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 number of overlapping 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 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.

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

<table>
<thead>
<tr>
<th></th>
<th>Isolated</th>
<th>Superimposed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>+ stress</td>
<td>- stress</td>
</tr>
<tr>
<td></td>
<td>- stress</td>
<td>+ stress</td>
</tr>
<tr>
<td></td>
<td>- stress</td>
<td>- stress</td>
</tr>
<tr>
<td>QR</td>
<td>32</td>
<td>3</td>
</tr>
<tr>
<td>NR</td>
<td>41</td>
<td>9</td>
</tr>
</tbody>
</table>

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 (±245ms). 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 (±143ms).

Pause 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.

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

<table>
<thead>
<tr>
<th></th>
<th>H</th>
<th>L</th>
<th>S</th>
<th>?</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>QR</td>
<td>24</td>
<td>11</td>
<td>6</td>
<td>5</td>
<td>50</td>
</tr>
<tr>
<td>NR</td>
<td>31</td>
<td>13</td>
<td>5</td>
<td>1</td>
<td>50</td>
</tr>
<tr>
<td>Total</td>
<td>55</td>
<td>24</td>
<td>7</td>
<td>6</td>
<td>100</td>
</tr>
</tbody>
</table>

Intonation pattern
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.

PERCEPTION TESTS
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 method by which, 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 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
graded 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 com-
parable to those of the pretest, were used
instead of one. Contrary to the pretest,
where only m's were inserted in the
excerpt, oui «yes» was introduced instead
of 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 natural-
ness of the speech sample. The respective
positions of the oui and the 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 m and
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 ver-
sions of the interaction receiving the
better scores are the ones that include a
BC signal in 25 to 50% of the possible
locations.

By vocalizing his listening to the conver-
sation in these proportions, the inter-
viewer is judged to be more polite, more
cooperative, more likeable and brighter.
These proportions of BC signals conform
more 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

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 distribu-
tion of the two forms of BC signals and of
their respective locations in that version
results in a sequence of 8 straight 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 m's sequence,
which decreases to 5 the number of 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 con-
secutive tokens of m's does not exceed 6.

The results obtained for the 6th version
of excerpt #2, which contained a maxi-
mum number and variety of BC signals,
show that the subjects rate it higher than
the 100% version containing only repeti-
tions of the same 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 percep-
tion 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 pre-
cede 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 interac-
tion.

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

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