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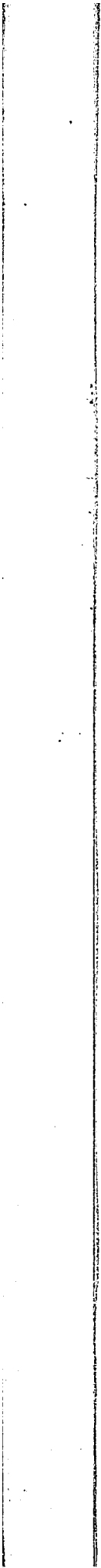
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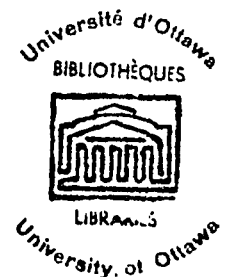
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VOCAL CUES IN THE CROSS-CULTURAL  
COMMUNICATION OF EMOTION

by Lynne Hollander

Thesis presented to the School of Graduate Studies  
in partial fulfillment of the requirements for the  
degree of Master of Arts in Psychology

UNIVERSITY OF OTTAWA  
OTTAWA, CANADA, 1978



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## CURRICULUM STUDIORUM

Lynne Hollander was born in Toronto, Ontario. In 1966, she received the Bachelor of Music degree from the University of British Columbia (Vancouver, B.C.). She earned the degree of Bachelor of Library Science from the same institution in 1967. In 1976, she received a Bachelor of Psychology, post-B.A. (Honours) from the University of Ottawa.

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ABSTRACT

VOCAL CUES IN THE CROSS-CULTURAL  
COMMUNICATION OF EMOTIONS

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This study is concerned with the accuracy of affective communication by means of voice qualities, with a special focus on cross-cultural affective transmission. Spontaneous expressions of love, anger, sadness, and happiness, elicited from three English- and three French-speaking amateur actresses, were tape-recorded. The resulting tape was passed through an electronic filter to render it content-free. The subjects were 17 English-Canadian and 17 French-Canadian female Introductory Psychology students chosen from a larger group of volunteers on the basis of specific criterion responses to a biographical questionnaire, who received two marks for participation. Using the facilities of a language laboratory, the two groups of subjects were each exposed to the instrument on two occasions, in order to ensure its reliability. Subjects recorded their judgments concerning the affective stimuli on multiple-choice response forms, and the contrasts between the responses of the two

groups were compared. The significantly greater accuracy of the English subjects on overall judgment of the emotions expressed by all speakers was in a direction contrary to the first hypothesis, which predicted a superiority in the decoding ability of the French-Canadian subjects for both English- and French-language affective stimuli. The second hypothesis, which postulated the superiority in encoding of emotions by the French-Canadian speakers, was also called into question by the finding that, while the French affective stimuli were identified by both English and French subjects with a similar level of accuracy, the English-speaking subjects were significantly more accurate than the French-speaking in judgments of the English emotional expressions. Sources of significant variations are discussed, with specific consideration of the contributions of differential efficacy of vocal cues in expressing specific emotions; individual differences in ability to encode affective communications by means of voice; and the possible influence of stereotypical modes of vocal communication of emotions, either innately formed or linked to socially learned cultural expressive modes, which may differentially influence the accuracy of affective communication across cultural/linguistic barriers.

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## INTRODUCTION

When we speak, we communicate much more than the semantic content of our spoken words. Much psychological research, addressing itself to the question of the non-content aspects of spoken language, has substantiated the intuitive sense of the important communication value of the nonverbal aspects of spoken language. Personality traits and emotions have seemed to be the aspects of vocal communication most likely to be related to the vocal channel of the voice. Consequently, many studies have investigated possible relationships between vocal characteristics and attributed personality factors and emotions.

For the most part, the focus of this research has been a single language group. Much evidence has accumulated to support the assumption that judges can assess with some accuracy many aspects of a person's relatively stable personality traits as well as his more transitory emotional states from cues found in the individual's voice. The almost universal finding of stereotypical judgments, which are characterized by marked social agreement, regardless of accuracy, raises the issue of the social learning of expressive vocal patterns, from which individuals may deviate with a concomitant loss of accuracy of affective

communication.

In spite of evident differences in the vocal patterning of different languages, evidence for stereotypical judgments across linguistic groups has also been found. This suggests that a universal mode of affective communication may exist, independent of social learning. The hoary problem of nature versus nurture, thus raised once again, is susceptible to study only in terms of cross-cultural projects. The relatively few studies that have been carried out in this area have indicated the presence of both similarities and differences in judgments, across cultural/linguistic groups, of personality characteristics as well as emotions.

The present study addresses itself to the role of vocal cues as a factor contributing to cross-cultural communication of emotions. In the first chapter, a review of the relevant literature is presented, and the hypotheses formulated. The second chapter describes the subjects, the construction of the instrument, and the procedures employed, as well as the methods of data analysis. In chapter three, the results are presented and discussed, and implications for further research are indicated.

## CHAPTER I

### REVIEW OF THE LITERATURE

This chapter begins with discussion of the literature relevant to this study. The first section is concerned with single-language studies of judgments based upon vocal cues. Cross-cultural identification of emotions is discussed in the second section. Methodological approaches to the study of content-free speech are the focus of the third section, and the chapter concludes with a summary and statement of the hypotheses.

#### Single-language Studies of Judgments Based upon Vocal Cues

#### Judgments of Personality Character- istics on the Basis of Voice Qualities

The pioneer study by Pear (1931) suggested that certain aspects of personality may be judged with some accuracy from auditory cues alone. Over 4,000 British radio listeners reported their judgments regarding sex, age, profession, leadership ability, and birthplace of nine speakers whom they heard over the air. While sex and age were correctly estimated most frequently, the highest rating of leadership

ability was associated with three speakers, an actor, a judge, and a clergyman, whose voices necessarily functioned as a vital professional tool. Birthplace of speakers was not, as a rule, correctly identified. The consistency of some incorrect judgments regarding speakers' occupations implied the existence of vocal stereotypes. Pear's descriptive study, while utilizing a large number of subjects, suffered from methodological weaknesses. Nevertheless, it raised many questions concerning channels of communication which were to be more carefully investigated by later research. A number of more adequately controlled studies followed, which were concerned with the accuracy of judgments, from voice alone, of many personal characteristics.

Eisenberg and Zalowitz (1938) found that, while dominance feeling was judged slightly more accurately than chance, stereotyped evaluations on the basis of desirable voice qualities were apparent. Several investigations by Fay and Middleton studied judgments, from vocal cues, of several personality characteristics. An accuracy of judgment superior to chance was found for the six Spranger personality types (Fay & Middleton, 1939), the Political, Aesthetic, and Social types being most accurately judged, and the Economic, Theoretical, and Religious, least accurately assessed. While a significant correlation was found between judged and actual types, based upon scores of Allport and Vernon's Study of Values, some of the voices

were found to be stereotyped.

Sociability was not found to be accurately evaluated on the basis of vocal cues (Fay & Middleton, 1941). Sex differences in judgments were found, with women's ratings more consistent, but men's judgments slightly more accurate. Again, some voices were characteristically stereotypical. In a study of judged truth-telling versus lying on the basis of voice alone (Fay & Middleton, 1941a), lying was judged more accurately than was truth-telling. In another study, little correlation was found between ratings of emotional balance on the basis of voice and those ratings made on the basis of personal knowledge (Fay & Middleton, 1941-1942). The assessments made based on voice alone, while relatively inaccurate, showed some evidence of stereotyped judgments. Leadership was found to be judged from transmitted voices at approximately a chance level of accuracy (Fay & Middleton, 1943). With some voices, but not with others, a high degree of social agreement was found.

The studies by Fay and Middleton all used small numbers of subjects, frequently chosen from special groups such as fraternities or sororities. The judgments of the salient characteristics were often made on a subjective basis. The transmission of voices over a public address system, in a period prior to the development of high fidelity sound systems, undoubtedly caused a degree of distortion sufficient to influence the listeners' judgments.

While raising a number of suggestive hypotheses, these studies clearly cannot be generalized to different populations.

Studies of clinical populations or of conditions associated with psychopathology have suggested that correlations exist between abnormalities and voice qualities. On the basis of the recorded voices of schizophrenic and nonschizophrenic readers, the schizophrenics were judged more potent than the nonschizophrenics, using a semantic differential technique for rating (Markel, Meisels & Houck, 1964). The voices of patients judged to be schizophrenics were rated as more active than those of the nonschizophrenics. The authors conclude that a speaker's voice qualities may determine impressions of the speaker's physical characteristics and demeanor.

A relationship between vocal characteristics and anxiety was found by Diehl, White and Burk (1959). The voices of 179 seminary students were classified as either normal or defective. The 62 voices rated as defective were rerated as harsh, nasal, or hoarse-breathy. Anxiety was operationally defined as a subject's score on the Taylor Manifest Anxiety Scale. It was found that the anxiety level of the hoarse-breathy-voiced subjects was significantly higher than scores of both the harsh-voice and the normal groups. This finding partially supports that of Moore (1939), who found a positive correlation between breathiness and neurotic tendencies and introversion.

Diehl et al. found no significant relationship between nasality and anxiety, however. The authors suggested that a poor home adjustment, found by Duncan (1945) to be correlated with a hoarse voice quality, may account for the level of anxiety associated with this voice quality.

Support for the relationship between voice quality and depression is found in a study by Hargreaves, Starkweather and Blacker (1965), who found a significant correlation between spectral analyses of the voices of hospitalized depressed patients and mood ratings of the same patients, these assessments being made by clinicians who interviewed these patients daily. Markel, Bein and Phillis (1973) found that while moderate depression is related to either an increase or a decrease in voice tempo, a relative decrease in tempo is associated with an extremely depressed state. Natale (1977) found that depression is positively related to silent pauses of two seconds or more.

#### Summary of Studies of Personality Characteristics on the Basis of Voice Qualities

These studies of paralinguistic communication of personal characteristics, which began in the 1930's, support the proposition that voice quality alone may permit the accurate judgment of such qualities as feelings of dominance; Spranger personality types; lying, but not truth-telling; anxiety; and depression. On the other hand, leadership

ability, sociability, and emotional balance are not transmitted with any significant accuracy by this communication channel.

Judgments of Expressed  
Emotions from Voice Qualities

Another body of research has been concerned with the identification of expressed emotion on the basis of voice quality alone. Sherman (1927) found that the expression of four basic emotions (surprise, fear/pain, sorrow, and anger/hate) by a trained singer resulted in the identification, by 27 graduate psychology students, of 22 different emotions. Sorrow and anger/hate were most frequently identified accurately, while judgments regarding fear/pain were especially dispersed. Observers commented that the gradual, even breath quality of sorrow aided in distinguishing this emotion from the sharp, abrupt breathing which they associated with anger.

Dusenbury and Knower (1939) asked student judges to identify 11 specified emotional states, after hearing the voices of four male and four female performers who recited letters of the alphabet. They concluded that emotional states can be judged from vocal tone with a high degree of accuracy, but found individual differences in performers' abilities to communicate affect, as well as in judges' abilities to identify emotional states. Overall, female judges were found to be more accurate than were males. Cues

influencing judgments included differing tonal qualities, intensities, and pitch.

Soskin (1953) suggested that vocal communication consists of two channels, one of which specializes in semantic information, while the other carries affective information. The verbal components of speech convey content, while the vocal channel, postulated by Soskin to be the carrier upon which the content is superimposed, is the bearer of affective information. An ambiguous communication would result from a conflict between these two channels.

In a study of tone and content, considered as two major components of attitude communication, Mehrabian and Wiener (1967) utilized two female speakers, who read nine selected words which communicated positive, neutral, or negative affect, in each of these three affective tones. Three groups of judges were instructed to rate the expressed emotions on the basis of (a) all available information; (b) using information found in tone, and ignoring content; and (c) using content information, and ignoring tone. The authors interpreted the resulting data as indicating that the tonal component was the primary influence on judgment of attitudes from inconsistent messages in one-word communications, when no other information was available. This clearly supports Soskin's conception of the function of the vocal channel as communicating affective information.

Further support derives from a study by Scherer, London and Wolf (1973), who used readings of a linguistically confident and unconfident text in both confident and unconfident voice. Forty-seven male undergraduate students rated the readings on confidence and other personality traits. Confidence was found to be related to increased loudness of voice, rapid speech rate, and infrequent short pauses, occasional higher pitch levels, and greater pitch and energy fluctuations. The judges perceived and used these cues to attribute confidence and related personality traits to a speaker. The linguistic channel seemed to communicate task-related traits, with decreased ratings for the adjective, 'personal,' while the vocal channel was related to attributions of competence, enthusiasm, power, and activity. The authors suggested that multichannel congruence may be an essential condition for the perception of a speaker as both competent and task-oriented. This study gives further support to the idea that ambiguous messages result from incongruity between communicative vocal channels.

Trager (1958) further analyzed the vocal channel into two major components, vocalizations and voice qualities, both of which are perceived against a background of voice set. Trager suggests that the voice set is prelinguistic, while both vocalizations, which include vocal characterizers such as laughing, crying, and belching, and voice qualities, which include such elements as pitch range,

resonance articulation control, and vocal lip control are termed paralinguistic. Trager's exploratory work served as the foundation for a large proportion of paralinguistic research during the following decade.

Davitz and Davitz (1959) asked eight nonprofessional speakers to recite letters of the alphabet in 10 different affective modes. Thirty judges assessed the resulting tape recording. While the emotions were identified above chance expectations, wide variations were found in speakers' abilities to communicate accurately. One speaker's expressions were accurately identified only 23% of the time, as compared to over 50% for another speaker. Judges' abilities to assess emotions correctly also varied widely, ranging from 20% to 50% accuracy. The degree to which different emotions were distinguishable was also extremely variable. For example, anger was correctly identified over 63% of the time, while the level of accuracy for pride was only 20%. This study confirmed Dusenbury and Knower's (1939) findings of varying skills in the expression, and identification, of emotions.

Starkweather (1961), reviewing research on content-free speech, concluded that, on the basis of voice alone, substantial agreement between judges is likely regarding the identity, and intensity, of an expressed emotion. He argued, however, that the existence of halo effects and stereotypes lessens the likelihood of accurate identification of affect. Nevertheless, he notes the unusual sensitivity to vocal cues

of some judges.

In a study which rendered voices content-free by the use of an electronic filtering device, Soskin and Kauffman (1961) provided further experimental verification for the supposition that a speaker's emotional state can be communicated by vocal cues alone. The 15 male voices used expressed a broad range of emotion, excerpted from real-life situations. The 49 U.S. Air Force officers who judged the expressed emotions from a filtered tape recording, agreed, for approximately 66% of the samples, indicating a relatively high level of unambiguous vocal communication about affective states. A second study (Soskin & Kauffman, 1961) using as subjects graduate psychology students as well as practicing psychologists and psychiatrists, also found a high level of agreement regarding emotional communication of content-free voices. In a later review of the literature, Kramer (1963) concluded that, although the independent measures for the criterion being judged were frequently inadequate, evidence supports the assumption that an individual's changing emotional state, as well as his relatively stable personality characteristics, can be judged from the nonverbal characteristics of his voice.

A study by Dawes and Kramer (1966) investigated the comparative accuracy of electronically filtered and non-filtered voices in regard to the communication of various emotions. Six experienced student actors read emotional passages which expressed love, grief, indifference, contempt,

or hate, and within which the same two sentences occurred in each passage. These embedded sentences were then re-recorded and electronically filtered. Twenty-seven male judges appraised the nonfiltered emotional expressions, and then the filtered stimuli. A proximity analysis of the judges' responses yielded a single-dimensional psychological space, which the authors interpreted as feeling-tone, ranging from a negative polarity (hate) through neutral (indifference) to a positive polarity (love). Love and grief were very closely related in this psychological space, a finding which the authors were at a loss to explain. Similar results were obtained from analysis of the judgments of the filtered voices.

In an investigation of the relationship of certain vocal characteristics to perceived emotion, Costanzo, Markel, and Costanzo (1969) obtained and recorded readings of emotional paragraphs by 23 undergraduate students. These readings were then judged as to expressed emotion by 44 native English-speaking students, and as to peak pitch, peak loudness, and peak tempo of voice by seven undergraduate psychology students. Statistical analysis revealed a positive correlation between peak pitch and soft empathic emotions of love and grief; between peak loudness and the hostile emotions of anger and contempt; and between peak tempo and states of neutrality or indifference. In a conflicting study, Markel, Bein and Phillis (1973), studying the relationship between words and tone of voice, focussed

upon anger and depression as modes, and pitch, loudness and tempo as voice qualities. The responses of 125 male students to four cards selected from the Thematic Apperception Test were recorded, passed through an electronic filter, and rated for salient voice qualities by 15 raters. The results indicated that neither pitch nor loudness was related to either depression or anger. Moderate anger was associated with an increased voice tempo, while extreme anger was associated with normal tempo. Moderate depression might manifest itself by means of either slow or rapid tempo, but extreme depression was characteristically associated with a slower tempo.

The studies described heretofore employed a single communications mode, that of voice alone. Other research has attempted to isolate the information transmitted by the various parameters of nonverbal communication. Shapiro (1966) used videotape and typescript as a means of separating the visual, audio, and content communication channels. Four groups of male undergraduate students judged the feelings of pleasantness or unpleasantness as expressed by 56 students in an interview situation. The results of this study suggested that judgments made in the audio, video, and transcript conditions were significantly correlated with the audio-visual presentation, which provides complete information, using both channels. Video was not in agreement with either the audio or the transcript presentation mode. In other words, visual and verbal cues of

pleasantness seemed not to be related. The authors also drew attention to the importance of visual affective cues. Since some early studies permitted visual contact between speakers and judges, the visual communication of affective cues may have confounded the resulting judgments. The importance of visual information is supported by research by Levitt (1964) who, using sound motion pictures, found that facial expression was a far more accurate channel of emotional communication than was vocal tone, for most emotions. Fear, however, in contrast to joy, surprise, anger, and contempt, is more accurately judged from voice quality.

On the other hand, Shapiro (1968) found evidence supporting the accuracy of judgment from vocal cues alone, thus lending support to the use of purely audial techniques in psychological and clinical research. Eighteen trained raters of the specific therapeutic conditions of genuineness, empathy, and warmth, assessed these characteristics in 39 interview segments, on the basis of audiovisual, video, or audio channels. The verbal and visual channels were found to be equally accurate predictors of the whole interaction.

In spite of this evidence that visual and vocal cues may be equally effective in predicting the therapeutic effectiveness of an interview, most research suggests that various facets of affective communication are carried by different communication modalities. Burns and Beier (1973) used 36 filmed presentations of angry, sad, happy,

seductive, anxious, indifferent, and sarcastic emotional states, portrayed by 30 introductory psychology students and judged by six groups of subjects from the same population. Six modalities of presentation were used. Results suggested that accuracy of judgment of emotion declines as a function of the mode of presentation of the stimulus. Audiovisual channels yielded the most accuracy. The accuracy decreased in the following order: audiovisual, with the voice electronically filtered; visual; audio, filtered audio; and, least accurately, content only, by means of typescript. All judgments were significantly greater than chance. All channels contributed different information. Visual cues were more important for communicating happiness, but less important than audio alone for the communication of anxiety.

Summary of Studies of Judgments of  
Expressed Emotion from Voice Qualities

In summary, the proposition that affective information is carried by the voice, and may be identified from vocal cues, although with varying degrees of accuracy, is generally supported by research findings. Two vocal channels carry, respectively, linguistic and affective information. The two must be congruent in order to communicate unambiguous messages. Research indicates individual differences in encoding ability, by speakers, and decoding ability, by listeners. A further source of variation of judgmental accuracy lies in the differential communicability of

emotions. Some evidence suggests that certain nonverbal communication channels are optimally suited to the transmission of some emotions but not others. A one-dimensional psychological space has been postulated, ranging from a negative to a positive polarity, and within which various emotions can be located. A relationship to physiological bases may be hypothesized. Finally, while interjudge agreement is found in the majority of the studies which have been reported, it has been suggested that such results may derive from stereotypical judgments rather than from accuracy of perceiving the expressed emotions.

#### Stereotyping of Judgments Within a Culture

Stereotyping, that is to say, a marked social agreement on many expressed personality traits, which, however, shows little agreement with subjects' self-evaluations, has been noted (Allport & Cantril, 1934; Stagner, 1936). Such stereotyped judgments have been found in the majority of the studies described above. Taylor (1934) focussed specifically on the question of social agreement. Readers included seven most neurotic, and eight least neurotic male students from the entire body of college freshmen for a particular year, as indicated by scores on the Thurstone Personality Schedule, as well as five randomly selected upperclassmen. All subjects rated themselves on a 136-item questionnaire regarding personality traits. Employing the

same questionnaire, 20 auditors then judged recordings of the subjects reading a newspaper editorial. The high degree of agreement among the judges was, for the most part, uncorrelated with subjects' beliefs about their own characteristics, including introversion/extraversion and neurotic tendencies. Stereotypical judgments tended to be most in agreement when they agreed least with subjects' self-ratings.

Kramer and Aronovitch (1970), in a study which utilized 22 introductory psychology students as speakers, and 18 psychology students from another university as judges, found no significant correlation between judgments of introversion/extraversion, based on recorded readings, and speakers' actual scores on the Eysenck Personality Inventory. The judges' ratings, however, were highly reliable, even though not valid, thus substantiating the existence of stereotyping based on vocal cues.

A study of the communication of confidence by Scherer, London and Wolf (1973) found that attribution of confidence was based upon acoustically definable vocal cues, including loudness of voice, higher pitch level under certain conditions, shorter pauses, and a rapid speech rate. The authors suggest that these cues are employed equally by the speakers encoding confidence and the listeners decoding it, a clear indication of the existence of a commonly recognized stereotype which speakers can manipulate to compensate for weakness in linguistic competence. A popular recognition of

this is reflected in the anecdote about the minister who makes this marginal note on his Sunday sermon: 'Point weak; shout emphatically.'

In a complex study, involving electronic modulation of voices, Brown, Strong and Rencher (1974) created 54 synthetic voices from speech samples of two adult males. Thirty-seven judges rated the resulting voice segments on a bipolar series of 15 adjectives. The results clearly indicated that effects of rate of speech, mean fundamental frequency, and variance of the manipulations of the fundamental frequency, as well as interaction effects of rate and variance of the fundamental frequency, were all statistically significant predictors of personality ratings.

Packwood (1974) studied 39 tape-recorded interviews by counselors, which had been rated by three independent judges as very persuasive or not very persuasive. These segments were subjected to acoustical analysis. On the basis of the number of peaks per statement over a 10-decibel cutoff line, Packwood concluded that statements rated most persuasive were louder than those rated as less persuasive.

Aronovitch (1976) investigated the vocal parameters related to judgments of various personality characteristics, as well as the relationship of such judgments to the sex of the speaker and the rater. The descriptions of simple pictures by 57 native English speakers of both sexes were recorded. Personality ratings on the basis of these voice

samples were made by 100 undergraduate students, employing a rating sheet listing 10 bipolar personality traits. Some, but not all, of the significant correlations suggested the existence of voice stereotypes based, at least in part, on measurable, distinctive voice properties. Male and female judges based their assessments upon different voice parameters. For males, all significant correlations between judged personality and voice parameters included intensity, variations of loudness and pitch, and rate of speech. Female judgments were based upon average intensity, average fundamental frequency, speech rate, and ratio of sound to silence. The existence of learned stereotypical judgment seems to be implied by this distinct sex difference in differentially meaningful vocal cues.

In a review article, Kramer (1964) suggested that stereotypes are not necessarily invalid, but are in fact derived from common experience. The differences between listeners should be noted. Kramer suggests that such differences may derive from personality variables, especially perceptual defences and idiosyncratic motivational-need structure. A developmental variable is evident, since children seem more sensitive than adults to vocal cues. Psychophysical variables such as differences in acuity may account for some individual differences. He also raises the question of cultural/linguistic variables, suggesting that nonverbal cues for both personality and emotion may vary from one language group to another.

### Summary of Studies of Stereotyping of Judgments Within a Culture

The evidence suggests that inter-judge agreement, often unrelated to the accuracy of judgments, is a manifestation of a tendency towards stereotyping on the basis of vocal cues; and that certain vocal characteristics seem to be associated with particular affective or attitudinal states. The studies cited heretofore have investigated the communication of various personality parameters within single language groups. The question of the universality of such communicability potential, as contrasted with the social learning of culturally-based vocal patterns, has been tentatively raised, but not directly investigated.

### Cultural Stereotypes Involving Personality Traits

Some research suggests the existence of cultural stereotypes. A characteristic speech-melody is associated with each spoken language (Zucker, 1946). The anthropologist, Edward Sapir (1927), reflecting on the disparate impressions conveyed by the speech patterns of various nationalities, drew attention to the many extant patterns of voice intonation, rhythm, relative continuity of tone, and speed of delivery. An inference regarding the personal characteristics of any individual, made on the basis of voice qualities alone, may fall wide of the mark if his cultural background is not taken into consideration. Even

such a fundamental vocal quality as timbre is subject to a certain modification in the direction of increased social desirability. Sapir thus emphasizes the interpenetration of the social and the personal elements of speech.

Kramer (1964a), discussing personality stereotypes as judged from vocal cues, pointed to personality, developmental, psychological, and cultural-linguistic variables as potential sources of differences in accuracy between listener-judges. In connection with cultural differences, he asked, "In what way do the nonverbal cues (for personality and emotion) in speech vary from one language group to another?" (p. 250).

Several studies have addressed themselves to this problem. Kramer (1964) studied judgments by English-speaking Americans of nonfiltered Japanese speech, contrasted with filtered and unfiltered American English speech, all of which expressed anger, contempt, grief, indifference, and love. While anger and indifference were accurately judged in all three modes, grief as expressed in Japanese was more accurately judged than in either the unfiltered or filtered English speech samples. Contempt was least accurately inferred from the Japanese, while love seemed difficult to judge in all three modes. Social learning may have influenced the wide individual differences in judgments of the Japanese actors' emotional expressions, especially of love, for the actors themselves were unaware of the vocal differences which puzzled the judges. The identification

patterns of anger and grief, on the other hand, suggest the possible existence of a more universal component of emotional expression.

Scherer (1974), in an elegant comparison of paralinguistic characteristics of Germans and Americans, found some attributed differences as well as some similarities between the two groups of speakers regarding the relationship between certain vocal characteristics and judged personal qualities, as rated by both the speakers and their peers. Both American and German speakers associated high pitch with self-attribution of dominance, emotional stability, and affiliative tendencies, and with peer attribution of sociability and likability. With American speakers, loudness and large dynamic contrast are associated with emotional stability and sociability; while dynamic contrast, in the German speaker, is correlated with self-attributed good personal adjustment, orderliness, and achievement, and peer-attributed dependability and likability. These results provide further evidence of the existence of cultural stereotypes which may be transmitted by vocal cues. Such nonverbal cues may thus be regarded as an important inferential foundation on which to base interpersonal attitudes and resultant behaviors.

Another area of interest involves possible relationship between stereotyping and attitudes toward such attributed stereotypes. It seems feasible to assume that, correctly or incorrectly, attribution of specific emotional and personal

characteristics may be made on the basis of socially learned cues. Lambert, Hodgson, Gardner and Fillenbaum (1960) studied the attitudes of Francophone and Anglophone students in Montreal towards French and English Canadians. A method which was later described as 'matched guise technique' (Lambert, 1967) utilized fluently bilingual speakers who recorded speech samples in both languages. Two groups of student subjects, one English-speaking and one French-speaking, listened to the tape-recorded passage of philosophical prose, read in its original French as well as in an English translation, by each of four bilingual male readers. The listeners rated each voice on 14 personality traits, using a six-point scale. Measures of subjects' attitudes toward the other language group as well as their degree of prejudice, as indicated by scores on the California F Scale, were also taken. This study found marked differences between language groups in the evaluation of characteristics of both the group's own, and the other, language group. The English subjects consistently rated as significantly higher for the English guise the traits of height, good looks, intelligence, dependability, kindness, ambition, and character. The French subjects also rated the English guises more favourably, not only on all of the above traits except kindness, but also on leadership, self-confidence, sociability, and likability. Attitudes towards the other language group were correlated with overall favourable evaluation. The judgments were preponderantly

biased, for both bilingual and monolingual judges, against French Canadians in favour of English Canadians. The existence of community-wide stereotypes, in the period during which this research was carried out, is supported by this study. Similar results were reported by Lambert (1967) who, using both male and female bilingual speakers and again employing the matched guise technique, asked male and female English- and French-Canadian student judges to evaluate the speakers on 18 personality traits, which were later grouped, for ease of interpretation, into the three personality categories of competence, personal integrity, and social attractiveness. This study used Continental French as well as French-Canadian bilingual speakers. English-Canadian judges rated all French female guises as more favourable than the related English guises. The tendency to downgrade French-Canadian guises was evident, however, in the English subjects' evaluation of male French-Canadian guises as substantially less favourable than the related English guises. Generally speaking, French-Canadian judges regarded both the Continental French and the English-Canadian guises as superior to the French-Canadian guises. This tendency was somewhat more marked with male than with female French-Canadian judges. In spite of sex differences in evaluation, the existence of linguistic stereotyping of personality traits seems confirmed, at least in the Montreal area.

A study of the attitudes of bilingual judges in Hong Kong toward English and Chinese speakers (Lyczak, Fu & Ho, 1976) suggests that such linguistic stereotyping may be a more universal phenomenon. The matched guise technique was again employed, with four female Chinese speakers, fluently bilingual in English and Cantonese, reading a short prose passage in both English and Cantonese. Bilingual student judges, using a six-point scale, rated the speech segments on 13 personality traits, all of which had been previously judged to be desirable within the Chinese culture. Factor analysis of the resulting data yielded a group of factors associated with success or competence and which were linked to the English guise, while traits related to character were ascribed to the Chinese guise of the speakers.

The postulated relationship between stereotyping and vocal cues, supported by the studies described above, has been confirmed still further by Mulac, Hanley and Prigg (1974). Speech samples from 12 foreign-born and four native American graduate students, both male and female, were recorded and rated according to a semantic differential which included 21 pairs of bipolar adjectives. Listener-subjects included a group of middle-aged, middle-class, non-student residents of a university town, and a group of undergraduate and graduate students. This study found that phonological speech foreignness elicited more deprecatory judgments, in comparison with native American speech, on the

attitudinal dimensions of socioeconomic status, aesthetic quality, and dynamism, by both American college students and non-university townspeople.

Summary of Studies of Cultural  
Stereotypes Involving Personality Traits

The characteristic speech-melodies of specific languages serve to distinguish between them on the basis of vocal qualities. The vocal output of an individual may, then, be regarded as combining his own vocal idiosyncracies with the cultural characteristics which he has acquired through social learning. Several studies have supplied evidence for the existence of such cultural stereotypes, which may be regarded as the cultural component of an individual's speech. Biased attitudes toward the stereotypes of a culture may manifest in the attribution of qualities or traits, either desirable or undesirable, to speech segments presumed to represent a particular language group. By means of a matched guise technique, group attitudes may be studied, while avoiding the problems associated with self-reports. It appears that, on the basis of voice alone, pejorative judgments regarding personal characteristics may be elicited by perceived foreignness, as well as by perceived membership in a linguistic group held in low esteem.

### Cross-Cultural Identification of Emotion

The greater part of the research concerned with cross-cultural communication by means of vocal cues has studied the relationship of voice quality to the transmission, to members of another linguistic group, of personality characteristics. Few studies have investigated the cross-cultural identification of emotion. Of interest in this regard is a study by McCluskey, Albas, Niemi, Cuevas and Ferrer (1975) which investigated the ability of Mexican and English-Canadian boys to identify, from filtered voice samples, emotions spontaneously expressed by Mexican and English-Canadian actresses. The subjects included 60 boys from a Winnipeg school division, as well as 60 boys from Mexico City, all of whose ages ranged from six to 11 years. As a control, two groups of 10 male undergraduate students, one from the University of Manitoba and the other from the Universidad Autonoma de Mexico, all aged 20 to 22 years, also served as subjects. The speakers were three English-Canadian and three Mexican actresses, whose ages ranged from 22 to 26 years. Each actress expressed, in a spontaneous mode, each of four basic emotions: happiness, joy, sadness, and love. The resulting tape-recording was passed through an electronic filter which passed frequencies from 100-450 Hertz, with a 60-decibel per octave attenuation at the upper level. The filtered tape-recording was presented to subjects individually by means of an external speaker. Identical instructions were given, in English and Spanish,

to the appropriate language groups. Significant differences were found between the abilities of the two groups to correctly identify the expressed emotions. Interestingly, both groups judged the three Mexican actresses' expressed emotions more accurately than those expressed by the Canadians. No information regarding the socioeconomic status of either group was provided, and sex differences were not considered in this study. Data regarding the accuracy of response of the adult control groups is not given, although the accompanying figure suggests that the same general response pattern prevails with this latter group.

A similar study, carried out by Albas, McCluskey, and Albas (1976) compared judgments regarding emotions expressed by 40 English-speaking rural male white Canadians from the Winnipeg area, and 40 Cree-speaking Indians from communities in Island Lake, Manitoba. The age range of all subjects was between 25 and 36 years of age. Six white, English-Canadian speakers and six Cree-speaking Indian speakers expressed each of the specific emotions of happiness, sadness, love, and anger, using a spontaneous speech mode. The resulting tapes were filtered electronically and presented to the subjects. In this experiment, each language group was randomly divided into two groups, one of which heard a same-language stimulus tape, and the other an other-language tape-recording. Results showed that both language groups identified the same-language tape-recordings significantly

more accurately than the other-language stimuli. The authors comment that "because language differed along with culture, it is difficult to know whether it was more important that the groups tested spoke English or Cree or that they were ethnically white or Indian." (p. 487) Without hypothesizing about that question, the study provides clear evidence of cross-cultural difficulties in communication, on the level of tone of voice with content removed.

#### Summary of Studies of Cross-Cultural Identification of Emotion

The two studies which have addressed themselves specifically to this area of communication report a consistent difference between linguistic/cultural groups in levels of accuracy of identification of emotion. One study also found that speakers from one linguistic group encoded emotions in a manner that led to a more consistently accurate decoding by both language groups.

#### Methodological Approaches to the Study of Content-free Speech

Many means have been employed in efforts to control the semantic vocal channel while investigating the nonverbal aspects of vocal transmission. Letters of the alphabet have been recited, in efforts to communicate specific emotions (Dusenbury & Knower, 1939; Davitz & Davitz, 1961), the latter study choosing this mode of communication because of

"an old, and perhaps apocryphal story that Sara Bernhardt could elicit tears by merely reciting the ABC's. . . ."

(p. 81) Similarly, a singer expressed various emotions on a single note (Sherman, 1927). Content has been controlled by the use of identical texts for all readers (Michael & Crawford, 1927; Allport & Cantril, 1934; Taylor, 1934; Stagner, 1936; Fay & Middleton, 1941-1942; Marker, Meisels & Houch, 1964; Brown, Strong & Rencher, 1974); or by the reading of equivalent passages (Eisenberg & Zalowsky, 1938; Diehl, White & Burk, 1959; Mehrabian & Wiener, 1967; Kramer & Aronovitch, 1970). A technique, first employed by Fairbanks and Provonost (1939), embedded a fixed test passage in several emotionally-laden paragraphs. The fixed passage was then excerpted onto another tape-recording, in order for judgments regarding the speakers' emotions to be made in response to a single text. This method has been used frequently (Fairbanks & Provonost, 1939; Fairbanks, 1940; Fairbanks & Hoaglin, 1941; Kramer, 1964; Dawes & Kramer, 1966; Costanzo, Markel & Costanzo, 1969). Kramer (1964) used, in part, Japanese speech segments (derived from Fairbanks) for judgment by American listeners, it being assumed that Japanese speech patterns would be totally unfamiliar to American listeners.

Such techniques, while controlling for content, suffer, to a greater or lesser degree, from a certain artificiality. A more authentic emotional state might be achieved, in the opinion of some researchers, by the use of samples of

spontaneous speech. Such speech samples have been gathered during the course of discussions, either dyadic or group (Welkowitz, Feldstein, Finklestein & Aylsworth, 1972; Scherer, 1974), responses to selected Thematic Apperception test cards (Markel, Bein & Phillis, 1973), descriptions of simple pictures (Mulac, Hanley & Priffe, 1974; Aronovitch, 1976), or simply expressing specific emotions using idiosyncratic verbal expressions (McCluskey et al., 1975; Albas et al., 1976). All of these methods control for the general level of content, while permitting spontaneous expressions.

In some of the early studies, subjects performed in front of the judges chosen to evaluate their voices (Sherman, 1927; Michael & Crawford, 1929; Stagner, 1936). The possible confound between visual and auditory channels weakens the validity of these studies. Other early research employed either radio broadcasting or public address systems as the medium of transmission (Pear, 1931; Allport & Cantril, 1934; Kelly, 1938; Fay & Middleton, 1939, 1941, 1941a, 1943). In view of the poor acoustical quality of early radio broadcasting equipment and public address systems, these results too may contain inherent distortions, because of limitations of the medium. Similar problems, associated with early sound recordings, may be assumed to bias the findings of those early studies which employed recording discs (Taylor, 1934; Eisenberg & Zalowitz, 1938). Since the advent of acoustically accurate electronic tape

recording, the greater number of researchers in paralinguistics have employed this mode of transmission.

The manipulability of tape-recorded sound constitutes a great advantage of this medium. For example, word recognition is postulated to be a function of the higher speech frequencies (French & Steinberg, 1947; Fletcher, 1953). Attenuating these higher frequencies by means of an electronic filter yields a vocal channel which can be judged for affective quality without the influence of content. Soskin and Kauffman (1961) provided experimental support for this method of producing content-free speech, suggesting that sounds within a narrow carrier band of 100-550 Hertz are sufficient for transmission of generally recognizable cues to the affective state of speakers. Kramer (1964) found that, as a whole, subjects were able to judge emotions as accurately from filtered as from unfiltered tape-recordings, although individual judgments could not be predicted from one to the other. Filtered voices have since been used in studies by Dawes and Kramer (1966), McCluskey et al. (1975), and Albas et al. (1976).

Studies concerned with the investigation of multi-channel communication have employed videotape or 16mm sound film. This medium permits the comparison of information transmitted by audio-visual, audio, and visual channels, as well as a content-only control group, using typescript, if desired. Shapiro (1966; 1968) and Burns and Beier (1973) exemplify studies using this mode of transmission.

The availability of computers and other electronic tools for acoustical analysis has permitted a more accurate and detailed investigation of physical characteristics of speech than has been possible heretofore. The resulting interest in acoustical analysis of voice qualities has led to an increasing number of paralinguistic studies utilizing such electronic techniques as spectrum analysis (Hargreaves et al., 1965), computer-based acoustical analysis (Scherer et al., 1973), and acoustical analysis of relative signal level (Packwood, 1974).

A novel technique, pertinent to bilingual studies, is the matched guise technique first employed by Lambert et al. (1960). Bilingual speakers read material in both of the languages being investigated. Subjects evaluate the resulting tape-recordings, unaware that the two language groups of speech samples which they are rating are in fact produced by a single group of speakers. Personal speaker variables are thus controlled, and it may be assumed that judges' attitudes towards the two language groups will be elicited more accurately than would be the case using two groups of speakers, one from each language group.

#### Summary of Methodological Approaches to the Study of Content-free Speech

Research on content-free speech faces the requirements involving content control, quality of transmission, and methods of judgment of analysis. Content control has been

more or less stringent, depending on the nature of the investigation and on the state of technological development. For example, electronic voice filtering was possible only with the availability of an adequate technology. Researchers have consistently employed available technology to enhance or control transmission. While judgments have most frequently been subjective, analysis has tended to be increasingly objective, making increasing use of available techniques of acoustical analysis.

#### Summary and Hypotheses

Research concerned with the voice as a mode of communication indicates the presence of two channels, one of which, the semantic or verbal channel, transmits content, while the other, the vocal channel, is postulated to transmit non-content information about the individual. The studies which have been discussed in the context of the present research have concerned themselves with discovering what can be learned about an individual from the vocal channel, and how valid this information may be considered to be.

Trager's (1958) description of voice set constitutes an apt delineation of the parameters of interest in relation to the vocal channel, or, as it is frequently termed, content-free speech. For Trager, voice set

. . . involves the physiological and physical peculiarities resulting in the patterned identification of individuals as members of a societal group and as persons of a certain sex, age, state of health, body build, rhythm state, position in a group, mood, bodily condition, location. From the physical and physiological characteristics listed are derived cultural identifications of gender, age grade, health image, body image, rhythmic image, status, mood conditions, locale--and undoubtedly others.  
(p. 4)

Research indicates that, while many relatively permanent personality traits are communicated accurately by voice quality alone, some are not. As far as the more transitory emotional states are concerned, the vocal channel has been found to communicate some affective states more accurately than others. Nevertheless, research generally supports the assumption that certain vocal cues signal certain emotions, and hence are encoded and decoded according to certain recognized patterns, at least within linguistic groups. The increasing availability of acoustical analytic technology has led to increasingly specific delineation of the relationship between physical speech characteristics and their phenomenological correlates.

In connection with this patterning of affective communication, a question of some importance may be raised regarding the basis of vocal cues, in either heredity or environment. On the 'nature' side, Chomsky (1975) has postulated a universal, innate pattern of vocal expression. In this case, any cross-cultural differences in accuracy of

emotional communication would derive from individual differences in encoding or decoding ability, rather than from differential perception related to linguistic cultural differences. One would hypothesize a relatively small difference between linguistic groups in accurate identification of emotion, using this model.

On the 'nurture' side, social learning theory would postulate that vocal behavior is totally learned, and that such linguistic/cultural differences as the speech-melodies of different languages will effectively differentiate between the affective communications of different language groups. A significant difference between the perception of emotions by different linguistic groups would be anticipated, in terms of this model.

Two contrasting theoretical positions, then may be assumed. One emphasizes the presence of universal modes of emotional communication, with a presumed genetic foundation. In the context of social learning theory, on the other hand, any significant group differences in accurate identification of affective communication from vocal cues would be attributed to environmental differences. The present study presumes the presence of underlying affective communication modes, although differences due to environment are not precluded.

The occurrence of intracultural stereotypes has been supported by research. Nevertheless, these stereotypes do not, for the most part, yield total social agreement regarding the emotion presumed to be communicated, nor do they yield to any greater degree a totally accurate identification of the emotion encoded by a speaker. In intracultural studies, then, it seems that the accuracy of a perceived emotional message, as derived from the vocal channel alone, is a function of (1) a stereotype which is presumed to be at least partially learned; (2) idiosyncratic 'noise,' that is, the extent to which the individual deviates from the stereotype; and (3) the differential effectiveness of the vocal channel for communicating specific emotions.

In cross-cultural studies of affective communication assessed from vocal cues, a model based on social learning theory predicts differential accuracy in identification of expressed emotions between linguistic groups, due to the presence of varying vocal-affective stereotypes. The greater the differences between languages, the more difficult it should be for listeners to identify the emotions expressed by speakers from another linguistic community.

An alternative postulation suggests that universal modes and culturally specific stereotypical modes of affective expression may be distinguished by differential intensity of expression by two cultural/linguistic groups. The McCluskey et al. study (1975), for example, found group

differences between Mexicans and English-speaking Canadians, in both encoding and decoding of emotional expressions. The authors' statement that the three Mexican actresses "communicated emotions more effectively than the Canadians (i.e., they were able more frequently to communicate what they intended)" (p. 554) implies that the existence of a universal mode of affective expression is implicitly accepted, with differential encoding ability, and, vis à vis the results, differing decoding abilities assumed to be a function of differing emotional qualities of life style in the two cultures (p. 554). Since neither analysis of individual encoding abilities of the actresses nor of variations between accuracy of perception of the various emotions were reported, no inferences are possible about other factors that might have influenced the results.

Several techniques have been employed to study content-free speech. The present study, prompted by McCluskey et al. (1975), employs a technique of eliciting spontaneous expressions of specific emotions from speakers skilled in the use of voice. The natural quality of these expressions is held to be more desirable in a study which presents electronically filtered voice samples for evaluation, than fixed-content readings which may possess a somewhat artificial quality. The filtering has been shown to remove the greater part of the semantic channel of communication, thus permitting uncontaminated judgments of the affective vocal channel.

Because of the contemporary political and cultural situation in Canada at the present time, stereotyped attitudes held by, as well as directed toward, both French- and English-Canadians are of particular interest. Of even greater importance is the question of nonverbal communication, since the inaccurate interpretation of a speaker's affective intent may be expected to influence the listener's response, in a fashion outside the awareness of either speaker or listener. Specifically, if French- or English-speaking Canadians tend to express emotions in a manner which is not readily understood, or which may be misunderstood, by members of the other language group, the resulting problems in communication may mitigate against successful bicultural relations.

This study addresses itself to the question of accuracy of emotional communication between French-speaking and English-speaking Canadians. A modification of the experimental design employed by McCluskey et al. (1975) is employed to investigate differences between female monolingual French- and English-Canadian subjects in accuracy of judging, from electronically filtered voice samples, the spontaneously expressed emotions of French- and English-Canadian actresses. Specifically, the hypotheses to be tested are as follows:

1. The French-Canadian listener-judges will more accurately judge the expressed emotions of both French- and English-Canadian speakers. This extends the McCluskey

study, which investigated Spanish and English-Canadian speakers. Since, as Romance languages, French and Spanish are commonly regarded as sharing a characteristic emotionality, it seems acceptable to substitute French-Canadian for Spanish-speaking Mexican performers.

2. The expressed emotions of the French-Canadian speakers will be more accurately judged by both linguistic groups than will the emotions expressed by the English-Canadian speakers. The assumption underlying Hypothesis 1 also holds here. Since French-Canadians are considered to be more emotionally expressive than English-Canadians (Graham & Rolland, 1964), it seems plausible to expect that the French-Canadian performers will be more accurately judged regarding their emotional expressions than will their English-Canadian counterparts.

The significance level for both hypotheses is .05.

## CHAPTER II

### METHOD

In order to test the hypotheses stated above, the following methodological procedure was adopted. Since the judgment of emotions from vocal cues emitted by speakers of two languages was the assigned task of the subjects, French- and English-speaking actresses were recruited to provide the requisite vocal expressions of emotion, responding to pre-recorded instructions in their own language. These speech samples were tape-recorded. Two tapes, including, respectively, the French and the English voice samples of the two groups of actresses, each in randomized order, were validated, with content still audible, by same-language groups of judges. The validated speech samples of the two language groups were then combined, in a single randomized order, onto a single tape-recording which was passed through an electronic filtering device to render it content-free. Two copies of this filtered tape were prepared, with added instructions to subjects in French or English, for presentation to two groups of subjects, one French-Canadian and the other English-Canadian. Each group of subjects judged the expressed emotions, from the filtered tape-recording, at two

different sessions, two weeks apart, the purpose of the second exposure being primarily to obtain reliability data for the instrument.

Questionnaires, constructed by the author, were used in the initial selection of subjects, as well as in eliciting biographical data and subjective descriptive comments regarding the relationship perceived between voice qualities and specific emotions.

### Subjects

The subjects used in this study included a total of 34 female French-Canadian and English-Canadian students. All were chosen on the basis of certain biographical information gleaned from a questionnaire completed by students wishing to volunteer for this project. Two groups of subjects, one French-speaking and the other English-speaking, were created, which were relatively balanced in terms of age and type of residential area during the primary years.

### Recruitment

Subjects were female volunteers, recruited from two sources. One group responded to a notice, in French and English, posted at the desk of the Audio-Visual Centre at the University of Ottawa during the week prior to the Christmas examination in Introductory Psychology. The project was described in general terms, and those wishing to participate

were requested to fill out a biographical questionnaire constructed by the author (Appendices A and B), designed to provide information adequate to select subjects according to the criteria listed below. Since course-related AV material was available at the Centre and examination tensions were assumed, it was anticipated that a number of students would be attracted by the possibility of earning two marks for participating in this research project. Nine French-Canadian subjects were selected from this group of volunteers.

A second group of subjects was recruited, in early January, from two Introductory Psychology classes, one presented in French and the other in English. A general description of the project was presented orally by the author or a French-Canadian colleague, in the appropriate language, and class members who wished to volunteer were given copies of the biographical questionnaire to complete. After the forms were filled out, they were collected. A period of approximately 20 minutes of class time was required for the explanation of the research and the subsequent completion and collection of the questionnaires. Eight French-speaking and 17 English-speaking subjects were chosen from this group of volunteers.

Criteria for the Selection of  
Francophone and Anglophone Subjects

Certain responses to the biographical questionnaire were used as a criteria for final selection of subjects. Only those students were eligible who conformed to the following five criteria:

1. The subject's birthplace and that of her parents was Canada.
2. The subject's mother tongue (i.e., language predominantly spoken within the home) and that of her parents was either English (Anglophone Canadian) or French (Francophone Canadian).
3. The subject's language of elementary and secondary schooling was that of her mother tongue.
4. The percentage of time, during the subject's primary years, that her mother tongue was spoken within the home was estimated by the subject as equal to or greater than 95% ( $\geq 95\%$ ).
5. The percentage of time, during the subject's primary years, that her mother tongue was spoken outside the home was estimated by the subject to be equal to or greater than 80% ( $\geq 80\%$ ). (Weisbord, 1977)

Since sex differences were expected to exist in both encoding and decoding of affective expressions (Dusenbury &

Knower, 1939; Aronovitch, 1976); control of this variable was carried out by limiting to females both the speakers and the judges. Also, an effort was made to balance the groups in terms of place of residence during the period of primary and secondary schooling, since it seemed intuitively plausible that experiential differences due to type of early environment, such as urban compared to rural, might influence judgmental ability regarding affective communication.

#### Demographic Characteristics of the Subjects

Seventeen female Francophone students, ranging in age from 19 to 36 years (average age: 21.7 years), and 17 female Anglophone students whose ages ranged from 18 to 41 years (average age: 22.1 years) served as subjects. All were Introductory Psychology students, and all conformed to the language criteria described above. Five French-speaking subjects spent their early years in villages or towns, while 12 were raised in cities. Within the English group, one girl was raised on a farm, six in villages or towns, and 10 in urban environments.

#### Apparatus

##### The Tape-Recording of the Affective Stimuli

This project required, as the basic instrument, a tape-recording of the spontaneous vocal expressions, by French-

and English-Canadian female speakers, of four specified basic emotions. Accordingly, the help of the following performers was solicited, in order to create the tape-recording which would, following randomization, be filtered and submitted to the subjects for judgment.

Three female French-Canadian, and three female English-Canadian amateur actresses, recruited from amateur theatre groups in the Ottawa area, and aged between 22 and 27 years, were asked to express vocally the emotions of happiness, sadness, anger, and love, using a spontaneous mode of expression. Instructions to the actresses (Appendices C and D) were tape recorded, in French and English, by a fluently bilingual female speaker. The order of enacting the four emotions was randomized for each speaker, with the proviso that, within each language group, no more than two speakers would express the same emotion first, and no two performers would employ the same order of expressing the emotions. A 'fishbowl technique' (Fox, 1969, p. 333) was used to establish the basic sequency of emotions, which was then randomized, using random numbers generated by a pocket calculator (Texas Instruments, Model SR-51A). Each performer then simulated each emotion, yielding a total of 24 speech samples which were recorded, using a Sony Stereo Tape recorder (Model TX 252).

In order to ensure that the emotions expressed by the actresses were susceptible to accurate decoding by speakers of the same language, two tape-recordings, one using the

speech samples of the French-Canadian actresses and one those of the English-Canadian performers, were prepared, using a randomized order of the voice samples of each language group. Two groups of seven graduate psychology students, one French- and one English-Canadian, who did not otherwise participate in the project, were asked to indicate, on a multiple-choice answer sheet, which of the four emotions was expressed by each of the 12 speech samples. Only those actresses were retained whose emotional expressions were accurately judged 80% of the time, under conditions when the judges could hear the actual words that were spoken. Two actresses, one French and one English, failed to meet this requirement, and were eliminated from the study. Two other actresses' emotional expressions were obtained by the same processes as described above, two new tape-recordings were prepared, and these in turn were submitted to the two groups of graduate students for validation. The second tape-recording was found to be acceptable, since all expressed emotions were judged correctly, on the basis of intelligible content combined with voice quality, at least 80% of the time.

The 24 speech samples were then arranged in a random order, with the stipulation that no emotion should appear more than twice in a row, and no two speech samples from any one speaker should appear successively. A pause of five seconds between the end of each speech sample and the beginning of the next provided an adequate length of time for

subjects to record their judgments. The resulting randomized tape-recording was then electronically filtered by means of a Krohn-Hite Filter (Model 3342) which passed 100-450 Hertz, with a 40-db. per octave attenuation at the upper level.

Tape-recorded instructions to the subjects, in French and in English, were read by a bilingual female speaker, and the resulting tape-recordings were dubbed onto the beginnings of two copies of the filtered master tape. Chimes were added to indicate the end of each speech sample.

A language laboratory, using Tanberg Language Laboratory, Series 10-21 equipment, was utilized for presentation of the appropriate tape-recording to the two groups of French- and English-speaking subjects. Each subject heard the stimulus tape over an individual set of earphones, with volume adjusted at a central master control position. Both groups were exposed to the stimulus tape-recording on two different occasions. Pearson product-moment correlations between the two sessions, for each group, yielded high positive correlations ( $\underline{r} = .93$  for the data obtained in the two sessions from the French-speaking subjects; and  $\underline{r} = .90$  for the English-speaking subjects' data from the two sessions), thus substantiating the reliability of the instrument.

#### Questionnaires and Response Forms

It was felt that certain biographical data was required in order to provide relevant information about the

socioeconomic, linguistic, and educational backgrounds of the subjects. The author therefore constructed a biographical questionnaire (Appendices E and F) which requested this information. This questionnaire was distributed to the subjects during the first session.

It was further believed that a knowledge of the voice qualities which subjects felt were related to specific emotions would be desirable. A form requesting brief comments about vocal characteristics contributing to the subjects' judgments of the emotions being expressed (Appendices G and H) was completed by the subjects following their second exposure to the filtered tape-recording, in the second session. Questions concerning subjects' attitudes towards Canadian political and bilingual issues, included in the second form, were related to establishing the feasibility of a later study utilizing similar data.

A multiple-choice response form, in English or French (Appendices I and J) was distributed to all subjects, at each session.

#### Procedure

Throughout the study, French-speaking subjects were addressed in French, and English-speaking subjects in English. It should also be noted that, since the sensitive nature of the final questionnaire seemed to demand that the subjects be guaranteed anonymity, identification numbers, assigned by order of appearance at the first session, were

used.

The two groups of subjects who volunteered for this study according to the procedure noted above, met on different days, using the same language laboratory facilities and an identical presentation format. Subjects entering the room, prior to the first session, received the biographical questionnaire. When all subjects had completed this form, instructions for evaluating the emotions from the filtered tape were presented, using a modification of the instructions used in the McCluskey et al. (1975) study (Appendices K and L). The randomized filtered tape-recording of the affective stimuli was then presented to the subjects, who indicated their judgments on the multiple-choice response sheet. The subjects were asked to remember their identification numbers for use in the second session. The questionnaires and the response sheets were then collected, and the subjects dismissed.

A second presentation of the filtered tape-recording took place, for each group, two weeks after the first session. During the second session, the recorded instructions and the affective stimuli were presented first, and the response sheets filled in. The second form (Appendices G and H) was then distributed, and subjects were asked to complete it. Finally, the nature of the research project was explained to the subjects. The completed forms were collected from the subjects as they left the room. The primary purpose of the second session was to obtain

reliability data for the instrument.

#### Data Analysis Method

As previously noted, Pearson product-moment correlations were calculated for the data obtained, in the first and second sessions, from each language group of subjects, in order to establish the reliability of this method of judging affective stimuli. This reliability of the judgments of emotions from filtered voice samples, for these subjects, being thereby established, data from the first session of each language group of subjects was considered to be suitable for use in the subsequent analyses.

The data obtained during the first sessions of this project, for each language group, were analyzed over four runs against sub-programmes of Version 6 of SPSS (Nie, Hull, Jenkins, Steinbrenner & Bent, 1975), in a Honeywell 6080 environment. For the first series of runs, a file was created containing one record for each subject. Each record indicated the mother-language of the subject, the imputed income of her father, in thousands of dollars, as obtained from census data of the occupational category in which the father worked, and her response to each of the 24 emotional stimuli, as well as its correctness or incorrectness. From these data, the scores on any possible combination of actress/stimulus emotion/stimulus language/response language could be computed and used for further analyses.

The first analyses of variance specified the two levels of language of subject as the independent variable, and, for separate one-way ANOVAS, total score, total English score, total French score, scores on French stimulus emotions of love, anger, happiness, and sadness, scores for total love, total anger, total happiness, and total sadness, as the dependent variables. A second run employed the same dependent and independent variables, controlling for a covariate, income of father.

Descriptive statistics were provided for all independent variables as noted above, as well as scores for each actress, relative to both the two levels of language of subjects and the total group of subjects. A t-test was computed for all contrasts between subject language groups for each of these independent variables.

A 2 x 2 x 4 x 3 ANOVA, with the same independent and dependent variables, but including actresses nested under stimulus language, was calculated (Glass & Stanley, 1970), to assess main and interaction effects between all crossed factors of the two levels of stimulus language, two levels of response language, four levels of emotion, and three actresses nested under each stimulus language, and the dependent variable scores for correct judgment of expressed emotion. Scheffé post hoc procedure was used for all multiple comparisons (Ferguson, 1976).

## CHAPTER III

### RESULTS AND DISCUSSION

This chapter will first present the results of the statistical analysis relevant to the hypotheses under consideration. The discussion, found in the second section, will examine in detail the sources of significant variance, with a view to describing the underlying factors and interactions meaningfully. Some possible implications of these findings are discussed, and fruitful areas for future research in the field of nonverbal vocal communication are suggested.

#### Results

Two hypotheses were postulated. First it was predicted that French-Canadian subjects would judge certain emotions expressed by actresses<sup>1</sup> more accurately than would English-Canadian subjects. The findings of this study, on the contrary, indicated that the English-Canadian subjects were significantly more accurate than the French-Canadians in the overall judgmental task ( $t(32) = 3.48, p = <.005$ ).

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<sup>1</sup>Throughout this chapter, the terms 'actress' and 'speaker' are used interchangeably.

Table 1  
 Significant Differences Between English and French  
 Subjects in Accuracy of Judging  
 Emotional Stimuli\*

Variable	<u>t</u> **	<u>p</u>
Total score	3.48	.005
Total English stimuli	3.40	.005
Total 'Happy'	2.31	.05
English 'Happy'	3.01	.005
Total 'Sad'	2.22	.025
Actress E1	2.40	.025
Actress F2	2.17	.025

\*Raw data are available from the author, School of Psychology, University of Ottawa.

\*\*df for all variables is 32.

The second hypothesis stated that the French-Canadian speakers would be more accurately judged by both language groups than would the English-Canadian speakers. This hypothesis was not borne out by the data. Over the entire subject group, no significant differences in accuracy of judging the French-Canadian speakers' expressed emotions were found ( $\underline{t}$  (32) = 1.17,  $\underline{p}$  = >.05). The English-speaking subjects, however, decoded the expressed emotions of the English-Canadian speakers significantly more accurately than did the French-Canadian subjects ( $\underline{t}$  (32) = 3.40,  $\underline{p}$  = <.005).

On the basis of these findings, it would appear that the postulation of a similarity between Spanish- and

French-language expressions of emotion must be questioned. A significant difference between accuracy of identification between groups was found, to be sure, but the direction of the difference, with the English subjects decoding more accurately, necessitates an examination of the data with a view to discovering the principal sources of group differences.

### Discussion

The unexpected reversal of the directional hypotheses was seen as resulting perhaps from a possible socioeconomic difference between the French- and English-speaking groups of subjects, in terms of the declared income of the fathers of group members. Data regarding employment income in Canada for males in 1970 was obtained from Statistics Canada for all fathers' occupations listed by subjects on the biographical questionnaire (Appendices E and F). Although an exploratory calculation of correlation suggested the possible presence of a confound between subjects' scores on the judgmental task and socioeconomic level of the fathers, an analysis of covariance, paralleling the first ANOVA, failed to alter the initial results. It was concluded that socioeconomic class, as adduced from fathers' income, could not be considered to influence ability to judge emotional communications from voice alone.

It should be noted, however, that this conclusion must be taken as tentative. Fathers' incomes, which were, in

fact, estimates based on verbal job descriptions, constitute only a partial basis on which to postulate a lack of relationship. A more accurate knowledge of precise income level of the subjects' fathers during the subjects' primary years would provide a more solid foundation for ascribing strength of relationship between socioeconomic status and accuracy of judging emotional expressions from vocal cues.

A careful exploration of sources of variation between the two language groups of subjects is a sine qua non for any possible interpretative comment. Table 1 shows areas of significant differences between the scores of the English- and French-Canadian subjects. Specific discussion relating to the significant group differences in emotional differentiation will be found later in this chapter. Of more general interest, however, is the question of the sources of variation in the scores. This matter will now be discussed.

The results of a four-way analysis of variance, treating stimulus emotion, subjects' languages (that is, response languages), stimulus languages, and actresses nested within stimulus languages, are presented in Table 2. While significant main effects, at the 5% level or better, were found for stimulus emotions, response languages, stimulus languages, and actresses, the only significant interactions, which were both at the 1% level, included stimulus emotions with stimulus languages, as well as with the actresses, nested in the stimulus languages. The implication of the

Table 2

Four-Way Analysis of Variance for the Factors: Stimulus Emotions,  
Response Languages, Stimulus Languages, and Actresses  
Nested Within Stimulus Languages

Source	SS	df	MS	F	p
Stimulus emotions (A)	18.567	3	6.186	38.095	.01
Response language (B)	1.867	1	1.867	11.498	.01
Stimulus language (C)	0.833	1	0.833	5.129	.05
Actresses (D) (nested in C)	34.29	4	8.593	52.919	.01
A x B	0.177	3	0.059	0.363	NS
A x C	3.680	3	1.226	7.550	.01
A x D	13.160	12	1.096	6.750	.01
B x C	0.540	1	0.540	3.325	NS
B x D	1.310	4	0.328	2.020	NS
A x B x C	0.680	3	0.227	1.398	NS
A x B x D	2.450	12	0.207	1.275	NS
Within	124.71	768	0.16238		
Total	202.264	815			

insignificance of the interaction between stimulus emotions and response languages has its major impact on the first hypothesis of this study, which predicted a greater accuracy on the part of French- than on English-Canadian subjects. On the other hand, the lack of any significant interaction between stimulus language and any factor (other than stimulus-emotions) is meaningful for the second hypothesis, which predicted more accurate judging of the French-Canadian than of the English-Canadian speakers. This nonsignificant finding is particularly

important in view of the fact that the significance of the main effect of stimulus language ( $p = <.05$ ) is at a lower level than that of any other main effect or of any interaction. Evidently the contrast between groups of English- and French-speaking actresses, as judged by all subjects, may be regarded as a less important source of variation than the emotions being expressed, the specific individuals expressing them, or the language spoken by the subjects.

The effects of emotions are divided among the four levels of expressed emotion, that is, love, anger, sadness, and happiness. The significant main effect for stimulus emotion justified the application of a Scheffé Multiple Comparison Test to the various combinations of means to determine where the loci of variance might most safely be said to lie. The results of a one-way analysis of variance, which investigated the variation between correct identification of the four emotions across both language groups of subjects, is shown in Table 3. In itself, the  $F$  score

Table 3  
One-way Analysis of Variance of the  
Factor, Stimulus Emotions

Source	SS	df	MS	F	p
Stimulus emotions	93.36	3	31.12	29.358	.01
Within	139.57	132	1.06		
Total	239.93	135			

merely serves to confirm the results of the previous four-way ANOVA. The Scheffé test, however, applied to the six possible combinations of emotional stimuli, provides a more detailed indication of the sources of variation within this area of contrast. The group means for accurate identification of emotions are shown in Table 4, and the results of

Table 4  
Mean Scores for All Subjects in Accurate Identification  
of Emotions Expressed by All Speakers  
(Standard Deviations are Shown in Parentheses)

Emotion	Mean Score	
Love	2.412	(0.857)
Anger	4.529	(0.961)
Sadness	3.735	(0.898)
Happiness	2.412	(1.104)

the Scheffé comparisons are summarized in Table 5. As these results clearly indicate, all subjects over the two language groups correctly discriminated between love and anger, love and sadness, anger and sadness, anger and happiness, and sadness and happiness. Only love and happiness were not distinguished by the subjects as a total group. While the low level of significance of the contrast between anger and sadness is curious, in view of the supposedly different intensities underlying these two emotions, the accuracy of identification, at exactly the same level, of love and

happiness, by the two subject groups, is truly perplexing. Since intuitively one might imagine that differential vocal cues might distinguish between these two emotions to at least a minimum degree, differences between the two language groups were considered as possible sources of this variation.

Table 5

F and Scheffé F' Values for the Comparisons  
Between Expressions of Stimulus Emotions

Contrast Between	
Love & Anger	67.93* <sup>a</sup>
Love & Sadness	20.12*
Love & Happiness	0.00
Anger & Sadness	9.38** <sup>b</sup>
Anger & Happiness	67.93*
Sadness & Happiness	20.12*

\*significant at  $p < .01$

\*\*significant at  $p < .05$

<sup>a</sup>critical value of  $\underline{F}'_{99; 3, 132} = 11.79$

<sup>b</sup>critical value of  $\underline{F}'_{95; 3, 132} = 8.04$

Using the Scheffé method, multiple comparisons among the means of the interaction between expressed emotion and stimulus language were computed. The means for the responses of the total group of subjects to the English and French emotional stimuli are presented in Table 6, while Figure 1 graphically illustrates their interrelationships.

Table 6

Mean Scores for All Subjects in Accurate Identification of Emotions Expressed by French and English Speakers  
(Standard Deviations are Shown in Parentheses)

Emotion	Mean Scores*	
	English Speakers	French Speakers
Love	1.41 (0.657)	1.00 (0.603)
Anger	2.03 (0.834)	2.50 (0.564)
Sadness	2.00 (0.651)	1.74 (0.912)
Happiness	1.50 (0.826)	0.91 (0.712)

\*n = 34

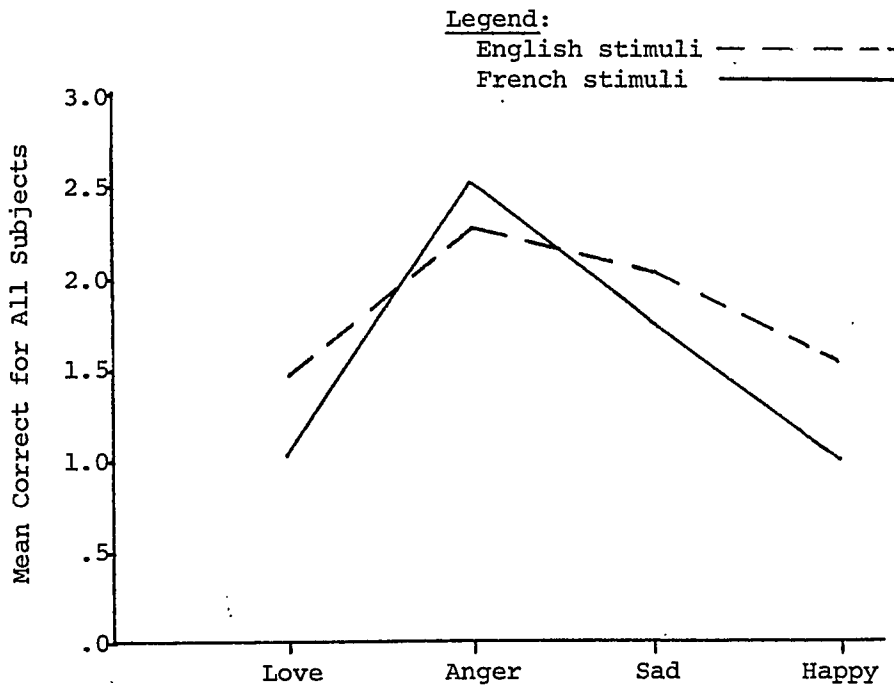


Figure 1:- Mean Accurate Identification of English and French Stimulus Emotions by All Subjects

For the 28 possible interactions of emotion with stimulus language, the results are summarized in Table 7.

Table 7

F and Scheffé F' Values for Comparisons Between English (E) and French (F) Expressions of Love (L), Anger (A), Sadness (S), and Happiness (H) as Judged by All Subjects

Contrast between	<u>F</u>	Contrast between	<u>F</u>
EL & EA	29.231** <sup>a</sup>	ES & FL	76.923**
EL & ES	26.923**	ES & FA	19.231**
EL & EH	0.769	ES & FS	5.385
EL & FL	13.077	ES & FH	91.539**
EL & FA	91.538**	EH & FL	19.231**
EL & FS	8.462	EH & FA	76.923**
EL & FH	19.231**	EH & FS	4.615
EA & ES	0.00	EH & FH	0.492
EA & EH	21.538** <sup>b</sup>	FL & FA	173.077**
EA & FL	81.538**	FL & FS	42.308**
EA & FA	16.923*	FL & FH	0.623
EA & FS	6.154	FA & FS	44.615**
EA & FH	86.154**	FA & FH	62.308**
ES & EH	19.231**	FS & FH	15.557*

\*significant at the  $p < .05$  level

\*\*significant at the  $p < .01$  level

<sup>a</sup>critical  $F'_{99; 7, 264} = 18.97$

<sup>b</sup>critical  $F'_{95; 7, 264} = 14.35$

In view of the results obtained thus far, it is not surprising to note that, of the contrasts involving love and

happiness, comparisons which were nonsignificant across stimulus languages and across response languages, only those which cross both language and emotion are significant at the 1% level. While same-language speakers expressing happiness and love could not be differentiated by either English or French subjects, English expressions of love were distinguishable from French happiness, as were French expressions of love from English happiness.

Also of interest is the contrast between anger and sadness, significant at the 5% level across stimulus and response language groups, which is here broken down into four stimulus language/emotion comparisons. Interestingly, the encoding of anger by English-Canadian actresses was not significantly differentiated from either the English or the French expressions of sadness, by the entire group of subjects. In contrast, French expressions of anger were distinguished from both English and French expressions of sadness, at a significance level of 1%, by all subjects. Such a vivid contrast between language groups in the encoding of anger may reflect a characteristic English-Canadian reticence at expressing strong emotions (MacLennan, 1949) which may mitigate against unrestrained emotional vocalization by this language group. Finally, within the group of contrasts between sad and happy expressions by English and French speakers, English expressions of sadness were clearly distinguishable from both English and French expressions of happiness ( $p < .01$ ). The French expressions of

sadness, however, are significantly distinguished only at the 5% level, and no distinction was made between French expressions of sadness and English expressions of happiness. The failure of the two subject groups to differentiate French sadness from English happiness, when considered in conjunction with the confusion between English expressions of love and happiness, suggest that English expressions of happiness, apparently subject to confusion with French sadness or English love, were less intense and 'emotional' than were the expressions of happiness by the French actresses. Such an inference parallels that drawn from the contrasts between language groups in the accurate communication of anger and sadness. The results deriving both from expressed anger compared with sadness, and sadness contrasted with happiness, suggest possible underlying cultural differences in intensity of emotional expression, a conclusion which accords with the emotionally reserved quality of the stereotypical English-Canadian.

Since the main effect for variance due to differential accuracy in identification of emotional expressions by different actresses was significant at the 1% level, Scheffé Multiple Comparisons of Means were computed, to identify the actresses whose expressions were differentially judged by all subjects. Table 8 shows the mean scores associated with each actress. The maximum score in each cell was 4, each actress expressing each of four emotions. A comparison of the mean accuracy scores for each actress clearly indicates

wide differences in encoding ability, both in contrast to the total group of subjects and to the separate French- and English-speaking groups. This variation in judgmental accuracy may reflect, in part, idiosyncratic 'noise' (Kramer, 1964a), that is, individual deviations from an expected stereotype.

Table 8

Mean Scores for All Subjects in Accurate Identification of Total Emotional Expression by Individual English (E) and French (F) Speakers

(Standard Deviations are Shown in Parentheses)

	Mean Scores					
	All Subjects*		English Subjects**		French Subjects**	
English Speakers						
E1	2.06	(1.071)	2.47	(1.07)	1.65	(0.93)
E2	1.59	(1.019)	1.88	(1.11)	1.29	(0.85)
E3	3.29	(0.760)	3.47	(0.72)	3.12	(0.78)
French Speakers						
F1	3.29	(0.719)	3.35	(0.61)	3.24	(0.83)
F2	1.71	(1.000)	2.06	(1.03)	1.35	(0.86)
F3	1.15	(0.501)	1.00	(0.50)	1.29	(0.47)

\*n = 34

\*\*n = 17

Table 9 presents the results of the Scheffé multiple comparisons of the mean scores for total subjects, from Table 8. There were significant differences, at the 1% level,

between each actress and at least three, and no more than four, other speakers, across both stimulus languages. All six actresses were contrasted nonsignificantly with at least one actress from the other language group. Two French-Canadian actresses were not differentially judged in comparison with two English actresses. The surprising total lack of differentiation between Speakers E3 and F1 is perplexing. Clearly, however, the majority of contrasts effectively differentiate between speakers, as reflected in judgmental accuracy across all subjects and emotions. The presence of differential abilities of individual actresses to encode emotions is hereby suggested.

Table 9

F and Scheffé F' Values for Comparisons Between Individual English (E) and French (F) Speakers as Judged by All Subjects

Contrast Between	<u>F</u>	Contrast Between	<u>F</u>
E1 & E2	6.614	E2 & F3	5.81
E1 & E3	45.135* <sup>a</sup>	E3 & F1	0.00
E1 & F1	45.135*	E3 & F2	74.798*
E1 & F2	3.724	E3 & F3	136.746*
E1 & F3	24.787*	F1 & F2	74.748*
E2 & E3	86.308*	F1 & F3	136.746*
E2 & F1	86.308*	F2 & F3	9.295
E2 & F2	86.695*		

\*significant at the  $p < .01$  level.

<sup>a</sup>critical value of  $\underline{F}'_{99; 5, 198} = 15.55$

In view of the significant interaction between stimulus emotions and actresses, a more detailed examination of the specific sources of this variation was justified, and a Scheffé Multiple Comparison of Means was calculated. The mean accuracy scores obtained from all 34 subjects for each actress's expression of each emotion are found in Table 10, as well as in Figure 2 (Appendix M).

Table 10

Mean Accuracy Scores for English (E) and French (F)  
Actresses' Expressions of Love (L), Anger (A),  
Sadness (S), and Happiness (H)

Speaker	Emotions			
	L	A	S	H
E1	.324*	.529	.706	.500
E2	.235	.676	.412	.265
E3	.853	.824	.882	.735
F1	.706	1.000	1.000	.588
F2	.265	.559	.647	.235
F3	.029	.941	.088	.088

\*n = 34

Contrasts resulting from the 276 Scheffé comparisons calculated on the basis of the mean scores from Table 10 are presented in Table 11. Of these, 176 comparisons, or 60.5%, are significant at the 1% level. In effect, these significant comparisons indicate the sources of differential accuracy of judgment of the actress/emotion combinations.

F and

L

	E1	E2	E3	F1
E1	-	4.9	172.1*	89.
E2		-	234.8	136.
E3			-	13.
F1				-
F2				
F3				
E1				
E2				
E3				
F1				
F2				
F3				
E1				
E2				
E3				
F1				
F2				
F3				
E1				
E2				
E3				
F1				
F2				
F3				

\*significant at the  $p <$

Table 11  
 Scheffé F' Values for All Contrasts Between All Expressions of Love (L), Anger (A), Sadness (S),  
 and Happiness (H) by Individual English (E) and French (F) Speakers

										S			H						
										A			S			H			
F2	F3	E1	E2	E3	F1	F2	F3	E1	E2	E3	F1	F2	F3	E1	E2	E3	F1	F2	F3
1.8	53.5	25.8	76.2	153.7	280.9	33.8	234.2	89.7	14.9	191.2	280.9	63.9	34.4	19.1	43.0	25.8	1.8	52.9	119.2
0.6	25.8	52.9	119.2	213.3	359.6	64.5	306.1	136.5	19.1	257.5	358.6	104.5	13.5	19.1	0.6	1.8	4.9	119.2	212.7
216.7	419.3	64.5	19.1	0.6	13.5	52.9	4.9	13.5	119.2	1.8	13.5	25.8	358.6	64.5	191.8	8.6	34.4	215.1	333.1
136.5	281.5	19.1	0.6	8.6	52.9	13.5	33.8	0.0	52.9	19.1	52.9	1.8	234.8	153.7	331.9	43.0	8.6	359.6	511.4
-	34.4	43.0	104.5	191.8	331.9	52.9	280.9	119.2	13.5	234.2	331.9	89.7	19.1	1.8	52.9	19.1	0.6	0.6	136.5
-	-	153.7	257.5	388.5	579.6	172.7	511.4	281.5	90.4	447.5	579.6	234.8	1.8	119.2	314.1	25.8	76.8	306.1	1.8
-	-	13.5	53.5	136.5	19.1	8.6	104.5	19.1	8.6	76.8	136.5	8.6	119.2	0.6	1.8	103.9	43.0	4.9	34.4
-	-	-	-	13.5	64.5	8.6	43.0	0.6	43.0	25.8	64.5	0.6	212.7	43.0	103.9	153.7	176.8	0.0	13.5
-	-	-	-	-	19.1	43.0	8.6	8.6	104.5	1.8	19.1	19.1	333.1	76.8	212.7	4.9	43.0	234.8	359.6
-	-	-	-	-	-	119.6	1.8	52.9	104.5	478.2	0.0	257.5	4.9	25.8	119.2	0.6	104.5	136.5	234.8
-	-	-	-	-	-	-	89.7	13.5	13.5	63.9	119.2	4.9	136.5	33.8	0.0	135.8	63.9	64.5	19.1
-	-	-	-	-	-	-	-	33.8	172.1	1.8	1.8	52.9	447.5	136.5	34.4	306.1	191.8	25.8	447.5
-	-	-	-	-	-	-	-	-	52.9	19.1	52.9	1.8	234.8	25.8	119.2	0.6	8.6	136.5	234.8
-	-	-	-	-	-	-	-	-	-	135.8	212.7	33.8	64.5	4.9	13.5	63.9	19.1	19.1	64.5
-	-	-	-	-	-	-	-	-	-	-	8.6	33.8	387.2	89.7	234.2	13.5	52.9	257.5	387.2
-	-	-	-	-	-	-	-	-	-	-	-	76.8	511.4	153.7	331.9	43.0	104.5	359.6	511.4
-	-	-	-	-	-	-	-	-	-	-	-	-	191.8	13.5	89.7	4.9	1.8	104.5	191.8
-	-	-	-	-	-	-	-	-	-	-	-	-	-	104.5	19.1	257.5	153.7	13.5	0.0
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	33.8	33.8	4.9	43.0	104.5
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	135.8	63.9	0.6	19.1
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13.5	153.7	257.5
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	76.8	153.7
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13.5

01 level <sup>a</sup> critical value of F' 99; 23, 732 = 42.3

The 109 nonsignificant comparisons, on the other hand, are foci of equivalently accurate judgment, indicating areas of similarity of emotional expression, in terms of accurate assessment, by all subjects, among all the actress/emotion contrasts.

Within Table 11, three different types of contrast may be distinguished. Actresses' own expressions of emotions may be contrasted; contrasts between all expressions of each emotion may be carried out; and all other actress/emotion combinations may be compared. In relation to contrasts between all emotional expressions of each actress, all speakers, with the exception of speaker E3, whose accuracy of encoding was equivalent over all contrasts with her own expressions, evidence some variability in accuracy of encoding emotions by voice quality, as inferred from subjects' judgments. Table 12 summarizes these contrasts. In general, English speakers seemed to communicate with more relative consistence over all their individual emotional expressions than did the French speakers. This finding suggests that the English-speaking actresses were more capable than the French speakers of communicating all four emotions at an equivalent level of accuracy.

Comparisons between pairs of actresses' expressions of the same emotion revealed 11 pairs with equivalent levels of accurate judgment by all subjects for at least one emotion. These comparisons are summarized in Table 13.

Table 12  
 Differential Accuracy of Individual Actresses' Emotional  
 Expressions of Love (L), Anger (A), Sadness (S),  
 and Happiness (H), Based on Scheffé Multiple  
 Comparisons of Means

Actresses	Emotion	Contrast With		
E1	L	A	S*	H
	A		S	H
	S			H
E2	L	A*	S*	H
	A		S*	H*
	S			H
E3	L	A	S	H
	A		S	H
	S			H
F1	L	A*	S*	H
	A		S	H*
	S			H*
F2	L	A*	S*	H
	A		S	H*
	S			H*
F3	L	A*	S	H
	A		S*	H*
	S			H

\* $p < .01$

With four exceptions, all pairs of actresses were assessed on a similar level of accuracy for at least one of the expressed emotions, as indicated by the nonsignificant comparisons. The significant contrasts, on the other hand,

represent differential accuracy of judgments regarding the contrasted pairs. Only two pairs of speakers were consistently accurately judged in all contrasts between their emotional expressions.

Table 13

Contrasts Between Expressions of the Same Emotions-- Love (L), Anger (A), Sadness (S), or Happiness (H)-- by Pairs of English (E) and French (F) Actresses, as Shown by Scheffé Multiple Comparisons of Means

Contrast Between	Emotion			
	L	A	S	H
E1 & E2	NS	NS	*	*
E1 & E3	*	*	NS	NS
E1 & F1	*	*	*	NS
E1 & F2	NS	NS	NS	*
E1 & F3	*	*	*	*
E2 & E3	*	*	*	*
E2 & F1	*	*	*	*
E2 & F2	NS	NS	NS	NS
E2 & F3	*	*	*	NS
E3 & F1	NS	NS	NS	NS
E3 & F2	*	*	NS	*
E3 & F3	*	NS	*	*
F1 & F2	*	*	*	*
F1 & F3	*	*	*	*
F2 & F3	NS	NS	*	NS

\* $p < .01$

An examination of Table 11 with particular attention to the interaction between each actress's expressions of

love, anger, sadness, or happiness and all other possible paired contrasts reveals that, in well over 50% of the possible contrasts, significant differences in levels of accuracy of judgment were found, over all subjects. In order to facilitate comparisons of significant and nonsignificant contrasts, Table 14 summarizes the data from each of the six overall contrasts between emotions, each of which includes a total of 36 possible comparisons between each actress's expressions of the two emotions being contrasted.

Table 14

Number of Scheffé Contrasts Between Levels of Judgmental Accuracy Regarding Total Expressions of Specific Emotions by All Actresses

Contrast Between	Significant*	Nonsignificant
Love & Anger	25	11
Love & Sadness	22	14
Love & Happiness	20	16
Anger & Sadness	16	20
Anger & Happiness	22	14
Sadness & Happiness	22	14
Total	127	89

\* $p < .01$

Only anger and sadness were judged, more frequently than not, at a similar level of accuracy by all subjects. In the other five comparisons between emotions, from 20 to 25

contrasts were indicative of a dissimilar level of accurate perception of the two emotions. This differential accuracy reflects the finding, commented upon above, that there was a significant level of variation between the relative accuracy of perception of the four emotional expressions. The sources of this variation are partially ascribable to the consistently differential perception, by all subjects, of the effective expressions by specific actresses, clearly visible in Table 11. For example, the expressions of love by speakers E2, F1, and F3, and of sadness by F1, were assessed at levels of accuracy significantly different from, respectively, the expressions of love and of happiness by all actresses. Similarly, other actresses demonstrate specific areas where emotional encoding was perhaps ambiguous, leading to significant differences in judgmental accuracy of the subjects. Across all emotions, no single actress was singularly poorly judged. On the positive side, speaker F1's expressions elicited a consistently high average of correct identification. Her expressions of anger and of sadness were correctly identified by all 34 subjects. Her expression of happiness, however, was judged at a significantly different level of accuracy than all actresses' expressions of anger.

Clearly, a large part of the significant variance in this total interaction may be ascribed to variation in individual actresses' differential accuracy in encoding specific emotions. Evidence of such differential accuracy

was found in comparisons between actresses' own emotional expressions, and between the expressions of the same emotions by different speakers, as well as between all other possible actress/emotion contrasts.

It must be noted that while this particular set of comparisons was concerned with relative levels of accuracy, it did not address the equally interesting problem of absolute accuracy of judgment. The question of which emotions were correctly identified, and how they were incorrectly perceived, will now be discussed.

The proportional identification of emotional expressions of French- and English-speaking actresses by French and English subjects is shown in Table 15. In view of the results reported heretofore, it comes as no surprise that love and happiness were least often identified correctly. When love was incorrectly identified, French expressions of love were judged as happiness, and English expressions, somewhat less clearly, as sadness, by all subjects. Similarly, misperception of English expressions of happiness were identified as sadness most often, while French-speaking expressions of sadness were most frequently considered to be anger. Both anger and sadness were more accurately identified, over all subjects, although French anger was more unambiguously judged than was English anger, which, when misjudged, was confused with either sadness or happiness. Although all emotions were identified at a level surpassing chance accuracy, differential accuracy in perceiving the

Table 15  
 Proportions of Emotions Expressed by English (E) and French (F) Groups  
 of Speakers, as Judged by English (E) and French (F) Subjects

Emotions as Judged by Subjects	Stimulus Emotions											
	Love			Anger			Sadness			Happiness		
	E	F	Total	E	F	Total	E	F	Total	E	F	Total
Love	E	.37	.43	.04	.02	.03	.22	.10	.16	.10	.04	.07
	F	.45	.37	.14	.00	.07	.35	.25	.30	.10	.16	.13
	Total	.47 <sup>b</sup>	.40 <sup>c</sup>	.09	.01	.05	.28	.18	.23	.10	.10	.10
Anger	E	.02	.06	.04	.76	.82	.02	.12	.07	.02	.33	.18
	F	.06	.06	.06	.59	.84	.00	.10	.05	.08	.37	.23
	Total	.04	.06	.05	.68	.83	.01	.11	.06	.05	.35	.20
Sadness	E	.35	.16	.25	.12	.08	.73	.63	.68	.25	.31	.28
	F	.33	.10	.22	.16	.04	.61	.53	.57	.45	.18	.31
	Total	.34	.13	.24	.14	.06	.10	.67	.58	.62	.35	.30
Happiness	E	.14	.41	.27	.12	.04	.04	.16	.10	.63	.31	.47
	F	.12	.53	.32	.20	.04	.04	.10	.07	.37	.29	.33
	Total	.13	.47	.30	.16	.04	.10	.04	.13	.08	.50	.40

<sup>a</sup>n = 51

<sup>b</sup>n = 102

<sup>c</sup>n = 204

four emotions is apparent. The differences in actresses' encoding abilities, discussed above, may have contributed to the varying proportions of accurate identification of many, although not all, emotion/stimulus language interactions. Each emotion's inherent degree of communicability by means of voice quality alone may also constitute an underlying factor in the differences in accuracy of identification. In particular, the results of this study concur in part with those of Burns and Beier (1973) who also found that the audial channel is least effective in the transmission of happiness.

The surprising similarity of levels of accurate identification of love and happiness may be attributable to differences in conceptualizing of the emotions by the actresses themselves. Since, perhaps unfortunately, the instructions did not specify any particular qualities to be associated with any of the four emotions, actresses were free to imagine situations varying a great deal from actress to actress. In the case of love, for example, the imagined situation might have involved romantic love, or, in contrast, the love for a tiny infant. Similarly, happiness might be related to joy at receiving a treasured gift, or exuberance after passing a terrifying examination. The evident contrasts between such possible personal differences in the background experiences which were chosen as the underlying stimulus for each emotional expression make the comparisons between happiness, sadness, and love somewhat

more intelligible.

In terms of the nature/nurture controversy regarding the transmitting of emotions by vocal channels alone, conflicting conclusions may be drawn from the data in Table 15. We have already seen, in Table 1, that significant differences between the English- and French-speaking subjects were found only in connection with English happy expressions, total happy, total sad, and total English expressions of emotion, and total scores, as well as one English- and one French-speaking actress. These differences, it must be remembered, relate to relative accuracy of judgment. Table 15, on the other hand, presents data related to absolute accuracy of identification of emotion. The French and English expressions of anger may be interpreted as supporting the presence of a universal modality of expression, for the French actresses' angry expressions are identified with a high level of accuracy by both English and French judges. In comparison, the English actresses are differentially judged by the two groups ( $z = 2.59$ ,  $p = <.01$ ). It might be postulated that while the French actresses communicated a universal modality of anger quite successfully, the English speakers were significantly more successful in communicating anger to English-speaking than to French-speaking subjects, perhaps because the Anglophone stereotypical reticence, discussed above, modified the expression of this very intense, hostile emotion to the extent that it was ambiguously interpreted by the French

group as any one of the other three emotions. On the nurture side, English expressions of happiness were differentially recognized by the two groups ( $z = 5.15$ ,  $p < .01$ ) while French expressions of happiness were equally accurately recognized by the two groups, but at a relatively low level of accuracy. While the small number of speakers representing each language group mitigates against regarding this evidence conclusively, the findings are suggestive of the existence of a cross-culturally recognizable mode of affective communication, at least for some emotions, with the possibility of its vulnerability through modification by stereotypical vocal patterns associated with specific languages.

Other possible explanations may, of course, be postulated. The effects of individual differences in encoding abilities might effectively mask either a universal or a cultural/linguistic stereotype. Furthermore, cultural modes of emotional expression cannot be ruled out as possible explanations. It is entirely possible that such cultural modes might influence the expressions of some emotions more than others. Perhaps the underlying biophysical role of the emotion might determine the degree of dominance of the cultural, or the universal mode. For example, the survival value of anger, with its concomitant physiological arousal state, suggests the possibility of a universal stereotypical mode of expression of anger, susceptible of being understood transculturally. Happiness, on the other hand,

is not an emotion that necessarily involves the safety of the organism. Therefore, in this case, much more importance might be ascribed to cultural stereotypical expressions. Such postulations are tentative at best. Further research is needed in this area.

To summarize the results of the investigation of the sources of significant variation in this study, we may say that:

1. The main effects of stimulus language, respondents' language, speaker, and stimulus emotion are significant.
2. Of the main effects of emotion, all differentiations are statistically significant with the exception of the contrast between love and happiness.
3. Of the interactions among the main effects, only those of stimulus emotion with stimulus language, and with speaker, are significant.

On the basis of these findings, a major portion of the variation was found attributable to individual intra- and inter-actress differences in encoding abilities of the four emotions used as stimuli in this study. Group differences between French and English actresses in consistency of level of accurate expression, as deduced from judgmental scores, were also noted, with more variation in accuracy level associated with the French than with the English

speakers. Possible cultural differences in expressions of various emotions were also suggested, with the stereotypical English-Canadian reserve, perhaps effecting the encoding of the more intense emotions by the English speakers, especially noted.

This concludes the investigation of the sources of significant variation found in this study. While certain aspects have been susceptible to tentative explanation, the reversal of both directional hypotheses must now be considered. The original hypotheses were formulated with the assumption that the 'romantic' nature of the French and Spanish languages justified their being used as equivalents in a study of emotional communication by means of voice quality. In view of the results of this project, the similar nature of the emotional components of these two languages should be called into question. For example, research might compare French and Spanish in terms of comparative efficiency in transmitting emotions transculturally.

The importance of broad cultural influences may have been a confounding factor. There is no doubt that more cultural similarity is present in the environments of English- and French-Canadians, no matter how superficially different, than in the environments of Mexican children compared to Winnipeg youngsters. If a part, at least, of an individual's emotional expressivity is learned within his own culture, extremely different cultural environments

may confound an experiment which focusses on language per se. The directional hypotheses, then, might not have been appropriate in either the present study nor in the model upon which it was patterned, as long as the reasoning did not include consideration of cultural factors. While, to a large extent, culture and language are inextricably intertwined, culturally accepted modes of behavior and of emotional expression undoubtedly influence the expressive vocal mode employed by a particular group, over and above the vocal patterning of communication imposed by the characteristic sounds of any particular language. Albas et al. (1976) found differences in cross-cultural accuracy of identification of emotion between Cree and white Canadian Manitobans, each group demonstrating more accurate identification of the emotions expressed by same-language than by other-language speakers. These authors, too, were concerned about whether the cultural or the linguistic aspect was of greater importance in influencing judgments. The question is complex, and deserves careful investigation.

The problem of culture and language interaction is of general concern. Some comment must be made about two aspects of the present study which might have contributed confounding factors. One of these points involves the high proportion of French-Canadian subjects who volunteered for the project while in a stressful pre-examination situation. It is conceivable that the French sample, therefore, represented a different population than did the English subjects

in terms of personality variables which might be correlated with judgmental ability in relation to emotional stimuli.

A second point involves the actresses chosen. While the original tapes were validated, the fact that, even with expressed content clearly audible, two actresses had to be excluded from the study because of low accuracy ratings, raised some doubts about the underlying emotional expressions of amateur actresses. While it might be argued that most of our interpersonal affective judgments are made on the basis of much less controlled emotional stimuli than that to which the subjects in this study were exposed, nevertheless, in a laboratory situation, the stimuli should be trustworthy, in the sense of eliciting valid and reliable judgments. The use of professional actresses would, therefore, be desirable in any further projects of this nature.

The vocal qualities to which both groups of subjects paid attention in differentiating the four emotions were very similar. Each group mentioned intensity, speed of delivery, intonation, and pitch as important vocal cues. The qualities linked to each emotion were also similar. With love, subjects in both groups associated low, smooth, calm, regular, quiet delivery. Sadness was quite similarly described, with the addition of pauses and a sobbing or sighing voice quality. Pitch was described as low and even by the English subjects, and as either low and even or as

varying, but ending low, by the French. Both groups perceived angry and happy expressions as higher pitched, rapid, and excited. Anger, for the most part, was seen as expressed by emphatic, loud voices, by the French, and by sharp or harsh voices, by the English. Intonation was seen as either rising or extremely varied, by both groups. In short, both groups described with great similarity, distinctions between emotions as associated with varying vocal qualities. The differences between the actual perceptions of the two groups, however, suggest that either some differences may exist between the two groups' conceptualization of the voice qualities they are describing, or some of the speakers produced ambiguous stimuli which could not be appraised with any degree of accuracy. Since Tomatis (1963) has shown that spoken languages differ in their dominant frequency levels, it is possible that the process of filtering the speech samples removed more essential components from one language than from the other, thereby presenting a task of differential difficulty to the two groups of subjects.

Finally, the statistical power of this study must be considered: how great a likelihood is there that these results are not attributable to chance? In the case of directional hypotheses, with a sample size of 17 per cell the power of the first hypothesis would be estimated at 85%. The power of the second hypothesis, with a cell size of 34, is approximately 57% (Cohen, 1969). However, since both hypotheses were directional, Cohen states specifically

that "since directional tests cannot, by definition, lead to rejecting the null hypothesis in the direction opposite to that predicted, these tests have almost no power to detect such effects." (Cohen, 1969, p. 5.) It must be concluded that, while the results of this study have suggested the presence of group differences between English- and French-speaking Canadian female university students in the decoding of emotions from voice qualities, other research must be conducted to confirm this.

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APPENDIX A



- 2 -

À QUEL ENDROIT?

TERRE-NEUVE	—	MANITOBA	—
ILE-DU-PRINCE-ÉDOUARD	—	SASKATCHEWAN	—
NOUVELLE-ÉCOSSE	—	ALBERTA	—
NOUVEAU-BRUNSWICK	—	COLOMBIE-BRITANIQUE	—
QUÉBEC	—	YUKON ET TERRITOIRES	—
ONTARIO	—	DU NORD-OUEST	—
		À L'EXTÉRIEUR DU CANADA	—
		(spécifier)	_____

QUELLE EST LA LANGUE MATERNELLE DE VOTRE PÈRE?

FRANÇAIS —

ANGLAIS —

AUTRE (spécifiez) \_\_\_\_\_

QUELLE EST LA LANGUE MATERNELLE DE VOTRE MÈRE?

FRANÇAIS —

ANGLAIS —

AUTRE (spécifiez) \_\_\_\_\_

JUSQU'À QUEL POINT, VOTRE LANGUE MATERNELLE ÉTAIT-ELLE EFFECTIVEMENT PARLÉE?  
INDIQUEZ UN POURCENTAGE APPROXIMATIF. (Répondez aux deux sections)

À LA MAISON — %

À L'EXTÉRIEUR — %

DANS QUELLE LANGUE AVEZ-VOUS FAIT VOS ÉTUDES?

ÉCOLE ÉLÉMENTAIRE: FRANÇAIS —

ANGLAIS —

AUTRE (spécifiez) \_\_\_\_\_

ÉCOLE SECONDAIRE: FRANÇAIS —

ANGLAIS —

AUTRE (spécifiez) \_\_\_\_\_

DANS QUELLE LANGUE PREFEREZ-VOUS TRAVAILLER?

FRANÇAIS —

ANGLAIS —

AUTRE (spécifiez) \_\_\_\_\_

À QUEL GROUPE ETHNIQUE SENTEZ-VOUS QUE VOUS APPARTENEZ?

CANADIEN-FRANÇAIS —

CANADIEN-ANGLAIS —

AUX DEUX —

À UN AUTRE (spécifiez) \_\_\_\_\_



APPENDIX B

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

number	street	apartment
_____	_____	_____
city	province	postal code
_____	_____	_____

TELEPHONE NUMBER \_\_\_\_\_

AGE \_\_\_\_\_

years	months
_____	_____

ARE YOU WILLING TO PARTICIPATE IN THIS RESEARCH? YES

NO

WHERE WERE YOU BORN?

NFLD.	___	ALTA.	___
P.E.I.	___	B.C.	___
N.S.	___	YUKON/NWT	___
N.B.	___	U.S.A.	___
QUE.	___	UNITED KINGDOM	___
ONT.	___	FRANCE	___
MAN.	___	OTHER (specify)	_____
SASK.	___		

WHERE WERE YOUR PARENTS BORN? (Check one for each)

	FATHER	MOTHER
CANADA	___	___
U.S.A.	___	___
UNITED KINGDOM	___	___
FRANCE	___	___
OTHER (specify)	_____	_____

DURING YOUR PRIMARY AND SECONDARY SCHOOL YEARS, WHERE DID YOU PREDOMINANTLY RESIDE? (Check one only)

IN A CITY	___
TOWN	___
VILLAGE	___
MUNICIPALITY OR SUBURB	___
FARM	___
OTHER (specify)	_____

WHAT LOCATION?

NFLD.	___	MAN.	___
P.E.I.	___	SASK.	___
N.S.	___	ALTA.	___
N.B.	___	B.C.	___
QUE.	___	YUKON/NWT	___
ONT.	___	OUTSIDE CANADA	___
		(specify)	_____



- 3 -

HOW MANY YEARS OF FRENCH INSTRUCTION HAVE YOU HAD IN SCHOOL (PRIMARY AND SECONDARY)?

1 YEAR                   \_\_\_  
 2 YEARS                  \_\_\_  
 3 YEARS                  \_\_\_  
 4 YEARS                  \_\_\_  
 5 YEARS OR MORE       \_\_\_

HOW MUCH CONTACT AS A CHILD (12 YEARS AND UNDER) DID YOU HAVE WITH PEOPLE OF CANADA'S OTHER OFFICIAL LANGUAGE GROUP?

EXTENSIVE CONTACT       \_\_\_  
 FAIR AMOUNT OF CONTACT \_\_\_  
 SOME CONTACT           \_\_\_  
 SLIGHT CONTACT         \_\_\_  
 NO CONTACT AT ALL      \_\_\_

HOW MUCH CONTACT AS A TEENAGER (13 YEARS AND OVER) DID YOU HAVE WITH PEOPLE OF CANADA'S OTHER OFFICIAL LANGUAGE GROUP?

EXTENSIVE CONTACT       \_\_\_  
 FAIR AMOUNT OF CONTACT \_\_\_  
 SOME CONTACT           \_\_\_  
 SLIGHT CONTACT         \_\_\_  
 NO CONTACT AT ALL      \_\_\_

TO YOUR KNOWLEDGE, HAVE YOU ANY HEARING LOSS?

YES   \_\_\_  
 NO    \_\_\_

APPENDIX C

### Instructions to French-Canadian Actresses

Cette recherche porte sur la manière dont le timbre de la voix traduit les émotions. Vous devez exprimer quatre émotions fondamentales, au moyen de phrases dérivées de vos propres sentiments et des expériences que vous avez vécues. On vous donnera des indications séparées pour chacun des quatre sentiments. Votre manière d'exprimer ces émotions sera enregistrée sur ruban. Avant de commencer, avez-vous des questions?

J'aimerais que vous évoquiez une expérience passée au cours de laquelle vous vous êtes senti \_\_\_\_\_ (heureuse; triste; fâchée; tendre). Essayez de l'imaginer le plus clairement possible. Ensuite, lorsque vous vous sentez réellement \_\_\_\_\_ (heureuse; triste, fâchée, tendre), dites deux phrases qui vous viennent à l'esprit, n'importe lesquelles, et qui exprimeront vos sentiments.

APPENDIX D

### Instructions to English-Canadian Actresses

This research is concerned with how voice qualities communicate emotions. You will be asked to express four basic emotions, using sentences which will grow out of your own feelings and past experiences. Separate instructions will be given for each of the four ways of feeling. Your expressions of these emotions will be tape-recorded. Before we begin, are there any questions?

I would like you to recreate, in your mind, a past experience in which you felt \_\_\_\_\_ (happy; sad; angry; loving). Imagine this as clearly as you can. Then, when you really feel \_\_\_\_\_ (happy; sad; angry; loving), say any two sentences that come to mind, and that will express the way that you feel.

APPENDIX E



- 2 -

QUEL EST LE NIVEAU DE SCOLARITÉ LE PLUS ÉLEVÉ DE VOS PARENTS?	PARENTS?	
	<u>PÈRE</u>	<u>MÈRE</u>
A. AUCUNE SCOLARITÉ	_____	_____
B. ÉCOLE ÉLÉMENTAIRE	_____	_____
C. ÉCOLE SECONDAIRE ACADÉMIQUE	_____	_____
PROFESSIONNEL	_____	_____
D. POST-SECONDAIRE (à l'exclusion de l'université)		
COURS COMMERCIAL	_____	_____
NURSING, PÉDAGOGIE	_____	_____
COLLEGE, CEGEP, COURS TECHNIQUE	_____	_____
E. UNIVERSITÉ		
DIPLÔME OU CERTIFICAT	_____	_____
BACCALAURÉAT	_____	_____
MAÎTRISE	_____	_____
DOCTORAT	_____	_____
DIPLOME RELIÉ À UNE PROFESSION	_____	_____

## ÊTES-VOUS

UN ENFANT UNIQUE? \_\_\_\_\_  
 L'AÎNÉ? \_\_\_\_\_  
 LE CADET? \_\_\_\_\_  
 OU VOUS SITUEZ-VOUS ENTRE \_\_\_\_\_  
 LES DEUX? \_\_\_\_\_

## COMBIEN DE FRÈRES AVEZ-VOUS?

0 \_\_\_\_\_  
 1 \_\_\_\_\_  
 2 \_\_\_\_\_  
 3 ou plus \_\_\_\_\_

## COMBIEN DE SOEURS AVEZ-VOUS?

0 \_\_\_\_\_  
 1 \_\_\_\_\_  
 2 \_\_\_\_\_  
 3 ou plus \_\_\_\_\_

## QUELLE EST VOTRE LANGUE MATERNELLE?

FRANÇAIS \_\_\_\_\_  
 ANGLAIS \_\_\_\_\_  
 AUTRE (spécifiez) \_\_\_\_\_

## QUELLE EST LA LANGUE MATERNELLE DE VOTRE PÈRE?

FRANÇAIS \_\_\_\_\_  
 ANGLAIS \_\_\_\_\_  
 AUTRE (spécifiez) \_\_\_\_\_

## QUELLE EST LA LANGUE MATERNELLE DE VOTRE MÈRE?

FRANÇAIS \_\_\_\_\_  
 ANGLAIS \_\_\_\_\_  
 AUTRE (spécifiez) \_\_\_\_\_

APPENDIX F



INDICATE YOUR PARENTS' HIGHEST LEVELS OF EDUCATION COMPLETED

	<u>FATHER</u>	<u>MOTHER</u>
A. NO FORMAL SCHOOLING	---	---
B. ELEMENTARY SCHOOL	---	---
C. SECONDARY:		
ACADEMIC	---	---
VOCATIONAL	---	---
D. POST-SECONDARY (excluding university)		
BUSINESS, TRADES	---	---
NURSING, TEACHERS' COLLEGE	---	---
JUNIOR COLLEGE, TECHNICAL INSTITUTE	---	---
E. UNIVERSITY		
CERTIFICATE OR DIPLOMA	---	---
BACHELOR'S DEGREE	---	---
MASTER'S DEGREE	---	---
DOCTORATE	---	---
PROFESSIONAL DEGREE	---	---

ARE YOU AN: ONLY CHILD      \_\_\_  
 OLDEST CHILD      \_\_\_  
 YOUNGEST CHILD      \_\_\_  
 IN-BETWEEN      \_\_\_

HOW MANY BROTHERS DO YOU HAVE?

0      \_\_\_  
 1      \_\_\_  
 2      \_\_\_  
 3 or more      \_\_\_

HOW MANY SISTERS DO YOU HAVE?

0      \_\_\_  
 1      \_\_\_  
 2      \_\_\_  
 3 or more      \_\_\_

WHAT IS YOUR MOTHER TONGUE? (i.e. LANGUAGE PREDOMINANTLY SPOKEN IN THE HOME)

ENGLISH      \_\_\_  
 FRENCH      \_\_\_  
 OTHER (specify) \_\_\_\_\_

WHAT IS THE MOTHER TONGUE OF YOUR FATHER?

ENGLISH      \_\_\_  
 FRENCH      \_\_\_  
 OTHER (specify) \_\_\_\_\_

WHAT IS THE MOTHER TONGUE OF YOUR MOTHER?

ENGLISH      \_\_\_  
 FRENCH      \_\_\_  
 OTHER (specify) \_\_\_\_\_

APPENDIX G

NUMÉRO D'IDENTIFICATION \_\_\_\_\_

Veillez décrire en peu de mots ce qui, dans le timbre de la voix, vous a aidé à reconnaître les émotions exprimées. Faites-le avec le plus de précision possible.

ATTITUDE À L'ÉGARD DE L'UNITÉ NATIONALE\*

S'il-vous-plaît, encerclez le choix qui vous paraît préférable.

1. Préconisez-vous une entité politique indépendante pour le Québec?
2. Préconisez-vous une représentation égale pour le Québec et pour le reste du Canada, dans l'administration du pays?
3. Préconisez-vous des pouvoirs égaux ou une représentation égale pour toutes les provinces dans l'administration du pays?
4. Préconisez-vous la division du Canada en cinq régions (le Québec, l'Ontario, les Maritimes, les Prairies, et la Colombie Britannique), dont chacune aurait une voix égale dans l'administration du pays?
5. Préférez-vous que rien ne change dans l'administration du pays?

ATTITUDE À L'ÉGARD DU BILL N° 101, CHARTE DU FRANÇAIS DU QUÉBEC

Ce bill, qui vient de devenir une loi dans la province de Québec, porte sur deux questions distinctes: l'utilisation du Français comme langue officielle des affaires, et l'utilisation du Français dans le domaine de l'enseignement.

1. Êtes-vous d'accord pour qu'au Québec le Français soit la langue officielle des affaires?  
 Oui \_\_\_\_\_ Non \_\_\_\_\_ Je ne sais pas \_\_\_\_\_
2. Êtes-vous d'accord avec la législation qui veut qu'au Québec seuls les écoliers dont la mère ou le père ont fait leurs études primaires en Anglais au Québec peuvent être admis dans les écoles anglaises?  
 Oui \_\_\_\_\_ Non \_\_\_\_\_ Je ne sais pas \_\_\_\_\_

\*Questions concerning subjects' attitudes towards Canadian political and bilingual issues were related to the establishment of feasibility for a later study utilizing similar data. These responses were not employed in the present project.

APPENDIX H

IDENTIFICATION NO. \_\_\_\_\_

Please describe in a few words the aspects of voice quality which helped you to identify the emotions being expressed. Be as specific as possible.

ATTITUDE TOWARD NATIONAL UNITY \*

Please circle the option which you find most preferable.

1. Do you favour Quebec becoming an independent political entity?
2. Do you favour giving Quebec equal representation with the rest of Canada in running the country?
3. Do you favour giving all provinces equal power or equal representation in running the country?
4. Do you favour dividing Canada into five regions (Quebec, Ontario, the Maritimes, the Prairies, and British Columbia), all with equal voices in running the country?
5. Do you favour maintaining the status quo in regard to running the country?

ATTITUDE TOWARD QUEBEC'S LANGUAGE BILL 101

This Bill, which has recently become law in the Province of Quebec, is related to two distinct questions: the use of French as the official language of business, and the use of French in the area of education.

1. Do you agree that, in Quebec, French should be the official language of business?  
 Yes \_\_\_\_\_ No \_\_\_\_\_ Don't know \_\_\_\_\_
2. Do you agree with the legislated position, in Quebec, that only students whose mother or father has attended English-language elementary schools in Quebec can be admitted into English-language schools?  
 Yes \_\_\_\_\_ No \_\_\_\_\_ Don't know \_\_\_\_\_

\*Questions concerning subjects' attitudes towards Canadian political and bilingual issues were related to the establishment of feasibility for a later study utilizing similar data. These responses were not employed in the present project.

APPENDIX I

NUMÉRO D'IDENTIFICATION \_\_\_\_\_

DATE \_\_\_\_\_

Cette femme est: (en encirclez UNE)Quelle pourcentage de certitude avez-vous?

1. Tendre	Fâchée	Triste	Heureuse	_____%
2. Tendre	Fâchée	Triste	Heureuse	_____%
3. Tendre	Fâchée	Triste	Heureuse	_____%
4. Tendre	Fâchée	Triste	Heureuse	_____%
5. Tendre	Fâchée	Triste	Heureuse	_____%
6. Tendre	Fâchée	Triste	Heureuse	_____%
7. Tendre	Fâchée	Triste	Heureuse	_____%
8. Tendre	Fâchée	Triste	Heureuse	_____%
9. Tendre	Fâchée	Triste	Heureuse	_____%
10. Tendre	Fâchée	Triste	Heureuse	_____%
11. Tendre	Fâchée	Triste	Heureuse	_____%
12. Tendre	Fâchée	Triste	Heureuse	_____%
13. Tendre	Fâchée	Triste	Heureuse	_____%
14. Tendre	Fâchée	Triste	Heureuse	_____%
15. Tendre	Fâchée	Triste	Heureuse	_____%
16. Tendre	Fâchée	Triste	Heureuse	_____%
17. Tendre	Fâchée	Triste	Heureuse	_____%
18. Tendre	Fâchée	Triste	Heureuse	_____%
19. Tendre	Fâchée	Triste	Heureuse	_____%
20. Tendre	Fâchée	Triste	Heureuse	_____%
21. Tendre	Fâchée	Triste	Heureuse	_____%
22. Tendre	Fâchée	Triste	Heureuse	_____%
23. Tendre	Fâchée	Triste	Heureuse	_____%
24. Tendre	Fâchée	Triste	Heureuse	_____%

APPENDIX J

IDENTIFICATION NUMBER \_\_\_\_\_

DATE \_\_\_\_\_

This woman is: (circle ONE)

How certain are you?

- |            |       |     |       |         |
|------------|-------|-----|-------|---------|
| 1. Loving  | Angry | Sad | Happy | _____ % |
| 2. Loving  | Angry | Sad | Happy | _____ % |
| 3. Loving  | Angry | Sad | Happy | _____ % |
| 4. Loving  | Angry | Sad | Happy | _____ % |
| 5. Loving  | Angry | Sad | Happy | _____ % |
| 6. Loving  | Angry | Sad | Happy | _____ % |
| 7. Loving  | Angry | Sad | Happy | _____ % |
| 8. Loving  | Angry | Sad | Happy | _____ % |
| 9. Loving  | Angry | Sad | Happy | _____ % |
| 10. Loving | Angry | Sad | Happy | _____ % |
| 11. Loving | Angry | Sad | Happy | _____ % |
| 12. Loving | Angry | Sad | Happy | _____ % |
| 13. Loving | Angry | Sad | Happy | _____ % |
| 14. Loving | Angry | Sad | Happy | _____ % |
| 15. Loving | Angry | Sad | Happy | _____ % |
| 16. Loving | Angry | Sad | Happy | _____ % |
| 17. Loving | Angry | Sad | Happy | _____ % |
| 18. Loving | Angry | Sad | Happy | _____ % |
| 19. Loving | Angry | Sad | Happy | _____ % |
| 20. Loving | Angry | Sad | Happy | _____ % |
| 21. Loving | Angry | Sad | Happy | _____ % |
| 22. Loving | Angry | Sad | Happy | _____ % |
| 23. Loving | Angry | Sad | Happy | _____ % |
| 24. Loving | Angry | Sad | Happy | _____ % |

APPENDIX K

Instructions to French-speaking  
Subject-judges

Vous entendrez différentes femmes parlant à une certaine distance. Elles diront des choses de diverses manières. Certaines sembleront heureuses, d'autres tristes, quelques-unes fâchées, et d'autres tendres. Ecoutez chacune d'elles et encerclez sur la feuille de réponses l'émotion qui paraît transmise. Est-ce une personne qui semble heureuse, une personne triste, une personne fâchée, ou une personne tendre? Un signal indiquera la fin de chaque exemple.

APPENDIX L

Instructions to English-speaking  
Subject-judges

You are going to hear different women speaking from some distance away. They will say things in different ways. Some will sound happy, some sad, some angry, and some loving. Listen to each one and circle on the answer sheet the emotion it sounds like. Does it sound like a happy person, a sad person, an angry person, or a loving person? A signal will indicate the end of each sample.

APPENDIX M

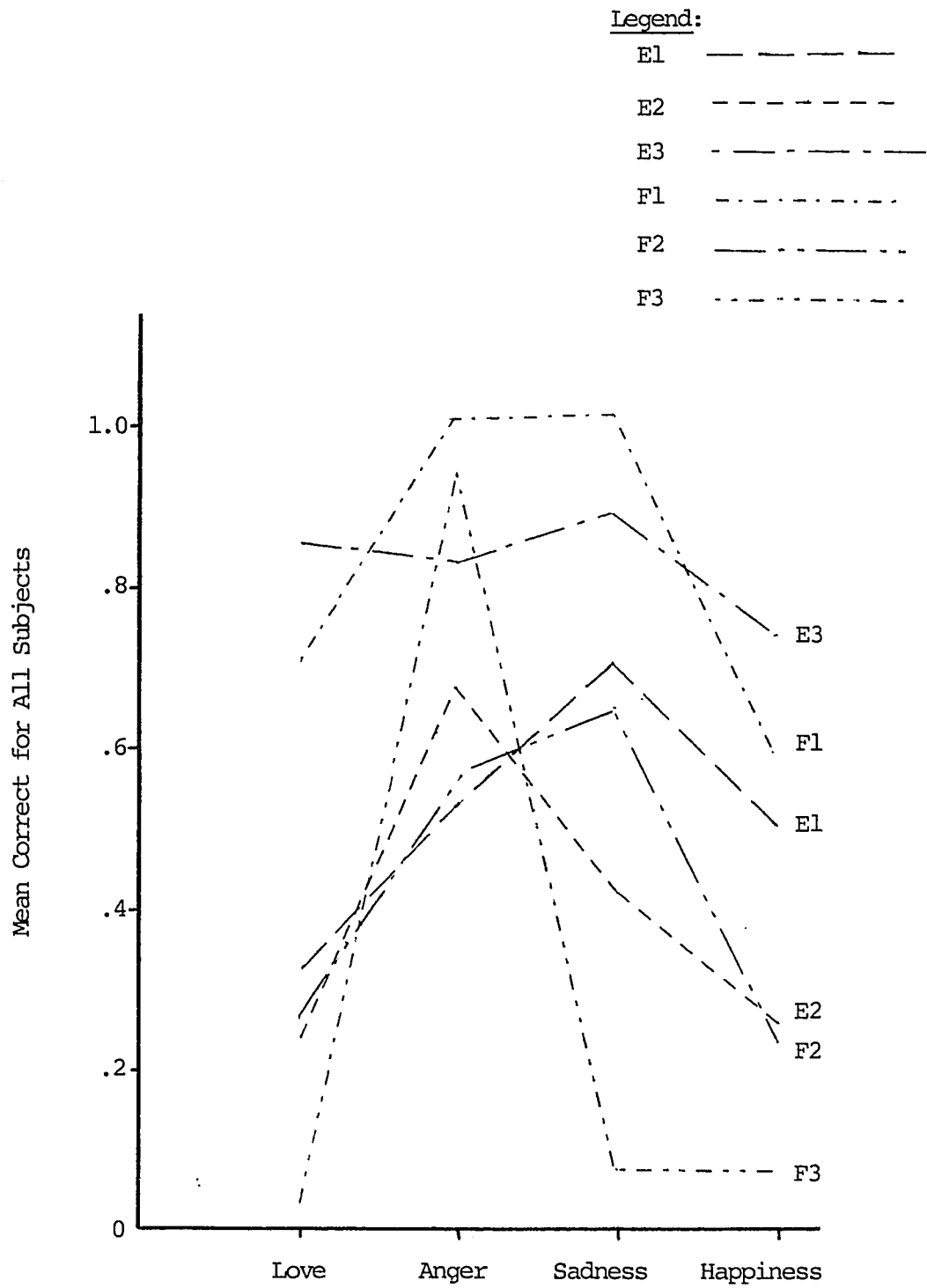


Figure 2:- Mean Accurate Identification by All Subjects of English (E) and French (F) Actresses' Expressions of Stimulus Emotions