VOICE AND INFORMATION PROCESSING

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ABSTRACT

Do intonation, intensity, speech rate and source gender impact on information processing? In a factorial design experiment, we tried to put forward an answer to those questions. Two professional actors (a male and a female) were asked to record a message previously validated about bank services. The experimental conditions totalized 14 conditions (6 conditions plus the moderate for both male and female source's voices) and were presented to undergraduate university students. We asked subjects to complete a questionnaire (a series of questions 7 points Likert scales) concerning different dimensions about the message, the services, the spokesperson and the bank. A total of 391 questionnaires were fully completed, 51,2% of the subjects heard the female voice source and 48,9% the male voice. Mean age was 26,51. Results show that phonetic variables affect the dependant variables differently. The speech rate is the most important variable and more specifically impact the most on information processing i.e. the spokesperson perception, attitudes to the message, the services or the bank. The attractiveness and the impression of competence of the spokesperson are significantly induced by the speech rate. In this message about banking services, the intelligibility of the message is not influenced by the intensity or the intonation. There is no significant impact of the source and respondents gender.

INTRODUCTION

Voice plays a fundamental role on the consumer's perception specially in a marketing context, and on his intent to buy. The caller's voice is a deciding factor for the perception of the situation and, therefore, for the success or the failure of the telephone call. What are the cues in the caller's voice that helps bring the message forward ? What are the cues in the caller's voice that will have a positive impact on the consumer's intent to buy ? Researches in phonetics or in social psychology have focused on the impact of the source's voice on the receiver, but few have done so on the information processing phenomenon.

1.1 Voice in verbal communication models

In social psychology, voice is known as a key element conveying information not only on personal or social identity ([1],[2], [3]), emotions, personality, attitudes ([3],[4],[5]), but also on the inferences and attributions done based on the voice ([6]).

A deep voice is preferred to a high pitch voice because it gives a better sense of credibility ([7]). A strong voice is often associated with a dominant character and gives the impression of being more convincing ([6], [8], [9]). A fast speech rate gives a dynamic and dominating impression ([10]), and reflects self confidence and competence ([5], [11]) or gives the feeling of a more credible source ([12]).

The voice's pitch, perceptually linked to the fundamental frequency's values, is the major cue distinguishing male and female voices ([11]). Women tend to speak with less intensity using less intonation variations ([13]). Many researches tend to demonstrate that listeners have a tendency to associate passivity, vulnerability and submission to women voices and to associate opposite qualities to men's voices ([3],[5]). Women have long been refused news broadcasting because it was believed that listeners preferred hearing male voices. This was not due to a problem in transmitting women's voices but to the idea that a low pitch voice gave a better impression : a man's voice was preferred to a woman's voice and a woman alto voice was preferred to that of a soprano ([3]).

For phoneticians, voice is very complex to study and few researches have explored the effects of the voice on the behavioral intents of the listener ([3]). Despite this lack of research, persuasion effects of the voice seem to be linked to marked variations in the intonation ([14]), to rising intonative contours ([15]), to high intensity ([16], [17]) and to a high speech rate ([12]).

1.2 Voice and marketing

In the well known *Elaborated Likelihood Model* (ELM), Petty & Cacioppo ([18]) and Petty, Cacioppo & Schumann ([19]) give this explanation of persuasive communication and of the attitudes and behaviors of consumers : if the message is important, the listener is willing to make an effort to understand the message by concentrating on the arguments. The consumer takes the central route. In this case of *strong implication*, the argumentation is assimilated and analyzed carefully before being accepted. If, in contrary, the message is perceived as being unimportant, or of *low implication*, the peripheral route is taken. The listener makes less efforts and focuses on the presentation and his construct instead of on the content. The cognitive effort is less and persuasion is the result of the heuristic elements of the message.

Voice is a fundamental heuristic element in a context based on audition, where visual cues are inexistent. The impact of two voice characteristics (i.e. intensity and intonation) has been shown to be a determining factor on the consumer's attitude in the audition of a recorded message, and more specifically in a low involvement message ([20], [21], [22]). In fact, Gélinas-Chebat & Chebat ([20]) have demonstrated that the two voice

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variables that are intonation and intensity have asymmetrical effects on credibility.

1.3 Voice and telemarketing

Contradiction arise from the few studies done on voice perception in telemarketing. Some authors, solely based on their own experience or on observations, suggest the use of a low intensity ([23]) or a slow speech rate ([24]). However, a study show that in telephone interviews, women with high pitch voices, strong intonation, fast speech rate and high intensity voices are more successful. Peterson, Cannito & Brown ([25]) reach similar conclusions in a study on male voices. In this case, authors were not able to show the positive effects of a low pitch and high intensity voice. These differences between practical application and researches results show the need for further research. To our knowledge, no comparative studies have been done between female and male voices in telemarketing.

1.4 Research goals

Our goal is to better understand the effects of the caller's voice characteristics on the attitudes of the listener in a telemarketing context. We consider only the low involvement message. In telemarketing, even before having access to the core of the message, the listener decides if he will pursue the conversation or not. The listener uses the information at the formal presentation level, which is the peripheral route of ELM. In this model, and according to other researches, voice have a more important impact in a low involvement message ([22]).

According to the available literature on the subject, more specifically in regards to social psychology's studies, we propose that voice characteristics of the caller at the phonological level (sex of the caller) and at the phonetical level (intensity, intonation speech rate and voice pitch) will have a direct effect on the consumer's attitudes, on is perception of the message as well as on his behavioral intents.

METHODOLOGY

1.1 Methodological approach

A professional actress and a professional actor were asked to record a message about a ATM card (Automatic Teller Machine card) offered by a known Canadian bank. It was a real publicity message that had been modified for our purposes. The low involvement message had previously been validated [21].

The first condition recorded was the *moderate* condition, which was asked to be as "neutral" as possible (normal speech rate, normal intensity, slight intonation). The other targeted conditions were the following : loud and soft intensity, marked and unmarked intonation and fast and slow speech rate (conditions labelled *high and low*) . During the recording, the actress/actor was asked to vary only the target of the condition, keeping all other as close as possible to the *moderate* condition. Adding the *moderate* to these conditions, we ended out with 14 experimental conditions (6 conditions plus the moderate for both male and female source's voices). All the recording were done in an acoustic room, on a Marantz PDM-222, using high bias audio cassettes.

The two best recordings of each conditions were first selected. Two experimenters separately choose the recording that best represented the targeted conditions. The level of agreement reached 100%. The collected conditions were all acoustically confirmed and excepts from each condition were presented to a group of linguistic students who confirmed the adequacy of the selected recordings.

1.2 Experimentation

Undergraduate university students were selected in 14 linguistic classes and were randomly assigned to one of the condition. Each groups was asked to listen to one of the experimental conditions from a good quality radio-cassette player. The students were all told that what they were about to hear was a mock telemarketing message. High and low frequencies were cut off to reproduce telephone conditions as accurately as possible. After listening to the recording, each student was asked to answer a questionnaire concerning his or her attitudes toward the message and his or her behavioral intent. Subjects filled series of questions in a 7 points Liskert scales form (-3 to +3). 399 questionnaires were fully completed, 205 by women (51,4%) and 194 by men (48,6%). Age range was 19 to 61 years old (mean : 26,51). Each group had between 20 and 37 subjects.

3. RESULTS

A (principal component) factor analysis was performed on the eight variables characterizing the source image. In addition an *oblimin* rotation was performed to take into account the nonorthogonality of the factors. Two factors were shown: *competence* (composed of the following variables: competent person, trustworthy, honest, credible) explaining 49.6% of the variance (eigenvalue=4.46) and *attractiveness,* (is composed of the following variables: persuasive person, prestigious, cultured, likeable, attractive) explaining 12.2% of the variance (eigenvalue=1.1).

Hypothesis 1:Voice intonation, intensity and speech rate significantly affect the source image.
In order to test the hypothesis, a MANOVA was performed where the dependent variables were the *source competence* and the *source attractiveness* factor scores. The independent variables were the manipulated voice characteristics (i.e. voice intonation, intensity and speech rate); we used the source's and the recipients' gender as *covariates* in order to cancel their effects and to pinpoint the sole effects of voice characteristics *per se.*

Two of the three main effects proved significant: intonation ($F_{4, 391}$= 12.79; p=.000) and speech rate ($F_{4, 391}$=9.27 ; p=.000) had a significant main effect on the perception of the source. More precisely, intonation and speech rates affected *both* competence and attractiveness (all F's >3.4; p<.04). Only intensity had no significant effects ($F_{4, 391}$=1.71 ; p=.14) on the global perception of the source ; but voice intensity impacted on *competence* ($F_{2,}$

$_{391}$=2.49 ; p=.04): under moderate intensity, the source was perceived as more *competent* (.35) than under low intensity (-.15), as shown by a *one way ANOVA* (p=.01).

Additional analyses (*one way ANOVA's*) were performed to understand the direction of these effects: under *low intonation*, a source is perceived as significantly *more competent* (.15) than under moderate (-.40) or high intonation (-.39); all p's<.001; under *low intonation*, a source is also perceived as significantly *more attractive* (.22) than under moderate (-.80) or high intonation (-.37); all p's<.001.

Similar *one way ANOVA's* showed that under *high speech rate*, the source was perceived as *both* significantly *more competent* (.57) and *more attractive* (.65) than under moderate speech rate (score of competence = -.15; score of attractiveness = -. 20) and low speech rate (score of competence = -.10; score of attractiveness = -. 15); all p's<.001.

Hypothesis 2: The recipients gender(2a), the source gender(2b) affects the perception of competence of the source.
A MANOVA where the dependent variables were the factor scores of *competence* and *attractiveness*, the independent variables were the *gender of the source* and the *gender of the recipient.* Note that we used the voice characteristics (intensity, intonation and speech rate) as *covariates*, in order to cancel the effects of voice and pinpoint the sole effects of gender.

The recipients gender had no effects on the perception of the source ($F_{2, 391}$=.76 ; p=.77). H2a is rejected. The source gender had a significant effect effects on the perception of the source ($F_{2, 391}$=5.61 ; p=.006). H2b is supported.

A significant two way effects of gender of the source by gender of the recipient was found ($F_{2, 391}$=6.02 ; p=.003) on the perception of the source. These effects were significant only for the *competence* of the source ($F_{1, 391}$=4.87 ; p=.03), not for *attractiveness* ($F_{1, 391}$=.083 ; p=.73).

More precisely, as shown in figure 1, for female respondents, the gender of the source had no significant effects on *competence* ($F_{1,280}$=.007 ; p=.94) whereas it was significant for male respondents ($F_{1, 110}$=9.59 ; p=.000): Male respondents scored the male source significantly higher (.26) than the female source (-.27).

Hypothesis 3:Voice intonation, intensity and speech rate significantly interact with both source and recipients' genders to affect the source image
In order to assess the *interactive* effects of voice and gender, a MANOVA where the independent variables were the *products* of the voice characteristics *by* the source and recipients gender was performed. As previously done, the dependent variables were the two factor scores (*competence* and *attractiveness*). None of the interactive effects proved significant : all F's < 1.7; p>.15. H3 is rejected.

Hypothesis 4: Voice characteristics and genders affect the behavioral intent

An ANOVA where the *behavioral intent* was the dependent variable and the voice characteristics and gender were the independent variables were the independent variables showed no main effects of neither voice nor genders (all F's <2.00; p>.08). Similarly, the interactive effects were not significant (all F's <1.5; p>.16). H4 is not supported.

However, a (*backward)* linear regression analysis where the *behavioral intent* is the dependent variable and competence and attractiveness were the independent variables showed a significant relationship ($F_{2, 392}$=80.03 ; p=.000; adjusted r^2= .29). Both betas are significant and positive (.309 and .270 for *competence* and *attractiveness* respectively; p<.001 in both cases).

4. DISCUSSION AND CONCLUSION

The results show a clear picture of the efficient telemarketing communicator. First, the lower the intonation and the faster the speech rate, the more the voice conveys an image of both *competence* and *attractiveness*; in addition a moderate intensity enhances the perceived *competence*. Second, a sexual bias is shown here: male recipients tend to perceive male telemarketers are more *competent* than the female counterparts; female recipients do not show any such bias. Third, neither voice characteristics nor genders (of the source and of the recipients) have direct effects on the *behavioral intent*. But both perceived competence and attractiveness affect significantly the behavioral intent.

Enhancing both source's perceived competence and attractiveness is likely to enhance in turn, the sales through telemarketing. The telemarketing salesperson should be trained to keep his/her voice at a moderate intensity, with low intonation and a fast rate. In addition, it is clear that female telemarketers should be used mostly to call female recipients because of the sexual negative bias that male respondents tend to show when exposed to a feminine voice.

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ANNEXE

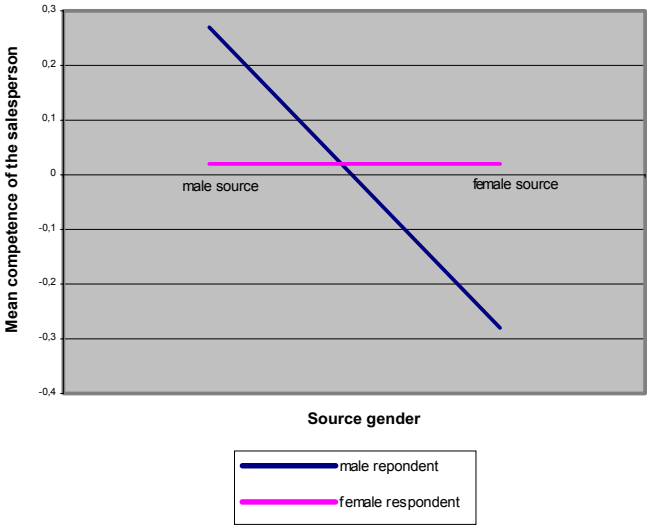

Figure 1. Effects of Source Gender and Recipients on Competence