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Vocal Correlates of Affective Stance
in
Pre-anaesthesia Medical Interviews and in Hypnotherapy

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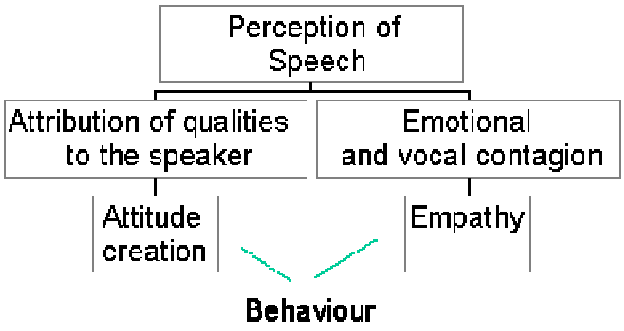
For Aristotle the study of delivery includes: *"..... the proper use of voice (loud, soft, and moderate to express individual emotions, the proper use of accents (acute, grave and circumflex), and the rhythms appropriate to different things."* (Russel and Winterbottom, 1972, p. 135).

For Cicero the vocal and nonverbal channels "signify in what sense everything /…/ is to be understood". The instrumental use of oratory to elicit the emotions in others is clearly described by Cicero in *The Brutus :* "The orator's audience believes his words, thinks them true, assents, approves; his speech carries conviction,.../../ the crowd rejoices, grieves, laughs, cries, likes, dislikes./../. It is angered and soothed, it hopes and fears. These effects take place according to the way in which the minds of those present are worked on by words, thoughts and delivery"(Ref…..). Cicero is aware that passions induced by oratory, modify people's judgment so that affect dominates over truth, and justice.

Interpersonal communication is **relational** in its nature. The relational components are largely present in the nonverbal channels such as facial expressions and the affective "tone".
In doctor-patient encounters, the **affective stance** provides the framework in which the content of the verbal exchange is interpreted.

K. Scherer's model of the mechanism :



Our research on vocal indicators of affective stance in hypnotherapy and medical interviews: 128 sessions of hypnosis and 26 pre-anaesthesia interviews. Samples of the physicians' voices before and during the induction of hypnosis were analysed and a series of questionnaires was applied to assess the efficiency of hypnotherapy. and emotional states of the patients.

In pre-anaesthesia interviews, samples of the doctors' voices during the examination of the patient and while talking about the risks of anaesthesia were analysed. Three external judges

independently assessed the interviews for their relational affective component by using The Relational Communication Scale for Observational measurement (RCS-O). The scale measured six dimensions of doctor-patient interactions: affection, similarity/depth, receptivity/trust, composure, formality and dominance.

We hypothesized that the interpersonal stance appropriate for the first phase (examining the patient) would be warm and encouraging, while that appropriate for the announcement of risks would be reassuring and calming. Our predictions regarding vocal correlates of such affective stances were: a warm and encouraging affective stance would follow the prosodic pattern of high salience combined with a higher affective arousal while those of a reassuring and calming stance would follow the pattern of low salience combined with lower levels of affective arousal. We thus expected the physicians' voices to display opposite tendencies at the time of examining their patients (Exam-voices) compared with the time of informing them about the risks of anaesthesia (Risk-voices).

Therefore the Exam-voices would have higher mean F0, wider F0 range, higher coefficient of F0 variation, higher F0 mean absolute slope, higher mean energy of voiced segments, higher voiced energy range, and slower speaking rate. By contrast the Risk-voices were expected to have lower pitch and energy values and faster pace.

Paired Samples t-Test was applied to measure the difference between the vocal parameters obtained in Exam-voices and Risk-voices. The results were significant for the following vocal parameters: mean F0, F0 coefficient of variation, F0 mean absolute slope, and pace (rate of delivery). None of the energy parameters were significantly different in Exam-voices compared with Risk-voices. The Exam voices had higher mean F0, higher coefficient of variation, higher F0 mean absolute slope, and slower pace.

Vocal parameter	T value	Probability
Mean F0	6.46	0.000
F0 coef. var.	3.33	0.003
Pace	-3.95	0.001
F0 range	1.7	0.095
Mean F0 absolute slope	2.39	0.024
Mean energy	-1.617	0.118
Voiced energy range	-1.97	0.283

Table 1 presents the Paired Samples t-Test results.

A number of vocal characteristics were significantly related to various dimensions of the communication quality scale (RCS-O).

The results show that in the **Exam-voices,** the **Affection** dimension was negatively correlated with mean F0 ($r = -.66$; $P<.00$), the ***Trust*** dimension was also negatively correlated with mean F0 ($r = -63$; $P<.00$) and pitch variation ($r = -.44$; $P<.03$). The ***Composure*** dimension was negatively correlated with mean F0 ($r = -.72$; $P<.00$) and pitch variation ($r = -.45$; $P<.03$) while it was positively correlated with pace ($r = .40$; $P<.05$).

The results for **Risk-voices** showed that the **Affection** dimension was negatively correlated with mean F0 ($r = -.61$; $P<.00$), ***Trust*** dimension was negatively correlated with the mean F0 ($r = -.58$; $P<.00$).

According to our hypotheses, an affective stance described as reassuring and calming - appropriate for announcing the risks –is conceptually close to the affective variable of *composure*. Indeed, the Pearson correlation coefficient between the ***Composure*** variable and mean F0 in Risk-voices ($r = -.65$ with two

tailed significance P<.00) and voiced energy range (r = .43 with two tailed significance P< .04)

	Vocal parameter	Affection		Trust		Composure	
		r	Sig.	r	Sig.	r	Sig.
Exam-voices	Mean F0	-.66	.00	-.65	.00	-.72	.00
	F0 coef. of variation		ns	-.44	.03	-.45	.03
	Rate of delivery		ns		ns	.40	.05
	Voiced energy range	.61	.00		ns		ns
Risk-	Mean F0	-.61	.00	-.58	.00	-.65	.00
	Voiced energy range	.63	.00		ns	.43	.04

Table 2: Pearson Correlation coefficients and 2-tailed significance levels; ns = not significant.
Only the vocal parameters significant for at least one dimension are presented.

Conclusion: Our results confirm most of our hypotheses regarding vocal correlates of affective stance in medical interviews. The findings appear to globally follow the pattern of vocal signalling of high vs. low informative salience and higher vs. lower affective arousal.

Vocal Style in Hypnotherapy

The research on Vocal Correlates of affective stance in hypnotherapy involved 64 patients (32 male and 32 female) heavy smokers wishing to stop smoking.(128 sessions of hypnosis). Samples of the physicians' voices were extracted before and during the induction of hypnosis. A series of questionnaires was applied to assess the quality of communication, the efficiency of hypnotherapy, and emotional states of the patients.

Paired samples T-test results:

Vocal parameter	Before Hypnosis	During Hypnosis	T	P	During the hypnosis
F0 median (male): Hz	101.34	96.17	5.06	0.000	F0 is lower
F0 median (female):Hz	200.79	196.92	2.06	0.049	F0 is lower
F0 coef. of variation	13.68	12.32	2.70	0.009	Pitch modulation is weaker
F0 Range: semitones	13.23	11.59	4.27	0.000	Pitch range is narrower
Speech rate: syllables/ sec	3.22	2.43	8.36	0.000	Speech rate is slower
Mean voiced energy	69.17	65.39	5.09	0.000	Vocal energy is weaker

Affective Stance and Efficiency of Hypnotherapy

Two-sample T-test results: The vocal variables significantly linked with success:

- Speech rate (syll/sec) T = -2.01; P = 0.050 DF = 49
- Speech rate (proportion of voiced segments vs. total duration) T = -2.13; P = 0.038 DF = 49
- F0 variability (mean absolute slope) T = -2.50; P = 0.016 DF = 49

Conclusion: The hypnotherapists who spoke faster and had a more modulated voice had more success than those who spoke slowly and had monotonous voices.

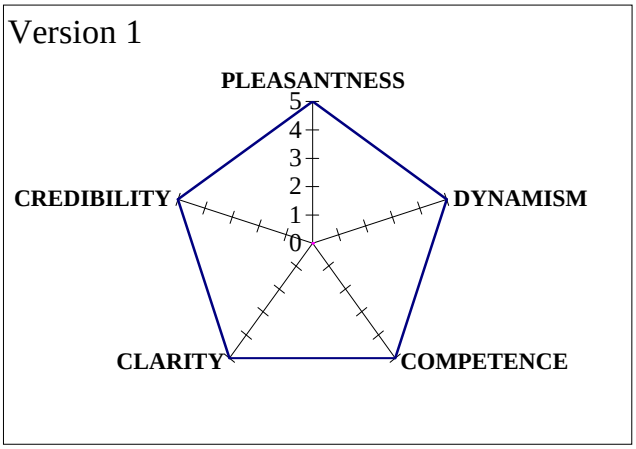
Lessons to be learned :

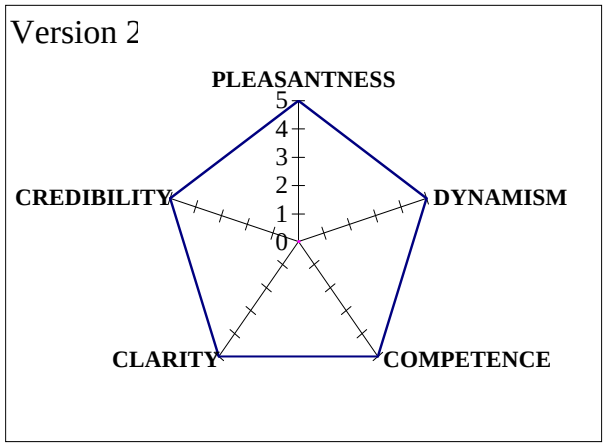
1. Encode affect into your speech patterns.
2. Decide on the impact to create : emotionally involved / emotionally flat.
3. Let you voice be congruent with the verbal message (positive / negative ; encouraging discouraging).

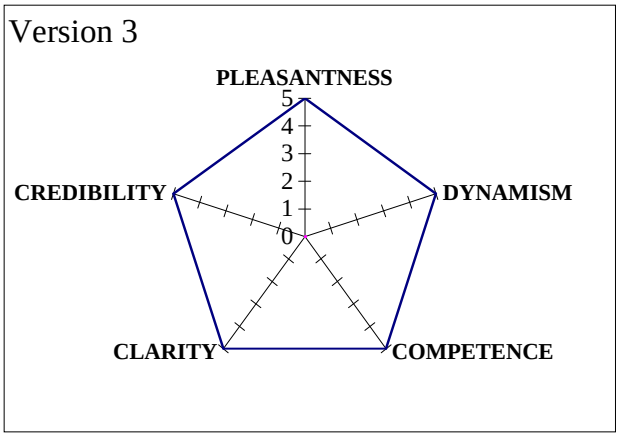
Three vocal parameters significantly related to conveying affect :

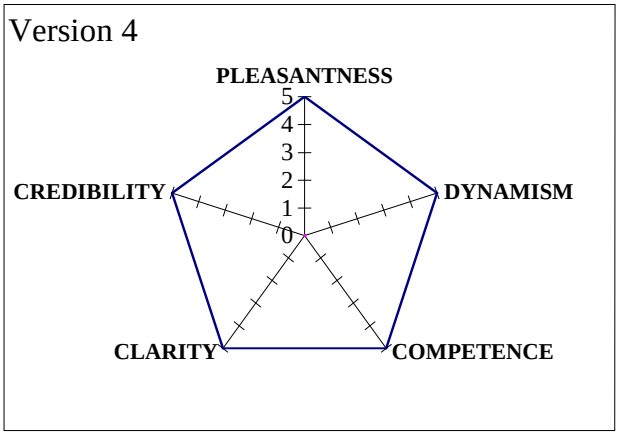
1. Mean pitch
2. Pitch variation
3. Speech rate

Evaluation of the Speaker









References

Boersma, P. & Weenink, D.J.M., Praat: doing phonetics by computer, computer, version 3.4. *Institute of Phonetic Sciences Amsterdam* http://www.fon.hum.uva.nl/praat

Diamond, M. J. 1987. The interactional basis of hypnotic experience: On the relational diamensions of hypnosis. International Journal of Clinical and Experimental Hypnosis, 35, 95-115.

Cappella, J. N. (1981). Mutual influence in expressive behaviour: Adult-adult and infant adult dyadic interaction. Psychological Bulletin, 89, 101-132

Caelen-Haumont and Branka Zei Pollermann 2007: Voice and Affect in Speech Communication, In K. Izdebski Ed : Emotions in the Human Voice, Volume 1, 215-232, Plural Publishing

Lane R. & Zei Pollermann. B., Complexity of emotion representations. 2002: In: The Wisom in Feeling, Eds. P. Sallovey and L. Feldman Barret pp 271-293.

Hatfield, E., Cacioppo, J. T., & Rapson, R. (1994). Emotional contagion. Cambridge: Cambridge University Press.

Gregory, S. W., Dagan, K. & Webster, S. (1997). Evaluating the relation of vocal accommodation in conversation partner's fundamental frequencies to perceptions of communication quality. Journal of Nonverbal behaviour 21(1), Human Sciences Press.

Joseph P. Green, Steven J. Lynn (2000). Hypnosis and Suggestion-based Approaches to Smoking Cessation: An Examination of the Evidence. The International Journal of Clinical and Experimental Hypnosis, vol. 48, 195-224.

T. Gallagher, P. Hartung, S. Gregory, 2001, Assessment of a measure of relational communication for doctor patient interactions. Patient Education and Counseling 45, 211-218.

Milmoe, S., Rosenthal, R., Blane, H. T., Chafetz, M.E. & Wolf, I. (1967): The doctorís Voice: Postdictor of successful referral of alcoholic patients, Journal of Abnormal Psychology, 72, American Psychological Association, pp 78-84.

Russel & Winterbottom Eds. (1972). Ancient literary criticism. Oxford: Clarendon press.

Williams, C. E., et Stevens, K.N. 1972. “Emotion and Speech: Some Acoustical Correlates”. *The Journal of the Acoustical Society of America.* 52, p. 1238-1250

Zei Pollermann B. (2002). “A Place for Prosody in a Unified Model of Cognition and Emotion”. In : *Speech Prosody 2002*, Université de Aix-en-Provence, pp 17-22

Zei, B., & Archinard, M. (1998). La variabilité du rythme cardiaque et la différentiation prosodique des émotions. XXIIèmes Journées d’Etudes sur la Parole. Martigny.

Zei, B. & Archinard, M. (2001) Acoustic Patterns of Emotions.In: Improvements in Speech Synthesis, Ed: Keller. E., Wiley, London.

Zei Pollermann and Izdebski K. ,2007. Unified Model of Cognition, Emotion, nd Action and Its Relation to Vocally Encoded Cognitive-Affective States. In K. Izdebski Ed : Izdebski, K.. *Emotions of the human voice*. Vol1 43-64. Plural Publishing

Zei Pollermann B., (2008), Autonomic Determinants of Vocal Expression of Emotions. In K. Izdebski Ed : Emotions in the Human Voice, Volume 2 Plural Publishing, pp 1-16.

Zei Pollermann B and Bernhard J., (2008)., Vocal indicators of coping style in patients with breast cancer: A pilot study. In K. Izdebski Ed Emotions in the Human Voice, Volume 2 Plural Publishing, pp 215-229.