. (1992). *Harvey Sacks' lectures on conversation.* Blackwell: Oxford.

Schegloff, E.G. (1988/1989). 'From Interview to Confrontation: Observations on the Bush/Rather Encounter'. *Research on Language and Social Interaction*, 22: 215-240.

___ Jefferson, G. and H. Sacks (1977). 'Preference for self-correction in the organization of repair in conversation', *Language,* 53: 361-382.

Schiffrin, D. (1984). 'Jewish argument as sociability'. *Language in society,* 13: 311-335.

Sheldon, A. (1998). 'Talking power: Girls, gender enculturation and discourse'. In R. Wodak (ed.), *Gender and discourse.* London: Sage.

Syrdal, A., J. Hirschberg, J. McGory and M. Beckman (2001). 'Automatic ToBI prediction and alignment to speed manual labelling of prosody'. *Speech communication,* 33: 135-51.

Takano, S. (2000, ms.). 'Repair sequences in Japanese work settings'.

Tannen, D. (1998). *The argument culture.* New York: Random House.

Tottie, G. (1991). *Negation in English speech and writing.* San Diego: Academic.

van Kemenade, A. (2000). 'Jespersen's cycle revisited'. In S. Pintzuk, G. Tsoulas and A. Warner (eds.), *Diachronic syntax.* Oxford: Oxford University Press.

Yaeger-Dror, M. (1985). 'Intonational prominence on negatives in English'. *Language & speech,* 28: 197-230.

___ (1996). 'Register as a variable in prosodic analysis'. *Speech communication,* 19: 39-60.

___ (1997). 'Contraction of negatives'. *Language variation & change,* 9: 1-36.

___ (ed.), (2002). Special issue of *Journal of pragmatics,* 34(10/11).

___, L. Hall-Lew and S. Deckert (2002). 'Using large corpora to determine the influences on contraction strategies'. *Language variation & change,* 14: 79-118.