BACK-CHANNEL SIGNALS IN QUEBEC FRENCH: PHONETIC DESCRIPTION AND FREQUENCY OF USE

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ABSTRACT

This paper deals first with the prosodic characteristics of the main channel at the point of insertion of a BC signal. Although no categorical pattern emerges, it is clear that the presence of certain prosodic cues favours the utterance of a back channel signal by the addressee. Based on these results, modified versions, in terms of the proportion of BC signals, of three interview excerpts were submitted to judges. It appears that the best interviews are the ones with a proportion of BC signals in the range of 25% to 50%.

PURPOSE

We call *back-channel* signals (*BC signals* hereafter) all the gestural (smiles, nods of the head, etc.) and the vocal and verbal (*ok, h'm, yeah*, repeats, etc.) signals that convey to a speaker that an addressee is manifestly listening. We claim that these signals are not randomly distributed with regard to speech that is produced on the main channel. We also believe that listening strategies, in the same way as whole sets of conversational strategies, are closely linked to a given culture [1], in particular with regards to the voicing frequency. The production of vocal and verbal BC signals is thus beyond the idiosyncrasies of a given speaker. More specifically, we posit that there is a range of adequate proportions of BC signals in a conversation, without and beyond which the functioning of an interaction may be at risk.

METHOD

From an analysis of nine excerpts of spontaneous discourse extracted from the same number of sociolinguistic interviews carried out in French in Montréal, we first identified the prosodic characteristics of 100 BC signals. Fifty of these were selected quasi-randomly in that the first ten tokens or so of BC signals were analyzed. The remaining 50 tokens were chosen because they met a set of definite criteria; namely, they belonged to the *h'm* family of BC signals; their sound quality was good and they did not overlap, even partially, on the signal produced on the main channel. The quasi-random (QR) and the non-random (NR) subsets of BC signals will be treated separately.

PHONETIC DESCRIPTION

Since BC signals function as marks of acknowledgment and means of supporting and backing up a speaker, it appears reasonable to believe that they are not inserted randomly in the speech chain, but, on the contrary, appear in specific positions. For this study, three prosodic parameters –stress, pause and intonation patterns– were checked for their effect on the utterance of BC signals.

Stress

Table 1 shows that, from the analysis of the 100 BC signals selected, 81 are perceived as following a stressed syllable, whereas 19 are judged as following an unstressed one. It is also worth noting that for the isolated tokens of BC signals in the QR sub-sample, the number of preceding stressed syllables is 32 (91.4%) whereas this figure drops to 8 (53,3%) when they are superimposed on the main channel.

The same table also shows that for the QR sub-sample, the number of isolated signals –35 (70%)– is significantly more important than the number of overlapping ones –15 (30%). The overlapping of the back and main channels in the QR sub-corpus assumes different forms: in 3 cases the speaker completes the preceding sequence even if uttered with a final low tone; in 3 other cases, the speaker resumes

Table 1: Number of BC' signals following stressed or unstressed syllables according to the type of sample and the relative position of the signals.

	Isolated		Superimposed	
	+ stress	- stress	+ stress	- stress
QR	32	3	8	7
NR	41	9	–	–

speaking while the interviewer is uttering a BC signal; 5 times the interviewer either utters a BC signal over the lengthening of a syllable caused by a hesitation, or appears to wait too long to utter its BC signal. The 4 last cases can only be explained by the idiosyncrasies of the interviewers or by the context of the interview.

Pause

Out of the 50 tokens in the QR sub-sample, 40 tokens (80%) are preceded by a silent pause of 100ms or more, whereas for 3 tokens there is virtually no pause: 0, 33 and 59 ms. The remaining 7 BC signals, for which there were no pauses, are the ones that are completely superimposed on the main channel. The average duration of the pause in the QR sub-sample is 369ms (σ245ms). Since the BC signals in the NR sub-sample had to be completely detached from the main channel to be part of the sample, there is a pause for every one of the 50 tokens, the average length of which is 339ms (σ143ms).

Intonation pattern

Using the INTSINT transcription system of intonation [2], for each of the 100 tokens, we identified the pitch movement on the last syllable before a BC signal. Table 2 gives the distribution of the various types of pitch targets in the corpus under analysis. It was determined empirically [3] that a pitch point is higher (H) or lower (L) than the preceding one when there is a variation of 3 semi-tones or more compared to the preceding target. When a variation of less than 3 semi-tones was found, the pitch target was said to be the same (S). For 7 tokens (?), it has been impossible to extract a reliable F_0 contour. It is quite clear from Table 2 that, even if most syllables before a BC signal (55) are Higher than the preceding one(s), there are quite a few tokens that bear a Lower tone than the preceding syllable(s) (24) or the Same tone as the syllable(s) before the signal (14).

Table 2: Number of syllables with a particular tonal configuration according to the type of BC samples (H higher L=lower, S= same, ? indeterminate).

	H	L	S	?	Total
QR	24	11	9	6	50
NR	31	13	5	1	50
Total	55	24	14	7	100

Since there is a change of tone for 79% (55% + 24%) of the syllables next to a BC signal, it is clear that the BC signals tend to be uttered right after syllables that bear a boundary tone or a pitch accent tone.

From these results on BC signals and stress, pause and intonation patterns, we conclude that even if there is no single prosodic cue that may explain the voicing of a BC signal by an addressee, the probability that a BC signal is to be voiced is greater after a pause following a stressed syllable bearing a pitch movement.

PERCEPTION TESTS

However, the number of BC signals found in real speech is always smaller than the number of locations, on the prosodic level where it can be inserted. This is the reason why, based on the results of the prosodic analysis, we built perception tests in order to determine the proportions of BC signals that are acceptable in spontaneous Quebec French speech.

Method

We first built a pretest based on a one minute long excerpt from a sociolinguistic interview, consisting of a brief statement by the interviewer followed by a long reply from the interviewee. All of the possible locations where a BC signal could be inserted in the interviewee's

speech were then identified empirically. Using CSL from *Kay Elemetrics*, the digitized recording of the excerpt was modified by introducing a certain number of *h'm*, the most frequent BC signal. Five versions of the original recording were built, with the proportion of BC signals introduced ranging from 0% to 100% (in 25% increments) of the possible locations. The exact position of these BC signals was randomly determined. Each of the 5 versions obtained was submitted to 6 subjects. After listening to one version of the modified excerpt twice, the subjects were asked to evaluate the significance or the interest of the excerpt by answering on graduated scales (ranging from 1 to 5) 17 questions on the interview itself and on the interviewer and the interviewee.

For the real test, the same procedure was followed, except that two excerpts, whose duration and structure were comparable to those of the pretest, were used instead of one. Contrary to the pretest, where only *h'm*'s were inserted in the excerpt, *oui* «yes» was introduced instead of *h'm* following a frequently attested proportion of one to four [4]. Using two forms instead of one has been found necessary in order to increase the naturalness of the speech sample. The respective positions of the *oui* and the *h'm* forms were also fixed randomly. Finally, in order to determine if the subjects reacted to the quantity of BC signals more than to the mere repetition of the two forms, we built a 6th version from one of the two excerpts. This last version was identical to the most saturated one (100%) of this excerpt, except that, instead of two forms of BC signals, 7 different forms were inserted. Each of the 11 recordings obtained were submitted to 20 to 35 subjects. No group listened to more than one version.

In all three excerpts used, the BC signals inserted in the recorded interaction had been uttered by the interviewer herself at one point or the other in the interview. For each of the 10 modified versions of the original recordings, only one *h'm* and one *oui* were used, which admittedly reduced the naturalness of the modified excerpts. However, for the *improved* saturated 6th version of one of the 2 excerpts, all of the tokens of BC signals inserted were different, except for a few that were less common.

Results

Among the questions asked to the judges, it is evidently those pertaining to the interviewer that are the most relevant for this study. Therefore, only the results for these questions will be discussed. For the pretest, as shown in Figure 1, the versions of the interaction receiving the better scores are the ones that include a BC signal in 25 to 50% of the possible locations.

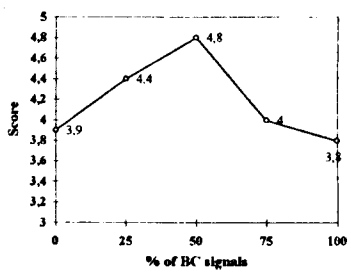

Figure 1: Rating scores by 6 judges for 5 modified versions of an interaction.

By vocalizing his listening to the conversation in these proportions, the interviewer is judged to be more polite, more cooperative, more likeable and brighter. These proportions of BC signals conform to those globally found in all the analyses carried out on other speech samples [1,4]. Conversely, the interviewer is not evaluated favourably when there are no (0%) BC signals or when there is more than 75% saturation.

In spite of the improvements that were thought to have been made on the tests for the larger-scale part of the study, the results that were obtained, as is shown in Figure 2, are less clear than the ones for the pretest. In accordance with what was found in the pretest, the versions with the 25% proportion of BC signals were rated the best, for both excerpts. The most

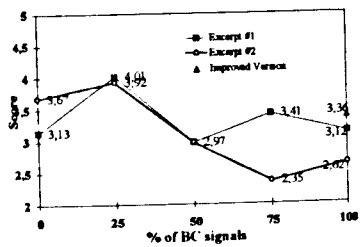

Figure 2: Rating scores by judges for 11 modified versions of two interactions.

negative judgments tend also to involve the extreme proportions. However, for the first excerpt, the score for the 0% version is not far removed from the score for the 25% one, and it goes up slightly from the 75% version to the 100% one.

But it is the results for the second excerpt that are the least consistent with the others. For this excerpt, it is the 50% version, as well as the 0% and 100% versions, that get the worst scores. A careful examination of this version may explain why it is so. The random distribution of the two forms of BC signals and of their respective locations in that version results in a sequence of 8 straight *h'm*'s, seven of which occur one after the other at the end of the excerpt, which seems to have been perceived as quite annoying. In fact, in the last part of this version, it is as if the saturation of the interaction was close to 100%. For the 75% version, the random distribution has introduced a *oui* right in the middle of the *h'm* sequence, which decreases to 5 the number of *h'm*'s that follow each other in quick succession, and, thereby, makes this version more acceptable than the preceding one. Even in the 100% version, the number of consecutive tokens of *h'm* does not exceed 6.

The results obtained for the 6th version of excerpt #2, which contained a maximum number and variety of BC signals, show that the subjects rate it higher than the 100% version containing only repetitions of the same *h'm* and *oui*; however the score for this *improved* version remains lower than the one for the 75% one.

CONCLUSION

Although it is difficult to measure the influence on the subjects of the increasing proximity of the BC signals, which is a result of their increase in number in a short span of time, and of the repetition of a single form, the results from the perception tests indicate that the variation in the number of tokens of BC signals uttered is well perceived, and that the proportions lower than 25% and higher than 75% are considered less favourably. We can predict that a large quantity of BC signals in a short span of time would upset the speaker, to the point of disturbing the communication, to the same extent a silent listening would do. These results thus support the hypothesis that there is a cultural determination of the adequate number of BC signals in a verbal interaction.

ACKNOWLEDGEMENT

The authors wish to thank H. Tétreault for her help with the acoustic analysis, and T. Heisler and A. Manning for revising this text. This research was supported by grants from the *Conseil de recherches en sciences humaines du Canada*.

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