VOCAL COMMUNICATION OF EMOTION:
A PROGRAM OF RESEARCH

by Ken W. McCluskey

A DISSERTATION SUBMITTED TO THE FACULTY OF GRADUATE STUDIES IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

DEPARTMENT OF PSYCHOLOGY

UNIVERSITY OF MANITOBA
WINNIPEG, MANITOBA, CANADA
OCTOBER, 1979

VOCAL CUMMUNICATION OF EMOTION:

A PROGRAM OF RESEARCH

BY

KENNETH McCLUSKEY

A thesis submitted to the Faculty of Graduate Studies of
the University of Manitoba in partial fulfillment of the requirements
of the degree of

DOCTOR OF PHILOSOPHY

ABSTRACT

The present program of research consisted of three studies. The purpose of Study I was to examine and compare the ability of Canadian and Mexican subjects to identify the emotional content of vocal expressions. Canadian and Mexican female teachers, speaking any words they wished in their respective languages (i.e., English and Spanish), simulated the emotions of happiness, sadness, love, and anger. After the initial recording, speech samples were arranged in random order and then rendered unintelligible by means of an electronic filtering device (which removed semantic content while leaving intact the tonal qualities of speech). The filtered vocal expressions were played to Canadian and Mexican subjects 5, 9, 13, 17, 25, 45, and 65 years of age. From 5 through 25, there was a progressive increase with age in ability to identify the emotion expressed. Ability did level off, however, and eventually even decreased (such that the 65-year-olds performed less accurately than the other adult groups). Overall, the Mexican subjects were significantly more sensitive to tone than their Canadian counterparts. However, subjects from both countries judged the speech samples from Mexican teachers more accurately than those from the Canadian speakers. As well, there was a response bias, with younger subjects in both cultures emitting more negative

than positive responses when judging the vocal expressions. Adult subjects, on the other hand, showed no tendency to respond with a preponderance of negative judgments.

In Study II, recordings were made of bilingual Canadian and Mexican female teachers reciting congruent and contradictory messages in both English and in Spanish. In the congruent condition, the verbal and tonal elements of the communication were consistent. With the contradictory speech, however, the tone of voice was incongruent with the words spoken. When the appropriate speech samples (i.e., English for the Canadian subjects and Spanish for the Mexicans) were played to Canadian and Mexican boys aged 5, 9, 13, and 17, it was found that there was a clear speech effect. That is, children at all age levels in both cultures reacted more negatively to contradictory than to congruent messages. Also, there was an age effect, with the younger children in both cultures interpreting the contradictory messages more negatively than the older ones. Further, a culture effect was noted, such that the Mexican children viewed the contradictory speech significantly more negatively than did their Canadian counterparts.

In Study III, variables other than culture were the major concern. As a consequence, only Canadian subjects participated. The congruent and contradictory speech samples recorded in English by the Canadian teachers for the second study were again used here. In this case, however, all the

congruent and contradictory vocal expressions were arranged in random order on a single tape and played to "normal" and "disturbed" boys of different ages (i.e., at the grade 2, the grade 4, and the grade 6 levels). Significant effects were found for type of speech and age: subjects reacted more negatively to contradictory than to congruent speech, and younger children responded more negatively to contradiction than did older ones. As well, contradictory, double-bind type speech seemed to have more of an impact on the "disturbed" boys than on the "normals." The fact that "disturbed" children reacted more negatively to contradictory communications was interpreted as being generally supportive of the double-bind hypothesis (after it had been redefined and softened in certain respects).

ACKNOWLEDGEMENTS

I'd like to extend sincere thanks to my academic advisor, Dr. John McIntyre, for all his assistance in the planning and design of this dissertation. Essentially, Dr. McIntyre picked me up as a student when no one else wanted me, and provided the help and support I needed to finish up the Ph.D. He continually made meaningful and constructive suggestions to help me along, giving very freely of his own time all the while. Indeed, without his supervision (which, paradoxically enough, managed to be flexible and structured simultaneously) this thesis would probably have remained unwritten.

Considerable thanks are also extended to Dr. Ross Hartsough and Dr. F.L. Marcuse not only for serving on the committee, but also for offering excellent courses in the nonverbal area (which served to shape and influence my thinking long before I undertook the research at hand). Their many suggestions regarding style and form were much appreciated. As well, I must thank Dr. Dan Albas for all the time spent "digging up" articles on my behalf ... his input with respect to the cross-cultural literature was especially helpful. Thanks also go to Dr. E.H. Schludermann for his suggestions during the preliminary oral.

Dr. Walter J. Lonner took time from his busy schedule to serve as external examiner for this dissertation. I very much appreciate his constructive comments and suggestions, and I feel the thesis benefited a great deal from his involvement. His many books in the cross-cultural realm were also extremely helpful.

At a more personal level, I want to thank my family for all their encouragement and moral support during this "period of suffering." Everyone at home knows Mom was involved in my university career every bit as much as I was. Her affectionate "nagging" kept me going ... I'm likely the only individual who completed a doctorate for the sole purpose of keeping his mother happy. Dad, of course, was always willing to help, and I've lost count of all the little "errands" he took care of so that I could work on without interruption. Now that I've finished up, he can finally stop playing hockey with the profs. I musn't forget Jill and Mark--who both like to see their names in print--for their involvement and patience. Due to clever planning (years of procrastination) on my part, Jill and I will be graduating together. In any case, likely no one at U of M has owed more to his family -- it was nice to have them in "on the kill." It was also nice to have Kathryn--a very special girl in my life--along as well. After the oral she noted (in her usual self-congratulatory fashion) that: "You never could have done it without me!" That facetious comment just might be true.

TABLE OF CONTENTS

	Page
ABSTRACT	i
ACKNOWLEDGEMENTS	iv
LIST OF TABLES	x
LIST OF FIGURES	xi
STUDY I	1
INTRODUCTION	2
METHOD	9
SUBJECTS	9
APPARATUS	10
STICK FIGURES	10
SPEECH SAMPLES	12
PROCEDURE	14
RESULTS	15
DISCUSSION	22
STUDY II	28
INTRODUCTION	29
METHOD	35
SUBJECTS	35
CONTRADICTORY AND CONGRUENT SPEECH SAMPLES	35
PROCEDURE	37
RESULTS	38
DISCUSSION	43

	Page
STUDY III	46
INTRODUCTION	47
METHOD	51
SUBJECTS	51
SPEECH SAMPLES	52
PROCEDURE	53
RESULTS	54
DISCUSSION	57
SUMMARY	60
APPENDIX I: REVIEW OF THE LITERATURE	63
NONVERBAL COMMUNICATION	64
CHANNELS OF COMMUNICATION	67
The Verbal Channel	67
The Vocal Channel	69
The Visual Channel	72
Nonverbal Channels in Combination	76
EMOTION	78
Coding the Vocal Channel for Emotional Content	80
JUDGMENT OF VOCAL ASPECTS OF SPEECH BY ADULTS	85
Recitation of Nonmeaningful Material	85
Recitation of Standard Content	87
Filtered Speech	88
JUDGMENT OF VOCAL ASPECTS OF SPEECH BY CHILDREN	91

Page

CROSS-CULTURAL DIFFERENCES IN THE PERCEPTION OF THE EMOTIONAL CONTENT OF NONVERBAL MESSAGES 98

Cultural Universals? 100

The Effects of Culture 102

Cultural Effects in Childhood 110

THE DOUBLE-BIND HYPOTHESIS 112

The First Decade of Double-Bind Research 116

The Second Decade 125

Research With Children 128

A Redefinition 133

APPENDIX II: REFERENCES 135

APPENDIX III 165

APPENDIX IV 167

APPENDIX V 170

APPENDIX VI 178

APPENDIX VII 180

APPENDIX VIII 182

APPENDIX IX 184

APPENDIX X 186

APPENDIX XI 188

APPENDIX XII 190

APPENDIX XIII 192

APPENDIX XIV 194

APPENDIX XV 196

APPENDIX XVI 198

APPENDIX XVII 200

Page

APPENDIX XVIII 202

APPENDIX XIX 204

APPENDIX XX 206

APPENDIX XXI 208

APPENDIX XXII 210

APPENDIX XXIII 212

APPENDIX XXIV 214

APPENDIX XXV 216

VITA 218

LIST OF TABLES

Page

1. Mean number of negative responses by Canadian and Mexican subjects at successive age levels 20

2. Individual, total, and mean correct responses (scored against tone) for Canadian and Mexican subjects at the various age levels in the contradictory condition 42

LIST OF FIGURES

Page

1a. Stick figures representing the four emotional states 11

1b. Mean number of correct identifications of Canadian and Mexican speech samples by Canadian and Mexican subjects at successive age levels 16

2a. Mean number of negative responses emitted to contradictory and congruent speech as a function of age and culture 39

3a. Faces (and numerical weightings) representing the emotional reactions to the speech samples 53

3b. Mean weighted scores to congruent and contradictory speech as a function of age and type of subject 55

STUDY I

PERCEPTION OF THE EMOTIONAL CONTENT OF SPEECH BY CANADIAN AND MEXICAN CHILDREN, ADOLESCENTS, AND ADULTS

Any spoken communication between two or more people involves both verbal and nonverbal elements. Indeed, much of the research in the area of communication is based upon the notion that speech is composed of two distinct channels: the verbal and the vocal. Supposedly the *verbal* channel is composed solely of sound patterns resulting in syllables, words, phrases, sentences, and other linguistic forms conveying the semantic meaning of speech. If the words spoken in a particular message are written down, the verbal aspects of the communication have, in effect, been isolated. In fact, the verbal information contained in such written messages is what is most commonly examined by traditional content analytic techniques (cf. Barcus, 1959; Carney, 1972; Holsti, 1969).

The features of the voice itself, irrespective of the semantic meaning of the words spoken, are thought to come in on what is called the *vocal* channel. In other words, the vocal channel can be thought of as simply the tonal qualities of speech. Soskin and Kauffman (1961) were among the first to suggest that this channel carried potential affective information. They felt that the vocal channel was the "carrier" upon which verbal content is superimposed, and that the cues to emotion supposedly reside within this "carrier."

A number of investigators have approached the study of communication of emotion in human speech by looking at the vocal channel alone. In their classic investigation, Davitz and Davitz (1959a) tested the hypothesis that emotion can be reliably communicated by the nonverbal aspects of speech. In

an effort to remove the semantic meaning from communication, they had speakers recite parts of the alphabet while attempting to simulate various emotions. Adult subjects then made judgments as to what emotion the speaker was intending to communicate.

Electronic filters have also been used to remove semantic meaning before playing the speech samples to judges (Rogers, Scherer, & Rosenthal, 1971; Rosenthal, Hall, DiMatteo, Rogers, & Archer, 1979; Soskin & Kauffman, 1961; Starkweather, 1956). This latter technique may be preferable in that subjects are actually allowed to speak words, rather than trying to express emotion while saying the alphabet. Furthermore, the filtering method can be employed in studies concerned with real-life situations. For example, taped speech samples obtained from therapy sessions, telephone conversations, radio, television, and so on can be filtered and played to subjects; acting need not be involved. In any case, regardless of the method used, the literature on vocal expression of emotion, reviewed by Starkweather (1961), Davitz and Davitz (1961), Kramer (1963), Davitz (1964), Mahl and Schulze (1964), Duncan (1969), Mehrabian (1972) and Rosenthal, Hall, DiMatteo, Rogers, and Archer (1979) indicates that adults in general are able to identify the affective content of both nonfiltered and filtered vocal expressions.

Although it has been shown that adults can recognize the emotional content of speech, there is a decided paucity of research concerning the development of sensitivity to the

emotional meaning communicated via tone of voice (Nash, 1970). In one of the few developmental studies in the area, Gates (1927) assessed the ability of children from grades three to eight to judge the emotional content of portions of the alphabet recited to express each of a number of different emotions. She found that there was a progressive increase with age in ability to identify correctly the emotional content of the voice samples.

The next study with children along these lines was performed almost four decades later by Dimitrovsky (1964), who attempted to isolate the vocal channel of speech by holding the verbal channel constant. In her speech samples, speakers were asked to recite the same standard paragraph while simulating the emotions of happiness, sadness, love, and anger. When these samples were played to children aged five through twelve, it was likewise found that the ability to judge vocal expression of emotion was positively related to age. Fenster (1967), using a similar standard content (nonfiltered) method, and McCluskey (1974), employing both standard content and filtered speech samples, also found that the ability to identify emotion in vocal expressions improves with age.

Additionally, in terms of frequency of response, it is interesting to note that while adults do not seem to exhibit a response bias when making emotional judgments of speech samples (Davitz, 1964), there is some indication that children do tend to emit significantly more negative ("sad" and "angry") than positive ("happy" and "loving") responses (Dimitrovsky,

1964; McCluskey, 1974). Since her data indicated that youngsters respond with a greater number of negative responses, Dimitrovsky (1964) concluded that children are characteristically more negative in their judgment of vocal expressions than are adults. Dimitrovsky's findings and conclusions in this regard, however, have not necessarily been accepted by all other investigators. Fenster (1967) and Fenster and Goldstein (1971), for example, contended that both children and adults show no negative response bias when listening to a standard, content-free sentence.

To date, most developmental studies have dealt with American or Canadian subjects. It would seem useful, then, to extend the scope of investigation and approach the development of emotional sensitivity from a cross-cultural perspective. In the research at hand, Canada and Mexico were chosen as the comparison cultures, largely because they are so radically different from one another. Despite the fact that they are both technically North Americans, pronounced differences in "emotional style" seem to exist between Canadians and Mexicans. From an anecdotal point of view, Canadians often describe Mexicans as being "Latin blooded" and "highly emotional." Conversely, Canadians and other Anglo races are typically stereotyped by Mexicans as being cold, aloof, and "mechanical" (cf. Lewis, 1961).

At an empirical level, there is evidence to indicate that emotional expression does in fact vary from culture to culture. Specifically, with respect to nonverbal communicative

patterns, clear cultural differences exist in terms of size of personal space zones, posture and angle of orientation in interpersonal interaction, volume and tone of voice, and amount of gesturing, eye-contact, and bodily-contact (cf. Albas, McCluskey, & Albas, 1976; Argyle & Dean, 1965; Birdwhistell, 1963; Hall, 1959, 1964, 1966, LaBarre, 1947; Lacroix & Rioux, 1978; McCluskey & Albas, 1978; Mehrabian, 1972; Sommer, 1969; Watson & Graves, 1966).

Of particular interest is a study by Baxter (1970) which showed that Mexican children, adolescents, and adults had smaller personal space zones (and engaged in more bodily-contact) than either black or white Americans. The nonverbal styles of expressing emotion were clearly different between the Mexican and American subjects, and differences found in childhood tended to persist into adult life. Further, in a pilot study examining sensitivity to tone of voice, Mexican children aged six through 11 were found to identify the emotional content of filtered speech more accurately than Canadian children of corresponding age (McCluskey, Albas, Niemi, Cuevas, & Ferrer, 1975).

For the purposes of the present study, the issue is whether or not the subtle nonverbal differences between the Canadian (Anglo) and Mexican (Latin) cultures extend to even the tonal level. Although there is some empirical support for the intuitive notion that communication of affect differs in the two cultures (cf. Argyle, 1972; Mehrabian, 1972), the question as to whether there are cross-cultural differences

in sensitivity to the emotional content of speech has not been adequately explored. Indeed, there seems to be only one study addressing itself to this issue (McCluskey, Albas, Niemi, Cuevas, & Ferrer, 1975). The major aim of the present research, then, was to compare the ability of Canadian and Mexican subjects of various ages to judge the affective content of filtered vocal expressions recorded by Canadian (English-speaking) and Mexican (Spanish-speaking) communicators.

A complete literature review (Appendix I) and list of references (Appendix II) are included elsewhere in this thesis. As mentioned earlier (and in more depth in the detailed literature review), virtually all research involving recitation of nonmeaningful material and standard content has shown that children are able to judge emotion in speech more accurately as they grow older (Dimitrovsky, 1964; Fenster, 1967; Gates, 1927). Also, with filtered speech where there were no words or verbal content for the children to "hook onto," the same general trend has been reported (McCluskey, 1974). In light of such research, it was hypothesized that:

> (1) there would be a progressive increase with age in children's ability to identify the emotional content of filtered speech in both the Canadian and Mexican cultures.

As well, since no complete developmental comparison between Canadians and Mexicans has been undertaken, it was decided to present speech samples to Canadian and Mexican subjects of various ages (i.e., to children, adolescents, young adults, the middle aged, and the elderly). Keeping

in mind Baxter's (1970) notion that cultural responses learned early in the childhood years tend to persist into adulthood, it was felt that any cross-cultural differences in sensitivity to tone might well perseverate through the entire life cycle. It is known that certain differences exist in the communication of emotion in the Anglo and Latin cultures (Argyle, 1972; Baxter, 1970; Hall, 1959; McCluskey, Albas, Niemi, Cuevas, & Ferrer, 1975; McCluskey, Niemi, & Ferrer, 1973; Mehrabian, 1972). Given what research there is in the area, and assuming that the widespread popular belief that Mexicans are "extremely" emotional may perhaps have some basis in fact, the most logical and parsimonious expectation was that:

> (2) Mexican subjects at all age levels would identify the emotional content of the filtered speech more accurately than their Canadian counterparts.

Finally, remembering Dimitrovsky's (1964) contention that children tend to be characteristically more negative in their responses to speech samples than adults, it was hypothesized that:

> (3) while adults would not show a response bias in either direction, children in both cultures would make more negative ("sad" and "angry") judgments than positive ("happy" and "loving") ones.

METHOD

SUBJECTS

Sixty boys from the Lord Selkirk School Division #11, Selkirk, Manitoba, Canada, and 60 from schools in Colonia del Valle, Mexico City, Mexico, served as subjects. More specifically, 15 boys from each country at each of the ages of 5, 9, 13, and 17 took part. No subject at any age level was within two months of a birthday at the time the study was run.

As well, 15 male teachers at each of the *mean* age levels 25, 45, and 65 were selected from both Manitoba and Mexico City schools. Due to the difficulty in finding enough individuals at each age level, subjects ranged (plus or minus two years) around the mean ages listed above. That is, the ages actually ranged from 23-27, 43-47, and 63-67. All subjects in the 65-year-old group had retired from active teaching (but were contacted through their former schools).

Every subject at each age level in both countries had an I.Q. score that fell in the normal range (90-110) on the PPVT (Peabody Picture Vocabulary Test), QT (Quick Test), Slosson Intelligence Test, or on any group intelligence test. Also, the hearing of every subject participating in the study was tested within normal limits on a Bell Tone Audiometer.

Since social class seems to be a factor influencing ability to encode and decode nonverbal information (Hore, 1970; Knight & Kagan, 1977; Quay, Mathews, & Schwarzmueller, 1977;

Scherer, 1974), some attempt was made to control for this variable. All subjects in Selkirk were chosen from "middle class" schools, and each student's cumulative file was checked with regard to father's occupation and family economic background. The same general procedure was followed in Mexico, where all but the lowest class schools are private institutions. Since all Mexican students in the study attended private schools, their families most probably had relatively good incomes. And since all adult subjects in both cultures were (or had been) teachers, they too would likely fall roughly in the "middle" socioeconomic class bracket.

APPARATUS

The original speech samples were recorded on a Sony Stereo Cassette Deck, model TC-199SD. These samples were then rendered unintelligible through the use of an electronic filter, which passed frequencies from 100-450 cycles per second with a 60-decibel per octave attenuation at the upper level. (For the theoretical rationale behind filtering, see Appendix I.) A second Sony Stereo Cassette Deck was used during the filtering procedure. After filtering, the final samples were presented to subjects via external speakers (Sony Speaker System Model SS-2250).

STICK FIGURES

In several studies of emotional communication, adult subjects are asked to choose the one particular word from a

checklist of adjectives that they feel best describes the emotional content of each vocal expression (Davitz & Davitz, 1959a, 1959b; Soskin & Kauffman, 1961). However, when dealing with children of various ages, it is inappropriate to use an experimental task involving either reading or writing, since age differences in these abilities may confound results. Consequently, in something of an attempt to control for this problem, all subjects were asked to make their identification of each speech sample by pointing to one of four stick figure drawings that represented the four emotional states under consideration (i.e., happiness, sadness, love, and anger). Each picture was drawn on a separate card, and the cards were presented in random order to each subject.

The stick figure drawings, which are identical to those used by Dimitrovsky (1964), are illustrated below.

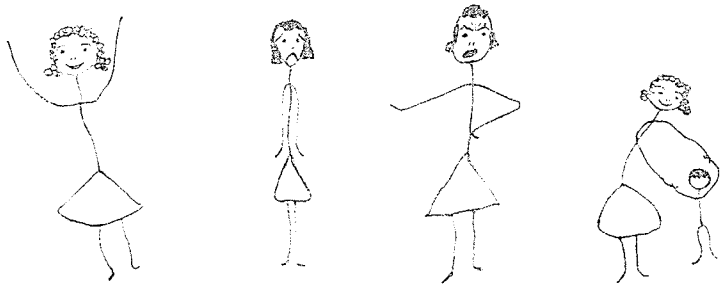

Figure 1a. Stick figures representing the four emotional states.

Actually, Dimitrovsky used two drawings to depict love because she felt that this emotion was the most difficult to portray pictorially. However, her one drawing for love

(wherein the woman and child were holding hands) was found to be far less satisfactory than the one shown above (McCluskey, 1974) and therefore deleted.

One important point about the stick figures is quite simply that children seem to like them and find them motivating. Pointing to a figure is an easy task, and even very young children have very little difficulty grasping the instructions and making their responses. In addition, previous work has shown that older subjects also respond well to the drawings (McCluskey, 1974). Things seem to go especially well with adults if the experimenter simply makes a point of mentioning that the task in question is to be given to individuals of various ages--including youngsters--and that the procedure must be identical for all subjects. When given this information, older subjects do not seem to react negatively to the drawings or think them silly. Thus, it becomes possible to give all subjects exactly the same instructions.

SPEECH SAMPLES

Three Canadian and three Mexican elementary school teachers, all female and all selected by their principal for their "sensitivity," were asked to express vocally the emotions of happiness, sadness, love, and anger. Each of these female teachers was between 25 and 35 years of age. Since the three teachers in each culture expressed each of the four emotional meanings, there was a total of 24 speech samples recorded. The order in which the four emotions were acted was randomized for each

speaker. However, it was stipulated that no more than two speakers could be asked to communicate the same emotion first. In addition, the order in which the emotions were expressed had to be different for all teachers.

To avoid artificiality arising from recitation of meaningless or neutral material, each Canadian teacher was allowed to say any two sentences (in English) that came to mind in an attempt to simulate each of the four emotions. Similarly, the Mexican teachers attempted to express the four emotional states in Spanish. Each speaker was asked to imagine a situation in which she felt extremely happy, sad, loving, or angry prior to attempting to simulate the appropriate emotion.

Emotional state was defined operationally partly by the recording of the speech samples. Each vocal expression was considered to communicate a particular emotional state simply because the speaker intended to express the emotion in question. Also, prior to filtering, the speech samples were played to and rated by ten male teachers (Canadian samples were rated by Canadian teachers and Mexican samples by Mexican teachers). Before any sample was included for use in the study, at least eight of the ten judges had to agree that the speaker was indeed communicating the emotion she intended to communicate.

After the 24 samples were recorded, they were arranged on tape in random order (with the restrictions that no emotion could appear more than twice in a row, no more than two speech samples from any one speaker could appear in succession, and

no more than two teachers from the same culture could show up in succession). The random arrangement of the 24 voice samples is outlined in Appendix III. Following this randomization procedure, the semantic content of the speech was removed by means of the electronic filtering device.

PROCEDURE

The procedure paralleled Dimitrovsky's (1964) methodology as closely as possible. All Canadian subjects in every age group were seen individually by the same Canadian experimenter (who of course gave the instructions in English). Similarly, all Mexican subjects were seen by the same Mexican experimenter (giving exactly the same instructions translated into Spanish). The experimental situation was as similar as possible in both countries.

Subjects in each age group were trained to associate each of the four pictorial representations with the appropriate corresponding emotional state. In other words, they were required to point to the happy woman, the sad woman, the angry woman, and the loving woman. This procedure was repeated until a criterion of two correct identifications of all four drawings was reached. No subject from either culture had any difficulty with this task.

Canadian subjects were told that they were going to hear the voices of ladies speaking from "far away," and that they would not be able to make out the words clearly. They were then given a slightly modified version of Dimitrovsky's (1964)

instructions, which read:

> You are going to hear different ladies say things in different ways. Some will sound happy, some sad, some angry, and some loving. Listen to each one and point to the lady it sounds like. Does it sound like the happy lady, the sad lady, the angry lady, or the loving lady?

All Mexican subjects were given exactly the same instructions in Spanish.

The filtered recordings were then played to subjects who made their 24 choices. After hearing each speech sample, each subject had a 10-second interval to point to the stick figure drawing that he thought best represented that particular vocal expression. Each response made by each subject to each stimulus was recorded. In the rare instances when a subject took longer than 10 seconds to respond, the tape was stopped until he made his judgment. No speech sample was played more than once. A more complete description of the instructions is presented in Appendix IV.

RESULTS

The raw data for this study (i.e., every response of every Canadian and Mexican subject to each speech sample at each age level) are presented in Appendix V. To test Hypotheses (1) and (2), the number of correct responses (scored against speaker's intent and judges' ratings) was computed for each subject. In order to derive the necessary error values, an analysis of variance containing seven levels of age, two levels

of culture of listener, two levels of culture of speaker, and four levels of emotion was performed on these data. The analysis, without F values, is summarized in Appendix VI.

Since directional hypotheses were indicated, tests were done by a priori (planned) comparisons in order to maximize power (cf. Hays, 1973; Kirk, 1969). In essence, the comparisons revealed that all four main effects were significant. When all subjects in both cultures were considered, tests of trend yielded significant linear ($F = 61.90$, $p < .01$) and quadratic ($F = 81.47$, $p < .01$) age trends. As well, overall planned comparisons revealed significant effects for culture of listener ($F = 25.35$, $p < .01$), culture of speaker ($F = 163.71$, $p < .01$), and emotion ($F = 9.51$, $p < .01$).

The mean scores for all age levels in both cultures are presented in Appendix VII and graphically in Figure 1b.

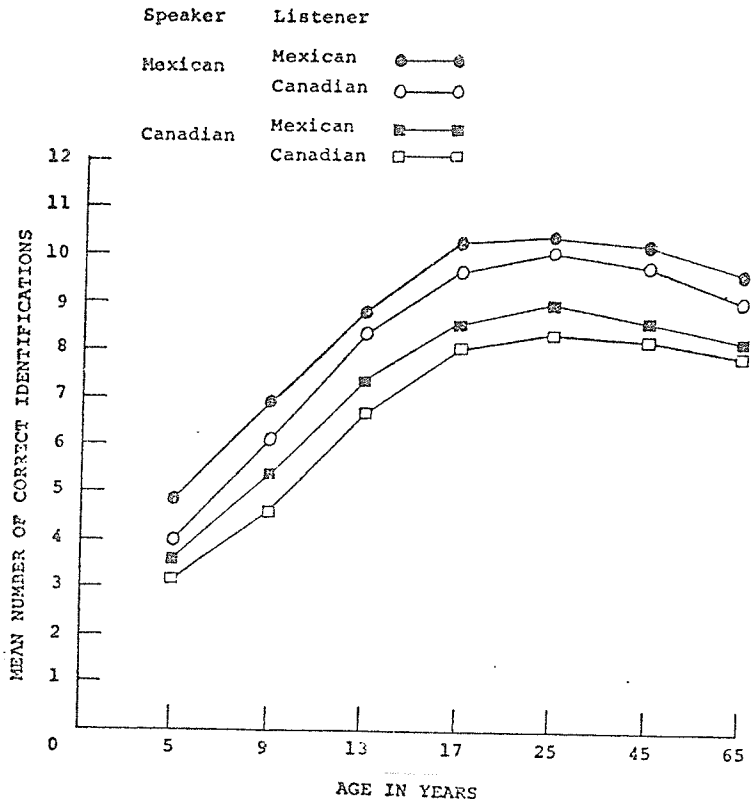

Figure 1. Mean number of correct identifications of Canadian and Mexican speech samples by Canadian and Mexican subjects at successive age levels.

Figure 1b, then, shows the responses of Canadian and Mexican subjects of various ages to the 12 vocal expressions simulated by Canadian speakers and to the 12 samples enacted by Mexican speakers. The significant age effect is accounted for by the gradual and progressive improvement in ability as subjects get older. From 5 through 25 years of age, there was an increase in accuracy from every younger to every older age level. At the 17-year-old level, however, there was a levelling off, and for the oldest age groups (i.e., the 45 and 65-year-olds), there was even a decrease in accuracy as compared to the performance of the 25-year-old group.

In terms of age effects, tests for trend (summarized in Appendix VIII) showed that subjects in general became more accurate with age in all four conditions shown in Figure 1b. That is, there were significant linear trends for Canadian subjects listening to Canadian speakers ($F = 30.50$, $p < .01$), for Canadian subjects listening to Mexican speakers ($F = 29.55$, $p < .01$), for Mexican subjects listening to Canadian speakers ($F = 24.81$, $p < .01$), and for Mexican subjects listening to Mexican speakers ($F = 26.13$, $p < .01$).

However, as Figure 1b indicates, scores do tend to level off with increasing age, peaking at 25 years and falling off somewhat thereafter. This decrease in sensitivity after 25 years of age appeared to be meaningful, as tests of trend (Appendix VIII) also revealed significant quadratic trends for Canadians listening to Canadian samples ($F = 31.05$, $p < .01$), Canadians listening to Mexican samples ($F = 45.30$, $p < .01$), Mexicans listening to Canadian samples ($F = 33.54$, $p < .01$), and Mexicans listening to Mexican speech ($F = 36.88$, $p < .01$).

As Figure 1b shows, the significant listener effect is accounted for by the obvious superiority of the Mexican subjects in ability to identify the emotional content of both Canadian and Mexican speech samples. Indeed, at every age level examined in the study, the Mexican subjects were more accurate in judging the emotional content of the voice samples than were the Canadians. Planned comparisons (summarized in Appendix IX) revealed that this cultural difference was significant at the 5-year-old ($F = 4.67$, $p < .05$) and 9-year-old ($F = 8.29$, $p < .01$) levels, but not at the 13 ($F = 3.69$, $p > .05$), 17 ($F = 3.69$, $p > .05$), 25 ($F = 2.43$, $p > .05$), 45 ($F = 2.07$, $p > .05$), and 65-year-old ($F = 2.07$, $p > .05$) levels.

Figure 1b also depicts the significant culture of speaker effect. Both Canadian and Mexican subjects were clearly more sensitive to the emotional content of the Mexican speech samples than to the Canadian speech. Planned comparisons (summarized in Appendix X) showed that both Canadian

subjects ($F = 80.30$, $p < .01$) and Mexican subjects ($F = 83.43$, $p < .01$) were more sensitive to the Mexican samples than to the Canadian speech.

With regard to the ability to judge specific emotions, an inspection of the scores outlined in Appendix XI reveals that the negative emotions of anger and sadness are judged more accurately than the positive emotions of happiness and love. Planned comparisons (summarized in Appendix XII that this is true in both the Canadian ($F = 4.17$, $p < .05$) and Mexican ($F = 5.37$, $p < .025$) cultures. A look at the total number of correct identifications presented in Appendix XI shows that anger is the emotion judged most accurately, followed by sadness, happiness, and love respectively.

A closer look at the table in Appendix XI, however, also shows that it is the younger subjects, not the older ones, who are judging the negative emotions more accurately than the positive emotional states. Planned comparisons (Appendix XII) revealed that, overall, the younger subjects aged 5 ($F = 4.27$, $p < .05$) and 9 ($F = 9.60$, $p < .01$) years did in fact make significantly more correct negative (angry and sad) than positive (happy and loving) judgments. This was obviously not the case in the adolescent (ages 13 and 17) and adult (ages 25, 45, and 65) groups.

The question arises as to whether this effect could be due to a response bias. To test for Hypothesis (3) in this regard, the number of negative responses made by each subject in the study was computed by summing his "angry"

and "sad" responses. If there is no response bias, subjects should make 12 negative (and 12 positive) responses when judging the 24 speech samples. If, on the other hand, a negative response bias exists, subjects should make significantly more than 12 negative judgments.

The negative responses of all subjects have been calculated on the raw data sheets included in Appendix V. An analysis of variance containing seven levels of age and two levels of culture of listener was performed on these negative response data. The analysis, summarized in Appendix XIII, yielded a significant age effect ($F = 10.74$, $p < .01$). The culture of listener and the interaction effects were not significant.

The mean negative response scores (out of a possible 24) at all age levels in both cultures are presented in Table 1.

Table 1. Mean number of negative responses by Canadian and Mexican subjects at successive age levels.

Age	Canadian Subjects	Mexican Subjects
5	14.00	14.13
9	13.93	13.87
13	12.40	12.86
17	12.00	12.13
25	11.87	12.00
45	11.93	12.07
65	12.80	12.60

Although it is evident that there is no pronounced cultural difference in negativity, Table 1 does illustrate the age effect clearly. As the means show, the younger subjects in both cultures exhibit a response bias, in that they make more negative than positive responses when judging the vocal expressions. Indeed, binomial estimates of probability reveal that the 5 and 9-year-olds (and no other age groups) in both cultures make significantly more negative judgments than positive ones ($p < .01$). Apparently, this tendency towards a negative response bias decreases and disappears with age.

To summarize, then, the major findings of the present study were: first, discrimination ability was a progressively increasing function of age from childhood through to the 25-year-old level. At this point, things seemed to level off, until eventually the 65-year-old group performed significantly more poorly than the other adult groups. Second, Mexican subjects were better able to identify the emotional content of speech than were the Canadians. Third, subjects of all ages in both cultures identified the emotional content of Mexican speech samples more accurately than Canadian samples. Fourth, younger subjects tended to make more correct identifications of negative than positive emotions. Since younger subjects tended also to emit more negative than positive responses, their apparent sensitivity to angry and sad voice samples would appear to be due simply to a negative response bias on their part.

DISCUSSION

The results of the present study support Hypothesis (1) and are in accord with previous findings of an increase in accuracy with age (Dimitrovsky, 1964; Fenster, 1967; Gates, 1927; McCluskey, 1974, McCluskey, Albas, Niemi, Cuevas, & Ferrer, 1975). Interestingly, the age trend was the same in both cultures; from 5 through to 25 years of age, Canadian and Mexican subjects showed a progressive increase in ability to identify the emotional content of filtered speech. It was also interesting to note that subjects tended to plateau and level off at the 17 through 45-year-old age groups. This finding is consistent with Rosenthal, Hall, DiMatteo, Roger, and Archer's (1979) work with the PONS test, which also showed that nonverbal decoding ability levelled off between 20 and 30 years of age. Even though there were some controls in terms of hearing and I.Q., it still appears that humans function less efficiently as they reach "old age." Certainly, the data here indicate, at least with respect to tone of voice, that 65-year-olds perform noticeably less accurately than the other adult groups.

Since Hypothesis (2) was also upheld (i.e., Mexican subjects of all ages judged the speech samples significantly more accurately than their Canadian counterparts), the results provide empirical evidence for the intuitive notion that Mexicans are generally more sensitive to the emotional content of communications than are Canadians. Since this difference does in fact hold true at every single age level examined, it

would seem that cultural differences in the vocal reception of emotion are established early in childhood and perseverate through to old age. As Baxter (1970) contends, cultural responses learned in childhood appear to have a lasting effect.

In addition, the data show that Mexican speakers communicated emotion more effectively than the Canadians (i.e., they were more frequently able to communicate what they intended). Although there were only three speakers from each country, this finding lends support to the idea that differences exist in the transmission (encoding) as well as in the reception (decoding) of affective information. Like Argyle (1975), who noted that Japanese are more sensitive to facial expressions from cultures other than their own, the results here show that Canadians are more accurate at judging speech from Mexicans than samples from other Canadians. Canadian speakers may simply be less expressive than Mexicans, or there may be a different code operating (i.e., a different "style" of expressing emotion). In any case, it does indeed seem to matter greatly "who communicates to whom" (cf. McCluskey, Niemi, & Albas, 1978).

It was also found that younger subjects made significantly more correct negative than positive judgments. However, this appeared to be due to a negative response bias on their parts; as predicted in Hypothesis (3), young subjects simply emitted more "sad" and "angry" than "happy" and "loving" responses. Although this finding supports some earlier work (Dimitrovsky, 1964; McCluskey, 1974), it contradicts the work of Fenster

(Fenster, 1967; Fenster & Goldstein, 1971), who found no evidence of a negative response bias in younger children. Actually, Fenster is quite critical of Dimitrovsky's work, suggesting that her results were due to a non-neutral standard paragraph (Her paragraph, "I'm going out now. I won't be back all afternoon. If anyone calls, just tell them I'm not here," supposedly evoked separation anxiety and negative feelings), differences in the socioeconomic classes of speakers (middle) and receivers (lower), and artifacts of the testing situation. However, despite external ratings, it doesn't seem that Fenster's material ("I am going out of the room now and I will be back later") is all that much less negative than Dimitrovsky's. And it's as likely that his results--rather than hers--are an artifact of the experimental situation. Certainly, other studies support the presence of a negative response bias in younger children (Bugental, Kaswan, & Love, 1970; McCluskey, 1974). The present research, which controlled for verbal content (through filtering) and social class, definitely supports the response bias point of view.

At this point in time, an extension of Fenster's (1967) own notion of "survival value" seems the best way to account for the tendency for young children to be "pessimistic" in their judgments. The idea is that if a child learns through experience that an error in recognizing the negative meaning of a communication can have serious consequences, he will tend to be negatively biased. For example, if a child fails to perceive a negative message, he is more likely to be punished

than if he does not understand a positive communication. When in doubt about a message, then, a child may "play it safe" as it were, and assume that the content is negative. As increasing age brings increasing sensitivity to tone (Dimitrovsky, 1964; Fenster, 1967; Gates, 1927; McCluskey, 1974), adults--more secure in their ability to respond accurately--have no need to exhibit the negative bias.

A note of caution--pointing out that the performance of subjects from one culture should not be viewed as being "better" or "worse" than that of subjects from the other--might be in order here. As Pike (1966) argues, to understand a particular system or culture, it is necessary to look at it from within (i.e., take an "emic" perspective) rather than from without (an external, "etic" view). In many ways, "better" and "worse" are etic and ethnocentric terms--"different" is perhaps more appropriate.

The findings here suggest that cultural differences in emotional perception are established early in life. Indeed, it may well be that Mexicans are more sensitive to speech because of learning experiences during socialization in childhood; the Mexican life style may simply be more "emotional" than that in Canadian society. Should this indeed be the case, the implications for international understanding (especially with respect to travelling, political negotiations, and the like) are self-evident. If, as this research suggests, people from different cultures interpret emotion in speech differently, effective cross-cultural communication may depend upon being

able to take another's emotional frame of reference (Hall, 1959; McCluskey, Niemi, & Ferrer, 1973; Mehrabian, 1972).

Obviously, it can be difficult to communicate between cultures. For one thing, tonal aspects of speech (such as pitch, strength, length, and pause) differ from language to language, and may create problems in cross-cultural communication (Key, 1975). With whites and Native Indians, at least, it appears that individuals from one culture are more adept at judging tonal affect from members of their own group (Albas, McCluskey, & Albas, 1976). Possibly, through socialization and historical twists of fate, the Mexican culture, language, or whatever has become more "emotional" than ours. For representatives of the two cultures to communicate effectively, then, it would be tremendously helpful for each to "take the place of the other" and try to become more aware of how the other reacts nonverbally and emotionally.

It may pay researchers to try to get more actively and pragmatically involved in improving intercultural communication through nonverbal training; for it has been shown that with practice subjects can become more sensitive to nonverbal cues (Rosenthal, Hall, DiMatteo, Rogers, & Archer, 1979). Already, nonverbal signals have been used effectively to help Spanish-speaking people learn to speak English, and vice versa (Johnson, 1976; Nine-Curt, 1976; Poyatos, 1972). Triandis (1975), going yet a step further in this regard, speaks of "cultural assimilators"--training devices designed to help individuals become more familiar with and more sensitive to

the attitudes, values, and communicative styles of people from other cultures. Work along these lines--aimed at improving intercultural communication--has a great deal of promise in terms of helping people from different cultures relate and communicate with each other in more realistic and meaningful ways.

STUDY II

PERCEPTION OF CONTRADICTORY SPEECH AS A FUNCTION OF AGE AND CULTURE

The age effect found in Study I has already been documented relatively frequently. Of more importance here is the fact that Mexican subjects were more accurate in judging the affective content of tone of voice than were their Canadian counterparts. It is also interesting to note that Mexican speakers were able to communicate the emotion they intended more accurately than the Canadian speakers. In other words, the cultural effect was pronounced for the both the transmission and reception of emotional content. Since cultural factors appear to be at work in the encoding and decoding of filtered information, it would seem logical to explore the effect of various other types of spoken messages, and to assess the impact of such messages on representatives of the two cultures in question.

Aside from nonmeaningful, standard content, and filtered speech samples, contradictory speech--in which the tone of voice is incongruent with the semantic meaning of the words actually spoken (e.g., "I love you," said in an "angry" tone) --is often used in communications research. For the most part, contradictory messages have been employed to evaluate the relative contribution of the verbal and vocal aspects of speech when both are present simultaneously. For example, Mehrabian and Wiener (1967) demonstrated that when vocal and verbal meaning were inconsistent, vocal cues tended to have the most impact. Specifically, a message wherein a positive single word was spoken in a negative tone (e.g., "honey" said negatively) was judged as being negative by the majority of

adult subjects. This same dominance of vocal over verbal signals has been noted by other researchers as well (Fujimoto, 1972; Starkweather, 1956). Along the same lines, there is evidence indicating some dominance of visual over vocal and verbal cues for adults and university students judging contradictory messages (Bugental, Kaswan, Love, & Fox, 1970; Levitt, 1962, 1964; Mehrabian & Ferris, 1967). For a more detailed discussion of this research, see Appendix I.

Similar investigations with children have also assessed the relative contribution of the various channels (in contradictory speech) across several age levels. Bohannon (1976) showed that while only 25% of kindergarten children could discriminate between normal and scrambled syntax (i.e, make less than five errors selecting a criterion picture from an array after listening to a stimulus sentence), 78% of grade two children were able to do so. Olsen (1967), by playing contradictory messages to children 5, 7, 9, 11, and 13 years of age, found that they responded to the verbal part of the message and discounted the vocal content. However, with age, his subjects did begin to show an increasing awareness for the subtle interaction between tonal and semantic information, such that the preference for verbal over vocal components of the message decreased somewhat as the children got older. On the other hand, Bugental, Kaswan, and Love (1970) showed that children 5 through 12 responded to the negative portions of "joking" or contradictory communications, and more or less ignored the positive aspects of the message.

Further, such contradictory communications were interpreted significantly more negatively by the children than by a group of adult subjects.

To put it succinctly, there are some very basic contradictions in the developmental literature to date. As mentioned earlier, for example, Dimitrovsky (1964) and McCluskey (1974)--along with Study I--indicate that children emit a greater frequency of negative responses when making emotional judgments than do adults, while Fenster (1967) and Fenster and Goldstein (1971) contend that there is no tendency on the part of children or adults to respond with a preponderance of either negative or positive judgments. This type of confusion extends into work dealing with contradictory communications as well. To illustrate, while Starkweather (1956), Mehrabian and Wiener (1967), and Fujimoto (1972) have shown that adults resolve verbal-vocal conflict in the direction of the vocal channel, Olsen (1967) contends that children faced with incongruent communication tend to accept the verbal message and ignore the tone of voice. And, in contrast, Bugental, Kaswan, and Love (1970) report that children resolve contradictory messages by accepting the negative elements of the communication while ignoring those that are positive.

Due to the overemphasis placed on determining the power of the specific communication channels, researchers have neglected a much more important question: what effect do contradictory messages have on children of various ages? Educators and clinicians have long insisted that it is a mis-

take to be sarcastic and inconsistent with youngsters, for sarcasm is a clear case of contradictory communication which many children just don't seem to understand (Bugental, Kaswan, & Love, 1970; Mehrabian, 1972). Indeed, the well-known double-bind hypothesis holds that an excess of contradictory communication from parents can cause their children to become schizophrenic (Bateson, Jackson, Haley, & Weakland, 1956; Weakland, 1960). Depsite such theorizing, however, there are only a handful of hard-core experimental studies which look at children's reaction to contradiction in a systematic fashion (cf. Bugental, Kaswan, & Love, 1970; Bugental, Love, Kaswan, & April, 1971; McCluskey & Albas, 1978; Mehrabian, 1972).

Unfortunately, more investigators thus far haven't really looked at things from the child's perspective. There is a need to know how children "feel" about contradictions in speech. The aim of the present study, then, was to undertake a direct examination of children's reactions to contradictory speech as a function of age. In the process, it was hoped that it would be possible to clear up some of the confusion concerning the relative importance of the vocal and verbal channels. Accepting that educators are quite likely correct in their belief that contradictory communications can be debilitating and confusing for young children in particular (Wood, 1976), and keeping in mind the double-bind hypothesis and the work of Bugental, Kaswan, and Love (1970) who feel that youngsters react more negatively to contradiction than adults, it was hypothesized that:

(1) children at all age levels would react more negatively to contradictory messages (in which words and tone are inconsistent) than to congruent messages (in which words and tone are consistent).

(2) younger children would interpret contradictory messages more negatively than older children.

It was also felt that it would be useful to study contradictory communication from a cross-cultural perspective. Even though Eibl-Eibesfeldt (1974) speaks of cultural universals with respect to territorial defense and commonality of greeting, and Izard (1971, 1977) and Ekman (Edman, 1970; Ekman & Friesen, 1971) make a strong case for the innateness and universality of certain facial expressions of affect, it is self-evident that emotional expression and various aspects of nonverbal communication vary from culture to culture (cf. Argyle, 1972; Benedict, 1959; Mehrabian, 1972). A more in depth discussion of this issue is presented in Appendix I.

More precisely, there are clear cultural differences in communication style between the Canadian (Anglo) and the Mexican (Latin) people (cf. Argyle, 1972; Baxter, 1970; Lewis, 1961; McCluskey, Niemi, & Ferrer, 1973; Mehrabian, 1972). It has been shown in pilot work that Mexican youngsters are more sensitive to the emotional content of tone of voice than their Canadian counterparts (McCluskey, Albas, Niemi, Cuevas, & Ferrer, 1975). And in Study I, across a much wider age range, Mexicans were again more sensitive than Canadians

at every age level. Since Mexican subjects do indeed appear to be more sensitive to tone of voice, it is possible that they might also be more sensitive to--and hence more affected by--contradictory communications. Therefore, it was expected that:

> (3) Mexican children at the various age levels would interpret contradictory messages more negatively than Canadian children of the same ages.

As mentioned previously, there are contradictions in the literature concerning which speech channel has the most impact on subjects making emotional judgments. However, there is some indication that children and adults respond differently to contradictory speech, with youngsters attending more to the semantic portion of the message (Olsen, 1967) and adults responding more to the tone (Fujimoto, 1972; Mehrabian & Wiener, 1967; Starkweather, 1956). Although other contradictory findings (regarding always responding in the direction of negativity) make it difficult to make a prediction here, Olsen's (1967) suggestion that subjects become more responsive to tone with age certainly seems quite plausible. As a consequence, it was expected that:

> (4) young children in both cultures would tend to accept the verbal content of contradictory messages, while older subjects would respond in the opposite manner.

METHOD

SUBJECTS

Eighty boys from the Lord Selkirk School Division #11, Selkirk, Manitoba, Canada, and 80 from schools in Colonia del Valle, Mexico City, Mexico, served as subjects. Twenty children from each country at each age level 5, 9, 13, and 17 took part. Half of these subjects (i.e., 10 from each country at each age) were assigned to the experimental group (hearing contradictory speech), while the other half comprised the control group (hearing congruent speech).

No child who was known to have behavioural or emotional problems or whose I.Q. was above or below the normal range was included in the sample. As in Study I, the hearing of all subjects was tested within normal limits. All subjects were chosen from "middle class" homes and schools.

CONTRADICTORY AND CONGRUENT SPEECH SAMPLES

In the contradictory condition, every speech sample was as contradictory as possible in terms of both activity and valence. That is, active ("happy" and "angry") sentences were expressed by speakers in passive ("sad" and "loving") tones, and passive ones in active tones. Similarly, positive ("happy" and "loving") passages were expressed in negative ("sad" and "angry") tones, and negative ones in positive tones.

For example, the first speaker was asked to recite "happy" words ("I feel so happy today") in a "sad" tone,

"angry" words ("I'm just so angry") in a "loving" tone, "sad" words ("I'm so sad now") in a "happy" tone, and "loving" words ("I love you, darling") in an "angry" tone. The other speakers recited comparable material. All 24 contradictory samples, with the verbal content and the tone in which each message was spoken, are listed in Appendix XIV.

Three Canadian and three Mexican bilingual teachers (again slected for their "sensitivity") were each asked to record four specific speech samples in English (for a total of 24 samples) for the Canadian subjects in the contradictory condition (i.e., for the experimental group). Each speech sample recorded by each teacher was different, and each was contradictory.

For the Mexican subjects also in the contradictory condition, the 24 English speech samples were translated directly into Spanish and the same six bilingual teachers (three Canadian and three Mexican) were asked to record these in the same contradictory manner. Using a procedure similar to that outlined by Bugental, Love, Kaswan, and April (1971), the verbal (typescripts) and the tonal (filtered samples) aspects of speech of both the Canadian and Mexican vocal expressions were rated by judges to insure that they were truly contradictory. That is, judges (10 teachers) in Canada rated the English samples with respect to verbal and vocal content. For the verbal content, they simply read typescripts of the words spoken and rated them as positive or negative. For tone, they heard the speech samples after the verbal content had been removed by

the electronic filter, and again rated the message as positive or negative. For every contradictory sample used in the study, 8 of 10 judges had to rate the verbal and vocal content as being incongruent. The same procedure was followed in Mexico (using 10 Mexican teachers as judges) to rate the Spanish samples.

In contrast, in preparing speech samples for the Canadian children in the congruent condition (i.e., for the control group), the same Canadian and Mexican bilingual speakers were asked to enact the same verbal messages in a congruent fashion (e.g., "I feel so happy today" said in a "happy" tone, "I'm just so angry" said in an "angry" tone, etc.). For the Mexican subjects also in the control condition, these samples were translated and recorded in Spanish in the same congruent manner. The congruent samples were also rated by the judges (teachers) in each culture to make certain that the words and tone were indeed consistent.

PROCEDURE

All Canadian boys in every age group were seen individually by the same Canadian experimenter, while all Mexican subjects were seen by a single Mexican experimenter. In an attempt to control for differences in language and reading ability, all subjects in the study were required to make their identifications of speech samples by pointing to one of four stick figure drawings that represented the four emotional states in question (i.e., happiness, sadness, love, and anger).

The stick figures used were identical to those described and illustrated in Study I.

As before, subjects in each group were trained to associate each of the four stick figure drawings with the appropriate corresponding emotional state (see Appendix IV). They were then told that they were going to hear the voices of ladies speaking, and were asked to indicate how the speech samples made them feel ("Does this lady make you feel happy, sad, loving, or angry?). All speech samples were, of course, arranged and presented in random order.

The testing situation was as similar as possible in both countries. Canadian and Mexican children in the experimental group heard the contradictory speech samples while Canadian and Mexican subjects in the control condition heard the congruent recordings. After listening to each speech sample, each subject had 10 seconds to point to the stick figure drawing of his choice.

RESULTS

The number of negative responses made by each subject was computed by summing his "angry" and "sad" responses. These raw data are presented in Appendix XV. To derive the appropriate error terms, an analysis of variance, containing four levels of age, two levels of type of speech, and two levels of culture of listener, was performed on these negative response data. The analysis is summarized, without F

values, in Appendix XVI.

In order to maximize power, planned comparisons were performed on the data to test Hypotheses (1), (2), and (3). These a priori comparisons yielded significant effects for type of speech, age, and culture of listener.

More specifically, the mean negativity scores for all age levels in both cultures (extracted from Appendix XV) are presented in Figure 2a.

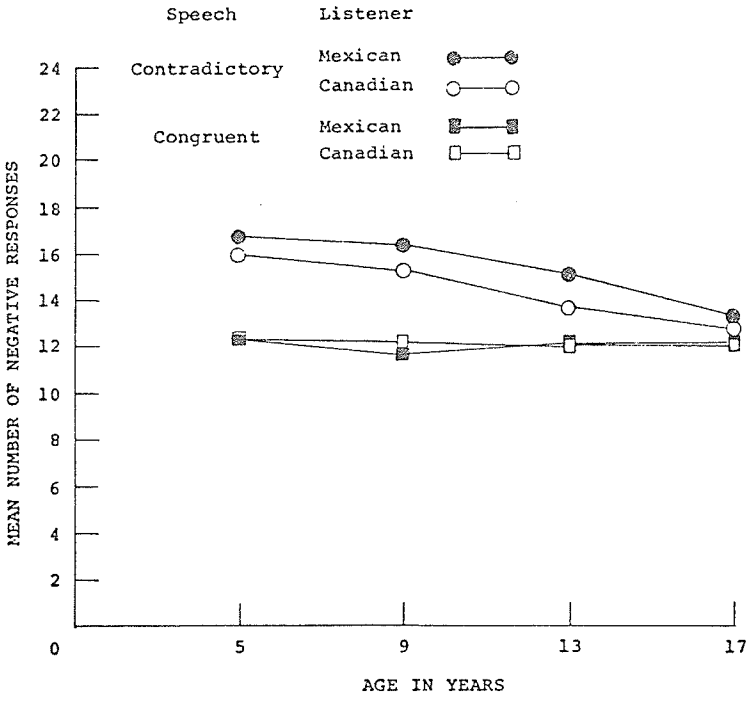

Figure 2a. Mean number of negative responses emitted to contradictory and congruent speech as a function of age and culture.

As the figure shows, the significant type of speech effect is accounted for by the fact that subjects at every age level made more negative responses to contradictory than to congruent speech. Planned comparisons (summarized in

Appendix XVII) revealed that the contradictory speech was judged much more negatively than the congruent speech samples by both the Canadian ($F = 40.17$, $p < .01$) and Mexican ($F = 86.40$, $p < .01$) subjects. For the Canadians, the tendency to view contradictory samples negatively was significant at 5 ($F = 25.71$, $p < .01$), 9 ($F = 17.85$, $p < .01$), and 13 ($F = 5.73$, $p < .025$) years of age, but failed to reach significance at the 17-year-old level ($F < 1$). Similarly, with the Mexican subjects, this negative view of contradiction was significant at ages 5 ($F = 38.40$, $p < .01$), 9 ($F = 41.97$, $p < .01$), and 13 ($F = 17.85$, $p < .01$), but not at 17 years of age ($F = 2.86$, $p > .05$).

Another inspection of the means in Figure 2a shows that the age effect is due to the fact that younger children respond more negatively to contradictory speech samples than do the older ones. Tests for trend (summarized in Appendix XVIII) revealed linear trends in this regard for both Canadian ($F = 24.88$, $p < .01$) and Mexican ($F = 26.23$, $p < .01$) subjects in the contradictory condition. That is, the younger the age, the more negative the response to the contradictory speech samples under consideration. In contrast, there were no linear age trends found in the congruent condition, since subjects responded similarly at all age levels. There were no quadratic trends evident in either the contradictory or congruent conditions.

With respect to the culture of listener effect, Figure 2a shows that Mexican subjects are in fact more negative towards contradictory samples than Canadians of corresponding age. At a subjective level, the Mexicans, (especially in the youngest group) were noticeably more disturbed by contradictory messages, often looking annoyed, confused, and occasionally even crying when listening to them. And empirically, while planned comparisons (summarized in Appendix XIX) showed no differences in the congruent condition, Mexican subjects did in fact emit significantly more negative responses than did Canadian subjects in the contradictory condition ($F = 7.54$, $p < .01$).

As well, it was possible to look at the responses of the subjects in the contradictory condition in still more depth. Since in contradictory speech tone is negative when the verbal content is positive, and vice versa, it is impossible to say whether or not any particular response is right or wrong per se. However, it is certainly possible--in a somewhat arbitrary fashion--to score each response correct or incorrect against tone of voice (e.g., when "happy" words are said in a "sad" tone, the message is considered to be "sad").

The raw data (individual, total, and mean scores) scored in this manner are presented below in Table 2.

Table 2. Individual, total, and mean correct responses (scored against tone) for Canadian and Mexican subjects at the various age levels in the contradictory condition.

	Canadian Subjects				Mexican Subjects			
Age	5	9	13	17	5	9	13	17
	7	7	12	10	10	8	13	17
	5	8	14	15	6	10	10	14
	5	7	15	12	6	11	12	11
	3	8	9	16	8	8	10	12
	8	6	10	11	9	12	15	15
	4	10	16	13	5	7	17	14
	5	5	13	14	5	8	13	16
	3	8	14	11	6	9	12	13
	4	7	11	14	8	10	12	18
	6	9	10	15	6	9	16	14
Total	50	75	124	131	69	92	130	144
$\bar{X}$	5.0	7.5	12.4	13.1	6.9	9.2	13.0	14.4

To test Hypothesis (4), an analysis of variance was performed on the number of correct responses (scored against tone). The analysis, summarized in Appendix XX, yielded significant age ($F = 71.35$, $p < .01$) and culture of listener ($F = 10.06$, $p < .01$) effects. As the means in Table 2 show, the culture of listener effect is due to the fact that Mexicans at all ages are more sensitive to tone than Canadians. Interestingly, however, subjects in both cultures tend to score more accurately (against tone) with increasing age. The age effect, then, is accounted for by the fact that while younger children are less influenced by tone, older ones seem more sensitive to it. Younger children, it appears, go more for the words; but with increasing age the tonal characteristics of speech take on more and more importance.

DISCUSSION

The results of this study support Hypothesis (1), in that the contradictory communications seem to affect subjects in a negative way. That is, although subjects have no trouble responding to congruent speech where words and tone agree (naturally, they respond negatively to negative messages and positively to positive ones), they emit significantly more negative than positive judgments when hearing contradictory passages. This finding is consistent with the earlier work of Bugental, Kaswan, and Love (1970), and provides some support for the double-bind hypothesis. Since children seem to have such a distaste for contradiction, it is not illogical to conjecture that an excess of incongruency might have a noticeable effect on them. Although no attempt was made here to link contradiction and disturbance, the results are suggestive and worthy of additional research. In fact, in Study III an attempt is made to look more closely at this issue, and to consider the variable of disturbance directly.

As predicted in Hypothesis (2), it was also found that younger children reacted more negatively to contradiction than did the older ones. It seems likely that during the developing childhood years, individuals are more "vulnerable" to inconsistencies in speech. This finding has all sorts of ramifications for the teaching profession, providing some solid experimental data in support of the hitherto intuitive notion that sarcasm is confusing for youngsters. Educators insisting that sarcasm has no place in primary classrooms quite

likely has a valid point. These data, in fact, also have implications for child rearing itself. It would appear obvious that being consistent on all communication channels (i.e., avoiding sarcasm and contradiction) might be tremendously important in communicating with children, especially the younger ones.

The results at hand also support Hypothesis (3), in that Mexican subjects reacted more negatively to contradictory speech than Canadians. Although Mexicans are often stereotyped as such a "happy" people, this may not necessarily be the case. It is possible that they are decidely more extreme, however, and that they are, in effect, more "happy" and more "sad." Certainly here, the Mexicans were more sensitive (and reacted more negatively) to contradictions than Canadians. It appears conceivable that, through learning and socialization, the Mexican culture and language have become "more emotional" than ours. Differences in the style of the mother-child relationship in the two cultures may be a contributing factor in creating such differences in "emotionality" (Hoppe, Kagan, & Zahn, 1977; Madsen & Kagan, 1973). In any case, it seems realistic to suggest that, due to a greater sensitivity to nonverbal and vocal cues, Mexican children may be more aware of--and consequently more vulnerable to--contradictory messages in speech.

Since Hypothesis (4) was upheld as well, these results would seem to resolve some of the controversy as to which speech channel has the most impact on subjects making emotional

judgments. As Olsen (1967) tentatively suggested, there is an age difference operating, with young children--apparently inaccurate and unsure in their tonal judgments--relying heavily on the information communicated through words and language. This could be part of the reason why youngsters don't understand sarcasm; they are simply unable to pick up (or afraid to rely on) the subtle nuances and inflections in tone. Older individuals, however, become more sensitive and give more weight to the vocal channel. In short, in this study, younger children responded more often to the words while tone predominated for older subjects. It appears then, that much of the controversy in the area has been due simply to the fact that people respond differently to speech at different ages.

STUDY III

PERCEPTION OF CONTRADICTORY, DOUBLE-BIND SPEECH BY NORMAL AND DISTURBED CHILDREN OF VARIOUS AGES

Contradictory messages clearly had a marked effect on subjects participating in Study II. Specifically, it appeared that Mexicans were more sensitive and vulnerable to contradiction than Canadians, and that younger subjects (in both cultures) were more affected than older ones. Certainly, the contradictory samples had an impact, such that subjects in general reacted significantly more negatively to them than they did to the congruent speech.

Having found this overall type of speech effect, there is a need to probe and examine contradiction in speech still further. Indeed, following the direction of other investigations in the area, it would seem appropriate at this point to make a more overt attempt to link contradictory, double-bind type speech with emotional "abnormality". Keeping in mind double-bind theory in general, it might be helpful to move away from cultural variables somewhat, in order to begin to explore emotional factors and "disturbance" to some degree.

An excess of incongruent communication from parent to child is thought by some to be involved in the etiology of abnormal behaviour. Specifically, the double-bind hypothesis has been proposed to account for the origin of schizophrenia (Bateson, Jackson, Haley, & Weakland, 1956). In brief, the theory is that a parent, usually the mother, says one thing to the child with words, while communicating something quite different on the nonverbal level. The contradictions in the message are hidden, inhibited, or denied in some manner, and any attempt by the child to point out the conflicting nature

of the communication simply leads the mother to deny any incongruity.

Supposedly, a child is placed in an ambivalent and confusing situation, referred to as a double-bind, when he/she is subjected to such incongruent communication. According to Bateson, Jackson, Haley, & Weakland (1956) and Weakland (1960), continued exposure to ambiguous messages of this sort can cause the child to develop schizophrenic behaviour patterns. For a more complete discussion of this theory, refer to Appendix I.

After the double-bind hypothesis was first proposed, there was something of a bandwagon effect. Unfortunately, the double-bind--being essentially a subjective, clinical concept --was difficult to come to grips with experimentally. Early research was discouraging (Ciotola, 1961; Loeff, 1966; Potash, 1965; Ringuette & Kennedy, 1966), and, in his complete and comprehensive review, Schuham (1967) concluded that the very existence of the double-bind was open to serious question. More recently, however, fruitful data have been produced, and ingenious attempts have been made to relate psychopathology and parental use of contradictory communication (Beakel, 1971; Beakel & Mehrabian, 1969; Bugental, Love, Kaswan, & April, 1971; Olsen, 1967).

In a study of major importance, Bugental, Love, Kaswan, and April (1971) prepared videotapes of parent-child communication in "normal" families and in families containing a "disturbed" child. In their investigation, a "disturbed"

child was one referred by school authorities as exhibiting emotional or behavioural difficulties. Adult judges rated these videotaped communications with respect to verbal, vocal, and visual content. It was found that a significantly greater proportion of mothers of "disturbed" children emitted conflicting, contradictory communications than did mothers of the "normal" children. Although this finding is consistent with the double-bind hypothesis, it suggests that contradictory communication on the part of the mother could be central to the causation of pathology in general, and not limited specifically to schizophrenia. In other words, it seems appropriate to "soften" the hypothesis and move beyond merely looking at schizophrenia alone. Simply examining the effects of contradictory, binding messages--rather than searching for a link with schizophrenia--represents pragmatic and meaningful research in its own right. A more thorough discussion of this issue is again presented in Appendix I.

In earlier investigations, it has been found that children show a marked improvement with age in ability to identify words, tone, facial expression, and other nonverbal information (Brown, 1973; Dale, 1972; Dimitrovsky, 1964; Fenster, 1967; Gates, 1927; McCluskey, 1974; McNeill, 1970; Wood, 1976). Powerful developmental trends have been clearly identified in these areas, yet, with a handful of exceptions (Bugental, Kaswan, & Love, 1970: Bugental, Kaswan, Love, & Fox, 1970; McCluskey & Albas, 1978; Olsen, 1967), age has been essentially ignored as a variable in double-bind research. It seems

appropriate, then, to look at the double-bind hypothesis from a developmental perspective, especially since the few studies looking at age and the double-bind have supported the possibility of developmental differences.

In many ways, the design of this study was similar to that in Study II. However, the aim was to focus more on the double-bind, and to examine "disturbance" rather than culture (i.e., rather than Canadian and Mexican youngsters, the subjects were "normal" and "disturbed" children). As well, to zero in still more on the "feelings" of the children, the measuring instrument and other aspects of the investigation were changed and extended considerably.

For the same reasons outlined earlier, it was again hypthesized that:

> (1) children at all age levels would react more negatively to contradictory mesages than to congruent messages.
>
> (2) younger children would interpret contradictory messages more negatively than older children.

There is some research to suggest that children dislike contradiction, and that they are, in fact, disturbed by it (Bugental, Kaswan, & Love, 1970; Bugental, Kaswan, Love, & Fox, 1970; Bugental, Love, Kaswan, & April, 1971). If the redefined, loosened version of the double-bind is tenable, and inconsistent communication indeed involved in the causation of "disturbance", it would not be unreasonable to expect

"disturbed" children to react negatively to contradictory messages (that supposedly played a part in the etiology of their problems in the first place). Consequently, for the purposes, here, it was also hypothesized that:

> (3) "disturbed" children at various age levels would interpret contradictory messages more negatively than "normal" children of the same ages.

METHOD

SUBJECTS

Sixty boys from the Lord Selkirk School Division #11, Selkirk, Manitoba, Canada, served as subjects in this study. Twenty subjects were at the grade 2 level, 20 at the grade 4 level, and 20 in grade 6. Half of the children at each grade level (i.e., 10) were classified as "normal", while the other half were considered to be "disturbed". Every child included in the "disturbed" group had been identified as a behaviour problem in school, and had gone through the standard referral process (i.e., classroom teacher to resource teacher to principal to outside personnel). And in every case, special service personnel within the school division (psychologist, co-ordinator of special education, etc.) and/or personnel from outside agencies (e.g., Health and Community Services, Children's Hospital of Winnipeg, Child Guidance Clinic of Greater Winnipeg, the Selkirk Hospital for Mental Diseases, etc.) had to concur that the child in question was emotionally

or behaviourally "disturbed". "Normal" subjects, on the other hand, were functioning well at home and at school, and had never been referred for any reason.

No child participating in the study had an I.Q. above or below the normal range (90-110). Scores on various intelligence tests (e.g., Wechsler Intelligence Scale for Children, Stanford-Binet, Peabody Picture Vocabulary Test, Quick Test, Slosson Intelligence Test, and various group tests) were already on file for most students. When no recent score was available, resource teachers were asked to run a quick screening test (i.e., Peabody Picture Vocabulary Test or Quick Test). Also, the hearing of all subjects used in the study was tested within normal limits by the division's hearing clinician. In addition, no subject participating in the study was reading more than one year below grade level (as measured by the Reading Comprehension section of the Peabody Individual Achievement Test).

SPEECH SAMPLES

The congruent and contradictory speech samples recorded by the Canadian teachers for Study II were used again here. That is, there were a total of 12 congruent and 12 contradictory messages (i.e., 3 teachers x 4 emotional states). These 24 speech samples were arranged in random order on a single tape.

PROCEDURE

A within subjects design was used, with each subject serving as his own control. That is, all "normal" and "disturbed" children in each grade heard all the contradictory as well as all the congruent messages. After the tape with the 12 contradictory and 12 congruent stimuli was presented, each child was asked to respond to each sample. In an effort to get more into each child's "feelings" and emotional frame of reference, a measuring instrument developed by Buck (1975) was adapted and used here. Other similar instruments have proven quite successful with children in the past (cf. Hogan, 1975). Very simply, every child heard each speech sample, and was then asked to point to one of the faces shown below:

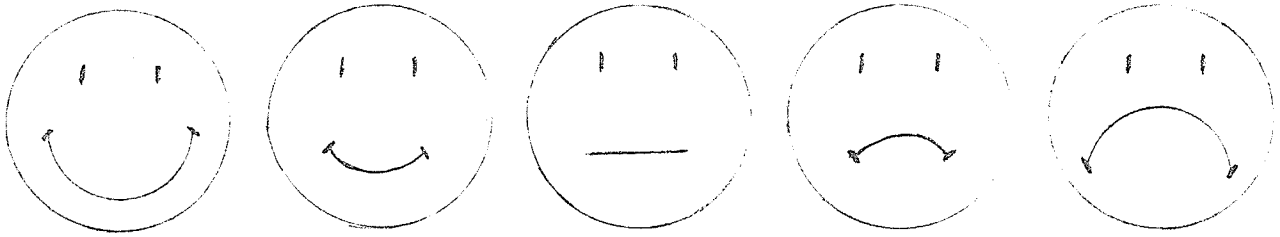

Figure 3a. Faces (and numerical weightings) representing the emotional reactions to the speech samples.

The actual instructions read as follows:

You are going to hear ladies speaking.

> Listen to each one and point to how the lady makes you feel. If you really like what she says and it makes you feel very happy, point to this face (experimenter points to the face on the extreme left). If what she says makes you feel a little bit happy, point to this face (experimenter points to points to the face just left of centre). If you really don't like what she says and it makes you very sad, point to this face (experimenter points to the face on the extreme right). If what she says makes you feel a little bit sad, point to this face (experimenter points to the face just right of centre). And if you feel nothing or aren't sure about what she says, point to the middle face (experimenter points). There are no "right" or "wrong" answers. I only want to know how you feel about what the ladies are saying.

RESULTS

The five-point scale with assigned numerical weights makes it possible to get at the degree of negativity in children's responses to the speech samples. Hypothetically, if a child reacted in a neutral manner to all stimuli, he would obtain an overall score of 72 (i.e., 24 x 3). If he responded negatively, his score would be higher, while if he responded positively it would naturally be lower. In each of the two conditions, a neutral score would be 36 (i.e., 12 x 3). Again, the higher the score--to a maximum of 60 (i.e.,

12 x 5)--the more negative the response.

A score was computed for each subject (by summing the numerical values of his responses) for the congruent and for the contradictory samples. These raw data (along with the means) are presented in Appendix XXI. To derive the appropriate error terms, an analysis of variance with repeated measures, containing three levels of age, two levels of type of speech, and two levels of listener, was performed on these data. The analysis is summarized in Appendix XXII. A priori comparisons were performed on the data to test Hypotheses (1), (2), and (3). These yielded significant effects for type of speech, age, and type of listener. Specifically, the mean scores for both "normal" and "disturbed" children at the three grade levels are presented graphically in Figure 3b.

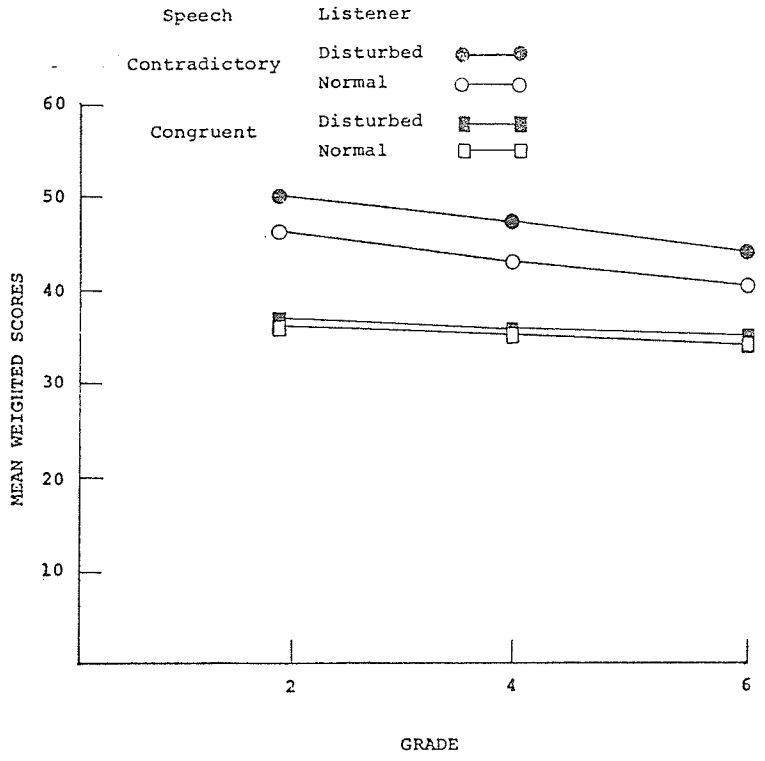

Figure 3b. Mean weighted scores to congruent and contradictory speech as a function of age and type of subject.

As the figure shows, the type of speech effect is due to the fact that subjects judge the contradictory speech more negatively than the congruent samples. Planned comparisons (summarized in Appendix XXIII) showed that this negative reaction to contradiction occurred in both the "normal" ($F = 51.63$, $p < .01$) and "disturbed" ($F = 111.30$, $p < .01$) populations. Further comparisons revealed that, for the "normal" subjects, this negative reaction was significant at the grade 2 ($F = 32.65$, $p < .01$), grade 4 ($F = 16.59$, $p < .01$), and grade 6 ($F = 7.07$, $p < .025$) levels. Similarly, this effect was also significant for the "disturbed" subjects at the grade 2 ($F = 54.92$, $p < .01$), grade 4 ($F = 39.43$, $p < .01$), and grade 6 ($F = 21.00$, $p < .01$) levels.

In terms of the age effect, Figure 3b shows that, in the contradictory condition, younger subjects are more negative than older ones. In the contradictory condition, then, tests of trend (summarized in Appendix XXIV) yielded significant linear age trends in the case of both the "normal" ($F = 7.00$, $p < .01$) and "disturbed" ($F = 6.13$, $p < .025$) subjects. No such linear trends were found in the congruent condition. Further, no significant quadratic trends were found in either the contradictory or congruent conditions.

Figure 3b also reveals that "disturbed" children reacted more negatively to contradiction than "normal" youngsters. While there were no differences in the congruent condition, planned comparisons (summarized in Appendix XXV) showed that "disturbed" boys responded to contradictory samples significantly more negatively ($F = 7.89$, $p < .01$) than did the "normals".

DISCUSSION

As implied earlier, the five-point scale permits a more precise differentiation of degree of sensitivity than did the stick figures used in the first two studies. In other words, this scale permits subjects to respond more negatively to some samples than to others. After Study II, it was no surprise that Hypotheses (1) and (2) were supported here. It appears quite definite that subjects do view contradictory speech in a negative fashion. And the age effect is clearly well-established, with younger children again reacting most negatively. It may be that children become more aware of the inconsistencies in contradictory speech as they grow older, perhaps gaining an understanding of and an "immunity" to such messages with age.

Of more interest here, however, was the fact that--as predicted in Hypothesis (3)--"disturbed" children were more affected by contradictory speech (i.e., viewed it more nega-

tively) than "normal" youngsters. In the first place, this finding provides solid support for the (redefined) double-bind hypothesis. Since "disturbed" children are so sensitive to contradiction, it is not unreasonable to suppose that such contradiction might have had a hand in causing the disturbance. At the very least, these results are thought provoking, and should provide something of a foundation for future research.

One possibility might be to examine in more detail what physical characteristics of tone are involved in contradiction. And in addition to analyzing the speaker's voice, it could be useful to measure the verbal and vocal responses of the listener to various speech samples. Mahl (1956) argued that since anxiety disrupts all ongoing behaviour, anxious individuals would exhibit many pauses and hesitancies in their speech. Indeed, Mahl (1956) managed to demonstrate that clients in psychotherapy respond with higher silence quotients (the proportion of time available to an individual during which he is silent) during high-anxious phases of the sessions than during low-anxious ones.

In forthcoming research with contradiction, each subject's comments throughout the session could be recorded on tape and examined by content analytic methods. One advantage of analyzing the verbal content (of the words actually spoken by the subjects) and the tonal information (in terms of pauses, interruptions, etc.) is that children would be allowed really to express themselves rather than merely point.

And it may well be that if contradictory communications disturb, upset, or make the children anxious to any marked degree, they may in fact exhibit more silence pauses or interruptions of continuity when listening to this type of speech. In any case, the notion of applying content analytic techniques to voice samples from speakers and listeners is worthy of serious consideration in the near future.

The findings at hand also have important implications for teaching and parenting. For one thing, it would seem logical to use all channels in order to improve communicative effectiveness. Naturally enough, if a communicator uses all channels in combination rather than single ones, interpretation accuracy on the part of the receiver is much higher (Archer & Akert, 1977). Further, if youngsters dislike and are confused by contradictory messages, adults should simply avoid directing too many their way. Both at home and at school, consistency in communication would appear to be the key. If one wants to positively reinforce a child, a happy facial expression and pleasant tone of voice should be coupled with positive verbal content. And if one is angry, it might be best to be annoyed on the verbal, vocal, and visual channels simultaneously. Certainly, if the results of the present research are any indication, parents and teachers would be well advised to avoid using an excess of sarcasm or contradiction when dealing with young children.

SUMMARY

The results of Study I were consistent with earlier findings in showing a pronounced age effect, such that subjects' ability to judge the emotional content of filtered speech tended in general to improve with age. This ability to glean affective information from tone did level off, however, with older subjects (particularly the 65-year olds) functioning less efficiently than "young" adults.

Study I also showed a marked culture effect, in that Mexican subjects were better able to judge the speech samples than Canadians of corresponding age. In fact, there was a speaker (as well as a listener) effect. That is, Mexican communicators were able to transmit the emotion they intended more accurately than the Canadian speakers. These findings, then, supported the intuitive notion that Mexicans are generally more sensitive to nonverbal cues than are Canadians. Interestingly, this "superior" sensitivity seemed to perseverate to some extent from childhood through to retirement age.

Clear differences in attitude and language obviously exist between Mexicans and other North Americans. And certain nonverbal "gestural" differences have been well-documented as well. However, it is interesting to note that the cultural differences appear to extend to even the nonverbal tonal level. The fact that there were such subtle differences between Canadians and Mexicans in both the transmission and reception of affect in tone has important implications for

cross-cultural communication and international understanding.

Having found a cultural difference in sensitivity to filtered vocal expressions, it seemed appropriate to attempt to examine other types of speech. In Study II, then, Canadian and Mexican subjects listened to contradictory speech (where the tone of voice was incongruent with the words spoken) and to congruent speech (in which the words and tone were consistent). A definite speech effect was found, such that subjects from both cultures reacted significantly more negatively to contradictory than to congruent samples. This finding was again consistent with earlier theory and research, and provided some support for the idea that contradictory, double-bind type messages can have a negative effect on the receiver.

As expected, Canadian and Mexican subjects both responded more negatively to contradiction at younger ages. In other words, while older children appeared to be more sensitive to the tonal portion of contradictory messages (and thereby gain some "immunity" from them), younger subjects viewed contradiction in speech in a very negative manner. This age trend has implications for parenting and teaching, and suggests that it would be beneficial to avoid sarcasm and incongruency when communicating with younger children.

Also, Mexican subjects in Study II viewed contradictory speech more negatively than their Canadian counterparts. It seemed possible that through learning, socialization, or whatever, Mexicans have become more "emotional" and more

sensitive to nonverbal signals than have Canadians. This cultural difference in sensitivity may have been operating in the contradictory condition, making Mexicans more aware of (and more vulnerable to) inconsistencies between tone of voice and verbal content.

In Study III, an attempt was made to explore the relationship between contradictory, double-binding speech and emotional "disturbance". The speech samples used were the same employed in Study II, but here the congruent and contradictory messages were played to "normal" and "disturbed" children. Again, there were age and speech effects. And, in addition, there was a type of subject effect, with "disturbed" children reacting noticeably more negatively to contradiction than "normal" youngsters.

This result was interpreted as being generally supportive of a softened, redefined view of the double-bind hypothesis. In other words, since the "disturbed" children were so extremely sensitive and negative towards contradictory messages, it was logical to conjecture that such messages may have had a part to play in the etiology of the "disturbance" in the first place. While such conclusions are speculative in many respects, the findings in Study III were suggestive, and again emphasized the importance of refraining from "bombarding" youngsters with an excess of potentially debilitating contradictory communications at home and at school.

APPENDIX I

REVIEW OF THE LITERATURE

NONVERBAL COMMUNICATION

Although intensive empirical investigation of the phenomenon is in some way a product of the twentieth century, nonverbal communication has of course been with us from antiquity. Obviously, before the onset of spoken and written language, man--like the animals--must have communicated almost entirely via nonverbal signals and gestures. As Darwin (1904) pointed out when he first raised the issue (and set off a storm of controversy) in *Descent of Man* in 1871, nonverbal cues are indispensable to communication in the animal kingdom. And even though they are supplemented by verbal input in human communication, it is now almost universally accepted that nonverbal signals such as facial expression, eye-contact, proximity, posture, gestures, and tone of voice play an integral part in any face-to-face interaction among individuals.

Philosophers and writers have often shown remarkable insight and appreciation for the nonverbal elements in communication. Socrates, for example, left little doubt concerning the importance he placed on facial and kinesic cues by observing that: "Nobility and dignity, self-abasement and servility, prudence and understanding, insolence and vulgarity, are reflected in the face and in the attitudes of the body whether still or in motion" (*Xenophon, Memorabilia III*). Shakespeare was another who consistently drew attention to both facial expression and tone of voice. Witness the lines: "Your face, my thane, is as a book where men may read strange matters" (*Macbeth, Act I*), and "I understand a fury in your words but

not the words" (*Othello, Act IV*).

Other sensitive writers and observers have shown a similar nonverbal awareness, as it were. In *The Adventures of Huckleberry Finn*, Mark Twain has Huck give himself away while masquerading as a girl by closing his legs to catch a falling object (as a boy would) rather than opening them to catch it in the folds of the dress (female style). Oscar Wilde, hinting at the more "risqué" aspects of nonverbal communication, has observed that "Dancing is the vertical expression of a horizontal desire." And Conan Doyle's master sleuth, Sherlock Holmes, relied extremely heavily on nonverbal cues in his entertaining investigations. In Holmes' words: "By a man's fingernails, by his coat sleeve, by his boots, by his trouser-knees, by the callosities of his forefinger and thumb, by his expression, by his shirt-cuffs--by each of these things a man's calling is plainly revealed. That all united should fail to enlighten the competent enquirer in any case is almost inconceivable."

In some ways, this sort of anecdotal observation of nonverbal communication is as relevant as hard-core empirical data. Since nonverbal communication occurs on an ongoing basis in the real-world, sensitive observations of real-life nonverbal events represent a meaningful and effective way to gain some understanding of this concept.

Unfortunately, a number of "how to" books have recently appeared on the scene in an obvious attempt to "cash in" on the mystique of nonverbal communication (Cundiff, 1972;

Moulton & Held, 1976). Such books can affect and damage the literature in the area, in that they often tend to be exploitive and misleading. However, some "popular" books on the topic do nevertheless have something to offer. For example, although of the same genre in certain respects, Fast's (1970) immensely popular *Body Language* does in fact contain some penetrating and intriguing nonverbal insights.

Much more valuable are those works that combine sensitive observation of meaningful events with scientific objectivity and methodological care. Occupying an important position in the literature are a number of unique books by the sociologist Erving Goffman (1959, 1961, 1963, 1967, 1972). Although much of what he has to say is anecdotal (at every opportunity he uses insightful, everyday examples to make his work come alive), Goffman manages to retain scientific credibility and work within the boundaries of experimental and theoretical knowledge. His real-life examples are undeniably stimulating and serve to generate hypotheses for others to pick up on and test.

Of more interest to the thesis at hand, of course, are the many well thought out and precise studies that examine aspects of nonverbal behaviour in a systematic and controlled fashion (e.g., Birdwhistell, 1970; Ekman, Friesen, & Tomkins, 1971; Mahl & Schulze, 1964; Mehrabian, 1972; Rosenthal, Hall, DiMatteo, Rogers, & Archer, 1979; Spiegel & Machotka, 1974). Perhaps the most complete and current bibliography listing much of the literature in the nonverbal realm has been com-

piled by Key (1977).

CHANNELS OF COMMUNICATION

The present program of research is directed towards examining how children respond to the emotional content of various vocal expressions. Historically, most research along these lines has been predicated upon the assumption that speech is composed of two channels: the *verbal* channel made up of articulated patterns of sound forming syllables, words, sentences, and other linguistic forms; and the *vocal* channel containing the other characteristics of speech such as voice quality and variation of tone. While the verbal channel supposedly conveys the semantic meaning of a communication, the vocal channel is thought to carry affective information. In normal speech, of course, the verbal and vocal cues are transmitted and received simultaneously. However, it is possible to separate--at least partially--the verbal and vocal aspects of speech. Indeed, a basic step in communication research to date has been to isolate these channels and look at each independently.

The Verbal Channel

It is almost certain, as Mead (1934) contended, that nonverbal communication antedated language. Man could never have communicated through spoken language had he not first engaged in nonverbal "conversations." However, over time certain sound patterns came to take on semantic meaning and language was born. And, of couurse, the importance of language

for mankind cannot be overemphasized. The word is man's primary medium, and language is such a pervasive element within the human life style that it is difficult to distinguish between it and thought. There can be little doubt that language colours the way we think. As Boring (1950) points out, "mind" and "soul" exist as separate words in the English language. However, "l'ame" in French and "Seele" in German mean both "mind" and "soul" simultaneously. As a consequence, it is far easier for English-speaking peoples to keep psychology separate from theology than it is for the Germans or the French. Along the same lines, Whorf (1956) makes it clear that one cannot expect the Hopi Indians, whose language lacks present, past, and future tenses of verb forms as well as masculine and feminine genders, to think as we do. With this sort of argument in mind, it would be somewhat naive to consider the development of philosophy, science, or, for that matter, any form of thought as being mutually exclusive from the language in which it is formulated.

In essence, the verbal channel can be thought of as the "content" of the communication: the "what" of the message. And, obviously, people are able to communicate fact, opinions, prejudices, and so on via the word. At an intuitive level, it is clear that even emotion can be communicated on the verbal channel. By way of anecdotal example, individuals often react "emotionally" when told orally or in writing that someone loves them.

The invention of the alphabet and writing must rank along

with the creation of language as milestones in human development. Without any doubt, writing was preceded by articulate speech. Indeed, writing as an "art peculiar to man, even more than speech, presupposes language, of which it is in some sense a refinement" (Diringer, 1948, p. 19-20). The point is that the invention of the alphabet made it possible for the sound patterns carrying the meaning of the oral message to be translated into writing. In fact, in this modern age of literacy, "we cannot think of language without reference to its written or printed form" (Chaytor, 1950, p. 6). For most of us in this society, the image evoked by a meaningful sound is inextricably tied to the image conjured up by corresponding written material. And if the words spoken in a particular message are simply written down, one has more or less isolated the verbal aspects of the communication in question. Traditional approaches to the investigation of communication content and the verbal channel have been confined largely to an analysis of the semantic information contained in such written messages.

The Vocal Channel

While it is common to think of communication simply as language, a communication between two or more individuals involves much more than the words actually spoken (Starkweather, 1956, 1961). Aside from nonverbal "gestures," a speaker's tone of voice and general vocal qualities affect a listener's perception of what is said. Although we do not commonly attend to only the vocal portion of a communication, it has

been suggested that emotion can be communicated by tonal variation and voice quality alone (Davitz, 1964; Davitz & Davitz, 1961; Duncan, 1969; Kramer, 1963; Mahl & Schulze, 1964; Rogers, Scherer, & Rosenthal, 1971; Starkweather, 1956, 1961). It appears that in terms of communicating emotion, "how" something is said may be just as (if not more) important than "what" is said.

Although analyses of the verbal channel (i.e., written communiques) have produced some intriguing and relevant data (cf. Barcus, 1959; Carney, 1972; Gerbner, Holsti, Krippendorff, Paisley, & Stone, 1969; Holsti, 1969), the traditional analytic approach falls short in terms of studying the emotional content of communications. While it is true that the method has been applied to measure the underlying emotional meaning transmitted via written messages, it is important to note that emotion is more effectively communicated on the vocal than on the verbal channel (Fujimoto, 1972; Starkweather, 1956). The same set of words can convey quite different meanings depending upon speed of delivery, loudness, pitch, rhythm, flow, and the social setting in which they are expressed. Experiments varying both verbal and nonverbal signals show that the latter have considerably more impact on communicating interpersonal states such as positive-negative or superior-inferior attitudes (Argyle, 1969). More specifically, Reusch and Prestwood have established that anxiety is more "infectious" (i.e., evokes a stronger emotional response in the receiver) in oral speech than in written passages (cf. Mahl &

Schulze, 1964).

Overall, then, studying communication of emotion solely by analyzing the verbal content of written messages is a somewhat limited and sterile approach, especially since the verbal channel seems to have less impact than the vocal on individuals making emotional judgments. To put it simply, there is much more to emotion than the written word. Hence, no mere analysis of the verbal channel alone can purport to examine more than a very limited aspect of affect.

The features of the voice itself (e.g., vocal quality and variation of tone), then, irrespective of the words spoken, are thought to come in on the vocal channel. Soskin and Kauffman (1961) were among the first researchers to suggest that this channel carried potential affective information. They also spoke of the continuous characteristics of sound making up the vocal channel as being the "carrier" upon which the verbal content is superimposed. The cues to feeling and emotion supposedly reside within this "carrier." It seems obvious that this is at least a fairly logical formulation. We can usually determine what emotions foreigners are experiencing, even though we don't understand what is being said. And children can often tell whether their pet dog is happy or sad by its bark--no words need be involved. For that matter, before the acquisition of language, infants communicate with their parents chiefly through nonverbal vocal means (Bullowa, 1974; Bullowa, Jones, & Bever, 1964).

The Visual Channel

Nonverbal signals are not only delivered verbally and vocally; if the communicator is close enough to be seen, touched, or whatever, other nonverbal cues can come into play. In loose terms a third level of communication--the *visual* channel--can be thought of as being made up of all nonverbal signals dependent upon the communicator's presence and visibility (i.e., facial expression, proxemics, etc.). Although the visual channel is not the subject of direct investigation here, it is more than peripherally relevant to many of the studies discussed in the literature review. Consequently, some discussion (albeit brief) of this communication channel would appear to be warranted at this point.

Nonverbal "visual" cues have been studied perhaps more extensively than verbal and vocal signals. To illustrate, facial expression (Darwin, 1899; Davitz, 1964; Ekman, 1970; Ekman & Friesen, 1971; Harmon, 1973; LaBarbera, Izard, Vietze, & Parisi, 1976; Vine, 1970, 1973), hair (Firth, 1973) and beards (Freedman, 1969) as public symbols, gaze and eye-contact (Argyle & Cook, 1976; Beebe, 1974; Exline, 1972; Exline & Winters, 1965; Goffman, 1963), pupil dilation (Hess, 1965; Hindmarch, 1973; Janisse, 1977), gestures and posture (Bauml & Bauml, 1975; Birdwhistell, 1952, 1966, 1970; Cicourel, 1974; Mehrabian, 1968, 1972; Prost, 1974; Rosenberg & Langer, 1965; Scheflen, 1964; Wundt, 1973), proximity and bodily-contact (Argyle, 1972a, 1975; Burns, 1964; Evans & Howard, 1973; Hall, 1963, 1969; Heshka & Nelson, 1972; Montagu, 1971;

Poling, 1974; Porter, Argyle, & Salter, 1970; Sommer, 1969; Watson, 1972a, 1972b; Weitz, 1974), clothing (Bregenser, 1970; Hillestad, 1974; Horn, 1968; Knapp, 1972) or lack thereof (Spiegel & Machotka, 1974; Truzzi, 1968), dance and movement (Penrod, 1974; Penrod & Plastino, 1970), and nonverbal responses to visual signals in animals (Darwin, 1899, 1904), Hahn & Simmel, 1976; Lorenz, 1952; Pliner, Kramer, & Alloway, 1974; Tinbergen, 1951; von Frisch, 1950) have all been the subject of intensive investigation. Other areas, such as nonverbal communication accuracy and skin conductance (Buck, 1977), the senses of smell and taste (Comfort, 1971; Parkes, 1963), blushing (Feldman, 1941), and the role of nonverbal cues in the acquisition of leadership and power (Henley, 1973; Stein, 1975) have also been considered.

In a more pragmatic sense, nonverbal visual and tactile cues have been used effectively to help work with blind (Dudeck, 1974), deaf (Cicourel & Boese, 1972), cerebral palsied (Hagen, Porter, & Brink, 1973), and aphasic (Chester & Egolf, 1975) children. As well, analysis of nonverbal visual information has been used in assessing and understanding the dynamics of teaching in the classroom situation (Breed & Colaiuta, 1974; Kalisch, 1970; North, 1972, 1973; Sommer, 1967, 1969; Thompson, 1973; Wood, 1976). Recent books and articles are available reviewing virtually all aspects of nonverbal communication ranging from proxemics and facial expression to tone of voice (Argyle, 1972b, 1973, 1975; Barbara, 1963; Beier, 1974; Benthall & Polhemus, 1975;

Cranach, 1974; Critchley, 1975; Davis, 1973; Davis, 1972; Dittman, 1972; Eisenberg & Smith, 1971; Goffman, 1959, 1961, 1963, 1967, 1972; Harrison, 1974; Harrison, Cohen, Crouch, Genova, & Steinberg, 1972; Harrison & Knapp, 1972; Hinde, 1972; Howell & Vetter, 1975; Kendon, Harris, & Key, 1975; Key, 1975, 1977; Kleinke, 1975; Knapp, 1972, 1978; LaFrance & Mayo, 1978; McCardle, 1974; McCroskey, Larson, & Knapp, 1971; Mehrabian, 1971, 1972; Rosenthal, Archer, DiMatteo, Koivumaki, & Rogers, 1974; Rosenthal, Hall, DiMatteo, Rogers, & Archer, 1979; Smith, 1966; Weitz, 1974; Wiener, Devoe, Rubino, & Geller, 1972), with some even getting into "exotics" such as extrasensory perception (Leathers, 1976).

The widespread work that has been accomplished in this area is partly attributable to the fact that it is relatively easy to isolate the visual channel. One technique for studying facial appearance, for example, is simply to analyze still photographs. In a classic study using this approach, Ekman, Friesen, and Tomkins (1971) demonstrated that specific emotions (happiness, sadness, fear, anger, surprise, and disgust) can be reliably communicated by facial expression alone. Their Facial Affect Scoring Technique (FAST)--used to describe facial behaviour in terms of three areas: (a) brows-forehead, (b) eyes-lips-bridge of nose, and (c) lower face, comprised of cheek-mouth-nose-chin-jaw--added a much needed objectivity to the study of the face per se.

In brief, FAST was used to analyze facial appearance in the three areas primarily in terms of constriction or relaxa-

tion of features, wrinkles, and position of features. The face was divided into these three areas so that the scorer would see only one portion of the face at a time, and not be influenced by the face as a whole. Another consideration was the fact that movement in one facial area will virtually always lead to corresponding changes in appearance of other features within that same area. On the other hand, movement in any one of the three areas need not lead to corresponding movment in the other two areas.

Another common way to isolate almost all visual cues is to have subjects view a television monitor (i.e., the video part of the message) without hearing the audio portion of the communication. As might be expected, electronic devices can be of great help to the content analyst in examining the visual channel. Complete descriptions of some of the modern tools used in analyzing motion picture film or videotape are available (Ekman & Friesen, 1969a; Ekman, Friesen, & Taussig, 1969). The VID-R system (Visual Information Display and Retrieval) is one such device. This system accepts 16 mm. film or videotape, and as such presents investigators with the opportunity to analyze the great backlog of video material compiled in psychotherapy sessions. The operator, by means of a keyboard, instructs the VID-R to perform various functions such as: (a) altering the viewing speed, (b) automatic search and retrieval of desired information, (c) editing and reorganizing the data, and (d) high speed coding of material. In addition, complex pupillometric equipment has been used to measure and score the dilation of the pupils of the eyes of subjects

experiencing various emotional states. Developments such as these have gone a long way towards improving the analysis of visual components of communication.

Nonverbal Channels in Combination

Obviously, having individuals attempt to simulate specific emotional states via tone of voice or facial expression is, in large part, a measure of encoding (sending) ability; some people are clearly better at this sort of thing than others (Buck, Miller, & Caul, 1974; Buck, Savin, Miller, & Caul, 1972; Davitz, 1964; Lanzetta & Kleck, 1970; Zuckerman, Hall, DeFrank, & Rosenthal, 1976; Zuckerman & Larrance, 1979). And, of course, there are also individual differences in decoding (receiving) abilities. Perhaps the most comprehensive method of assessing nonverbal decoding ability is the PONS (Profile of Nonverbal Sensitivity) test, an instrument developed by Robert Rosenthal and his colleagues (Rosenthal, Hall, DiMatteo, Rogers, & Archer, 1979).

In essence, the PONS is a forty-five minute inventory containing 220 visual and auditory segments enacted by American females. Subjects are shown each two-second segment and asked to make a judgment as to what they feel is being communicated. There are scenes--five in each category--portraying positive-dominant, positive-submissive, negative-dominant, and negative-submissive affective states. Each segment is presented to subjects in eleven various ways (i.e., face only, body only, face and body, filtered speech only, randomized spliced speech only, face plus filtered speech, face plus randomized spliced

speech, body plus filtered speech, body plus randomized spliced speech, face and body plus filtered speech, and face and body plus randomized spliced speech). Consequently, a score for specific channels or combination of channels, as well as an overall total score for decoding ability, can be obtained for each receiver or subject.

The most consistent finding from the PONS was that females performed significantly more accurately than males. Actually, the superiority of females over males in ability to decode nonverbal information has been well-documented previously (cf. Dimitrovsky, 1964; Hall, 1978; Rosenthal & DePaulo, 1978). Perhaps of more interest here is the fact that although verbal content was communicated most accurately through randomized spliced samples, emotion was communicated most accurately via filtered speech. Also, receivers who scored high on the PONS (i.e., those exhibiting sensitivity to nonverbal cues) appeared on personality profiles to be better adjusted than those who made out relatively poorly. Interestingly enough, however, it appeared that interpersonal relationships can suffer if receivers are too good at interpreting nonverbal cues. More specifically, there was some evidence to suggest that extremely sensitive receivers--those able to decode facial and bodily cues exposed for only a fraction of a second (42 milliseconds)--may have less satisfying social relationships than those somewhat less skilled in picking up nonverbal signals. In short, it appears that some individuals are able to decode and react to nonverbal messages that they were never intended to receive in the first place.

EMOTION

As Arnold (1968, 1970) points out, "emotion" itself is an extremely illusive concept. While it is evident that emotion plays a major role in virtually all facets of everyday life, it is difficult to spell out an unequivocal definition of the term. Be that as it may, all sorts of catch phrases and neat (and usually simpleminded) statements have been proposed in an attempt at definition. Most contemporary researchers in the area usually try to avoid such simple cut-and-dried definitions, with the unavoidable result that any serious look at emotion tends to become vague, complex, and in many senses, untidy and unsatisfying.

Theories of emotion have a unique history all their own. Many philosophers, both in ancient and modern times, have assumed that it is emotion that causes physiological change. In other words, they felt that if a person is anxious, the anxiety may give rise to certain bodily changes such as sweating, trembling, etc. On the other hand, certain investigators such as James and Lange espoused the notion that the emotional experience does not occur until after the physiological change; the bodily states precede and cue the emotion which is felt (Lange & James, 1922). Other theories hold that physiological changes and emotional feeling occur simultaneously; neither causes the other (Cannon, 1927). Still other viewpoints contend that the emotion we feel is determined by our interpretation of our bodily states (Schachter & Singer, 1962). And cognitive theories of emotion assert that the same stimulus

does not necessarily always produce the same emotional reaction; emotional experience depends on the organism's interpretation and evaluation of the situation (Arnold, 1970). All of these viewpoints are probably partially valid, and none of them absolutely so. In short, emotion is an intangible which is most difficult to come to terms with in an applied sense.

The point is, when dealing with communication of emotion, some thought ought to be given to what actually is being communicated. The question arises as to whether it is appropriate to speak of emotion as a "thing" which can be "sent" back and forth. Investigators in the area are well aware of the ambiguity of the concept. In fact, Davitz (1970) has even gone so far as to attempt to compile a dictionary and grammar of emotion. But no matter how hard one tries to ascertain what precisely emotion is, the fact still remains inescapable that it is impossible for an investigator to establish unequivocally whether or not a given communicator is indeed experiencing, expressing, or conveying a particular emotion. Recently, many attempts have been made to conceptualize emotion in purely an objective way. At one time or another, emotion has been arbitrarily defined as a pupillary response, a rise in blood pressure, an increase in heart rate, and a decrease in heart rate. Such definitions are helpful in that they make possible objective measurement. However, despite the need for objectivity, it is critical not to lose sight of the idea that emotion is a subjective experience. If we want to speak of emotion of any kind, it must be recognized that we are talking about an idio-

syncratic, mentalistic phenomenon (Arnold, 1968).

In studies dealing with vocal communication, there are two basic methods of operationally defining emotion. In some investigations, emotional state is defined operationally solely by the intent of the speaker during the recording of the speech samples. That is, each vocal expression is considered to communicate a particular emotional state simply because the speaker intended to communicate the emotion in question (Davitz, 1959a, 1959b; McCluskey, Albas, Niemi, Cuevas, & Ferrer, 1975). Insofar as the communication of emotion is a particularly private and subjective experience, such a definition is a viable one.

Other studies have demanded a more stringent definition which involves the rating of speech samples by adult judges (Beldoch, 1964; Dimitrovsky, 1964; McCluskey, 1974). In these investigations, a sample is not thought to express a particular emotion solely on the basis of speaker's intent, but also because raters agree that the emotion in question is indeed being transmitted. There is a definite external criterion. Despite the ambiguity of the concept, then, emotion contained within speech samples can be defined operationally by speaker's intent and/or by judges' ratings.

Coding the Vocal Channel for Emotional Content

Since cues to emotional state supposedly reside within the vocal channel (Soskin & Kauffman, 1961), most research dealing with tone of voice has focused upon analyzing the attributes of vocal messages in an effort to gain specific information about the communication of affect. Content ana-

lytic methods involving word counts and categorizations are commonly used to assess written communications. However, objective measures, including rate, pitch, and spectrum analysis of frequency can also be employed to examine the vocal channel. And for the most part, such measures have been shown to be reliable indicators of emotional state (Starkweather, 1969). Adults and children alike tend to use vocal cues in decoding nonverbal information, and both are more sensitive to negative (anger, sadness, etc.) than to positive (e.g. happiness, love, etc.) cues (Fenster, 1967).

Mahl and Schulze (1964) summarized the categories of classification of vocal information developed by Trager. The proposed classification categories were:

(a) Voice qualities: pitch, range, tempo, resonance, articulation control, etc.

(b) Vocalizations:

  (i) Vocal characterizers: laughing, crying, voice breaking, sighing, yawning, etc.

  (ii) Vocal qualifiers: extra increase or decrease in intensity (overloud or oversoft), pitch height (overhigh or overlow), and extent (drawling or clipping vocalizations short).

(c) Vocal segregates: sounds other than words (e.g., "um-hmm," "huh," "uh," various types of pauses, etc.) which have specific communicative value.

Typically, the frequency of occurrence of an individual measure, or combination of measures, is correlated with some emotional state (as defined by certain behavioural variables). If there is a relationship, inferences about the emotional state of the speaker can be made on the basis of his vocalizations.

One tonal variable, vocal pitch, was examined in detail by Fairbanks and Pronovost (1938, 1939) some forty years ago. These investigators developed four measures of pitch (i.e, pitch level, pitch range, rate of pitch change, and extent of pitch shifts). Using a phono-photographic technique for recording pitch, they found that vocal expressions of fear had the highest median pitch level when compared to other emotions (i.e., grief, anger, contempt, and indifference). Furthermore, recordings of fear had: (a) the widest tonal pitch range, (b) an extremely wide mean extent of pitch shifts and of upward shifts within phrases, (c) the widest mean extent of shifts between phrases, (d) the fewest proportion of pauses within phrases at which shifts of pitch were not made, and (e) the greatest number of pitch changes per second during the total speaking time. In short, messages interpreted as communicating fear seem to be characterized by a great number of changes in direction of pitch movement.

More than a decade before the work of Fairbanks and Pronovost, Travis (1927)--using a similar technique to measure pitch--studied the effects of stress on stutterers and non-stutterers. Since stutterers were found to have more range

in pitch under conditions of stress, and since just the opposite was found in the case of non-stutterers, the implication was that it should be possible to make certain inferences about the emotional state of the communicator on the basis of vocal pitch characteristics.

Silent pauses and interruptions of continuity of vocal expressions are also thought to be very important in communicating feeling. A number of criteria have been formulated for the purpose of distinguishing between standard linguistic boundaries and hesitation pauses (Lounsbury, 1954). Mahl and Schulze (1964) cite numerous studies dealing with the coding of pauses in more detail. One technique is to calculate the respiration rate (RR), a measure obtained by dividing the number of breathing pauses (i.e., inspirations) by the number of time units in the sample. Another measure, the ventilation index, is simply the RR value over the number of syllables per breath.

Although it would seem that the face is the most powerful nonverbal communicator of emotion, it is also the one that is best controlled by the sender. In other words, if he so desires, a sender can easily hide or "mask" the emotions he gives off via facial cues (Dittman, 1972; Ekman & Friesen, 1969b; Izard, 1971; Rosenthal, Hall, DiMatteo, Rogers, & Archer, 1979). Often, however, even though the face is under conscious control, nonverbal information may unknowingly be transmitted or "leaked" through bodily cues such as gestures, posture, leg movements, etc. (Anon, 1948; Ekman & Friesen,

1969b, 1974; Ford, 1970). Not surprisingly, tone of voice is another additional source of cues to anxiety or deception (Ekman, Friesen, & Scherer, 1976; Hargreaves, Starkweather, & Blacker, 1965; Streeter, Krauss, Geller, Olson, & Apple, 1977). And "leakage" of information that the speaker wants to conceal can also be inadvertently given off through tone of voice (Bugental, Henker, & Whalen, 1976; Bugental & Love, 1975; Holzman & Rousey, 1966; Weitz, 1972).

Mahl (1956) speculated that one characteristic of anxiety is that it disrupts all complicated ongoing behaviour. Taking this theoretical perspective, it is likely that an anxious communicator will emit many pauses, hesitancies, and extraneous vocalizations (such as "ah") in his speech. Others have also espoused the notion that duration of pauses in speech is central to the "unconscious" vocal communication of anxiety. In an attempt to provide empirical support for this rationale, Mahl (1956) demonstrated that a psychotherapy client's speech was marked by significantly higher silence quotients (i.e., an index of the proportion of time available to the client during which he is silent) during clinically rated high-anxious phases than in low-anxious ones. Other research has also shown that although there are pronounced individual differences, there are certain identifiable speech disturbances that are clearly associated with anxiety (Cook, 1965).

Mahl and Schulze (1964) make clear that there are many other temporal phenomena and measures of vocal speech that can also be looked at. The measure of intervals between words

(i.e., speech rate or total time) is often compared with a measurement of the drawl of the pronounced syllables (i.e., articulation rate or absolute time). Latency--the time intervening between a question (or some such stimulus) and the beginning of a subject's vocal response--has been used as another measure. Also, productivity, as measured by word counts, counts of various tones, or length of time used in responding, has been considered as well.

JUDGMENT OF VOCAL ASPECTS OF SPEECH BY ADULTS

Isolating the vocal aspects of speech (i.e., the vocal channel) from the articulated sound patterns is much more difficult than isolating semantic or visual meaning. Simulating human tones through the use of mechanical devices has been attempted, but the necessary equipment is not readily available. Also, some investigators contend that such devices are not yet sophisticated enough to accurately simulate human tones (Soskin & Kauffman, 1961). It is also possible to utilize foreign speech samples in an effort to isolate the vocal channel. Unfortunately, foreign speech samples are sometimes difficult to obtain, and inflectional variations from language to language may confound results (Soskin & Kauffman, 1961).

Recitation of Nonmeaningful Material

Davitz and Davitz (1959a) were concerned with whether affect could be reliably communicated by vocal, content-free speech. Apparently thinking they were the first in the field (Gates had done similar work over thirty years earlier), Davitz

and Davitz devised a method for varying vocal expression while holding verbal meaning constant. "Recalling an old and perhaps apocryphal story that Sara Bernhardt could elicit tears by merely reciting the ABC's, they asked speakers to express ten different feelings by reading aloud parts of the alphabet" (Davitz & Davitz, 1961, p. 81). It was assumed that reciting neutral material such as letters would remove the semantic meaning from the speech samples. Therefore, any differences in the expression of emotion would have to be due to variation of tone rather than verbal content.

In terms of specific methodology, the speakers were instructed to recite portions of the alphabet, first in a "normal" manner, and then simulating ten various emotions (i.e., love, anger, fear, happiness, jealousy, nervousness, pride, sadness, satisfaction, and sympathy). The speech samples were recorded, and then presented randomly to graduate students who were required to attempt to identify the emotion expressed by choosing one of ten adjectives from a checklist. Since it was found that the expectation was only .01 that the number of correct identifications made by these judges could have been obtained by chance alone, Davitz and Davitz concluded that feelings can indeed be transmitted by content-free speech. Or to put it another way, receivers seem to be able to make inferences as to the emotional state of a communicator even when words are not part of the message. No attempt was made to ascertain which cues the judges had utilized in making their judgments, but the authors implied that physical charac-

teristics of speech (e.g., tone, volume, pitch, rate, rhythm, and frequency) were intimately associated with emotional expression and sensitivity.

A number of similar studies involving either the recitation of letters or numbers have shown that emotion can be communicated accurately by the nonverbal aspects of speech (Davitz & Davitz, 1959b; Dussenberry & Knower, 1939; Knower, 1941, 1945; Pfaff, 1953; Thompson & Bradway, 1950). In all cases, judges demonstrated the ability to recognize emotional state from vocal cues alone. Again, the judges seemed to depend on changes in the physical characteristics of the voice, but were unable to describe these characteristics in a consistent fashion.

There is a subtle problem inherent in this type of research due to the fact that the speakers are not allowed to say words. For most of us, words have been inextricably tied to the expression of emotion since early childhood. It is likely, then, that it would be difficult and unnatural for speakers to communicate emotion vocally without using words. Therefore, any attempt to manipulate speakers so that they are not permitted to use words may be somewhat artificial.

Recitation of Standard Content

In other studies, the verbal content is held constant by having speakers recite a standard paragraph that is considered to be emotionally neutral. All speakers try to express different emotions by reciting the same neutral verbal content; the emotional feeling communicated depends on vocal rather

than verbal cues (Beldoch, 1964; Fairbanks & Pronovost, 1939; Pollack, Rubenstein, & Horowitz, 1960). However, this procedure still depends on speakers reciting specific standard material, thereby increasing the chances of artificiality and precluding the possibility of studying unacted, real-life conversations.

Filtered Speech

One approach that obviates this problem is to employ an electronic filter to remove the verbal content of speech while leaving intact most of the emotional cues carried by the vocal characteristics (Rogers, Scherer, & Rosenthal, 1971; Starkweather, 1956; Soskin & Kauffman, 1961). When the filtering method is used, it becomes possible to consider samples of speech other than those generated in experimental situations. In fact, investigation can proceed in an unobtrusive or "nonreactive" fashion (cf. Webb, Campbell, Schwartz, & Sechrest, 1966). Voice samples, including those recorded without the speaker's knowledge, can be filtered and played to subjects.

In terms of theoretical rationale for using the filter, the notion is that vowels, which carry most of the tonal qualities in speech, are low frequency sounds. However, consonants, which convey most of the semantic meaning, are sounds of high frequencies (Soskin & Kauffman, 1961). Essentially, filtering out the high frequency consonant sounds leaves behind the vocal channel--the tonal characteristics of voice comprised chiefly of vowel sounds--while removing most of the verbal meaning. The assumption is made that the

tonal qualities, left behind when the high frequencies are removed via the filter device, retain the majority of the emotional cues in speech.

Vocal expressions filtered in this manner become garbled; the speech is reduced to a kind of mumble as if heard through a wall (Starkweather, 1956). Soskin & Kauffman (1961) refer to a number of word recognition studies of filtered exerpts which indicate that listeners can identify only two or three percent of the words spoken, and that most of these identified words are merely conjunctions, prepositions, and articles. In addition, these investigators point out that in filtered samples of 50-150 words in length, this level of accuracy would be attained by guessing alone. In short, filtering appears to be a viable technique for removing the semantic meaning from vocal expressions of human speech. Other methods, such as the compression of speech to some multiple of its normal rate (Goldhaber, 1970; Goldhaber & Weaver, 1968; Orr, 1968; Orr, Friedman, & Williams, 1965) and rearranging words and removing intelligibility by randomized splicing (Rosenthal, Hall, DiMatteo, Rogers, & Archer, 1979; Scherer, 1971), have also been relatively effective in this regard.

The conceptualization of the vocal channel as the "carrier" of emotion receives support, albeit somewhat anecdotal, from research regarding speech development. Vowel sounds have been found to be present in the crying of the human infant (Irwin & Chen, 1941; Irwin & Curry, 1941). Young children, when they finally start using consonant type sounds, encounter far more

difficulty pronouncing these than they do pronouncing vowels. Indeed, a child typically uses all of the vowel types found in adult speech by the age of two and a half years, but only about two-thirds of the complement of consonant type sounds. Even at four and five years of age, many children are unable to produce consonant type sounds (Chen & Irwin, 1946). Since infants seem to be able to communicate emotion to their parents through vocal speech comprised mostly of vowel sounds, and since language and meaning are acquired with the laborious learning to pronounce consonants and consonant blends, the logical inference is that emotion is transmitted in large part on the vocal channel. Such a formulation points to the efficacy of the filter device in research dealing with emotional communication.

More acceptable support for the use of this technique has been provided by Soskin and Kauffman (1961) and by Starkweather (1956). Utilizing filters passing frequencies from 100-450 cycles per second (cps) or 150-550 cps, it was found that adult listeners were able to identify the emotional meaning of content-free speech samples at a level significantly above chance (Soskin & Kauffman, 1961). Subjects made their judgments by trying to identify (on a checklist) which emotion the speaker was intending to communicate. Starkweather (1956), also using filtered material, found that adults were able to identify submissive and aggressive speakers when listening to either normal or filtered speech. Subjects looking at the verbal content alone (as recorded on typescripts) were unable

to make this differentiation. Interestingly enough, subjects were more efficient in making the submissive-aggressive distinction with filtered than with normal speech. It seems that the presence of verbal content may even constitute some form of distraction for adults making emotional judgments.

Even though speech can be broken down into components, neither the vocal nor verbal aspects of speech should be thought of as being independent. It would be naive to suppose that speech is composed of two mutually exclusive channels. There is an implicit overlap. Therefore, when speech is filtered, a great deal of the tonal quality is probably lost along with the high frequency sounds (McCluskey, 1974; Starkweather, 1956). And although tonal variation may account for the majority of emotional cues, the words actually spoken are no doubt also very important.

Nevertheless, it has been demonstrated clearly that a great deal of emotional information is contained within filtered speech (Rogers, Scherer, & Rosenthal, 1971; Soskin & Kauffman, 1961; Starkweather, 1956). This fact, along with the need to examine real-life voice samples, provides ample justification for employing the filtering technique.

JUDGMENT OF THE VOCAL ASPECTS OF SPEECH BY CHILDREN

Unfortunately, there are relatively few studies assessing the development of emotional sensitivity. The earliest, and for a long period the only experimental study of this sort, was performed by Gates (1927). Using recordings of adult

speakers reciting the alphabet in an effort to express each of nine emotions, she found that there was a steady increase with age in children's ability to make the correct identifications. Only very tentative conclusions can be drawn from this early study, however, since a short abstract is all that has ever been published and the original data are unavailable.

Almost four decades later, Dimitrovsky (1964) reopened the question of whether the ability to identify emotion in vocal speech improves with age. In her recorded voice samples, chosen from among a larger number compiled by Beldoch (1964), male and female adult speakers recited a standard paragraph while attempting to communicate happiness, sadness, love, and anger. Since all speakers recited the same standard paragraph, considered to be emotionally neutral, expression of emotion was dependent on vocal cues rather than on the words spoken. The different expressions of this standard paragraph were rated by adult judges. For every speech sample accepted for use in the study, the number of judges who identified the item correctly had to exceed that which would have been expected by chance at the .01 level.

Dimitrovsky (1964) then had children from five to twelve years of age attempt to identify the emotion expressed in the speech samples. Children's judgments were scored correct or incorrect solely on the basis of the adult ratings. Dimitrovsky's (1964) results paralleled Gates' (1927) findings, in that there was a progressive and significant increase with chronological age in children's ability to identify emotion communicated by

the vocal expressions. That is, with increasing age, children's judgment of emotional state approached more nearly the adult interpretation.

Additionally, Dimitrovsky (1964) demonstrated that girls are more sensitive to the emotional content of adult voice samples than are boys. This finding was not entirely unexpected, since girls are superior to boys in the acquisition of normal speech (McCarthy, 1953, 1954; Sampson, 1959; Young, 1941). Dimitrovsky (1964) points out that in our culture the female is stereotyped as being more emotionally sensitive than the male. Thus, the superior accuracy of girls in judging the affective content of speech may simply reflect the learning of cultural expectations.

In any case, for whatever reason, sex differences in sensitivity to tone have been found repeatedly at all age levels, with females clearly exhibiting greater accuracy in judging the emotional content of speech than males (cf. Davitz, 1964; Dimitrovsky, 1964; Fenster, 1967; Hall, 1978; Rosenthal & DePaulo, 1978). Since this finding is already well-established, sex differences were not considered to be of prime importance to the research at hand.

A great deal of attention has been devoted to the role of the mother in the etiology of psychopathology and the mother-son relationship in general (cf. Clausen & Kohn, 1960; Scheflen, 1972). While mothers of "disturbed" children produce a significantly greater number of conflicting messages than do mothers of "normal" children, no such difference is

evident among the fathers (Bugental, Love, Kaswan, & April, 1971). It has also been demonstrated that incongruent messages are judged more negatively by children if the speaker is female rather than male (Bugental, Kaswan, & Love, 1970). Consequently, it appears as if the role of the female communicator is of considerable importance and worthy of direct investigation.

Further, since interest here extends into the realm of emotional disturbance, the responses of males of various ages are extremely relevant. It is well-known in education that special classrooms for the emotionally disturbed are populated mostly by boys. Female pupils, although they may be "disturbed," tend to be less aggressive and disruptive than boys, and tend not to be placed as frequently in special classes. Since the response of boys in such classes is a major point of interest, and since sex differences have been clearly established long ago, the present research is restricted to a single communication pattern. That is, rather than varying both the sex of the speaker and receiver, the research will be restricted to the communication pattern in which samples from female speakers are played to male subjects of various ages.

Dimitrovsky (1964) also distinguished between emotional states on the basis of valence and activity. With respect to the valence dimension, each emotion was defined as being either positive or negative. Similarly, in terms of the activity dimension, each emotional state was considered to be

either active (exuberant) or passive (subdued). Dimitrovsky (1964) found that the negative emotions of sadness and anger are judged correctly by children more often than are the positive emotional states of happiness and love. However, errors tend to be characterized by similarity along the activity dimension, rather than valence. That is, the active emotions of anger and happiness are frequently mistaken for one another, as are the passive emotions of sadness and love. Furthermore, it has also been noted that a response bias seems to exist along the valence dimension, such that children in general tend to emit more negative than positive responses (Dimitrovsky, 1964; McCluskey, 1974).

Davitz and Davitz (1959a) have shown that adults, as well as children, correctly identify expressions of negative emotions more often than positive ones. However, although adults judge the negative emotions more accurately, they do not seem to emit a greater frequency of negative than positive responses when making emotional judgments (Davitz, 1964). On the other hand, according to Dimitrovsky (1964), children not only make more correct identifications of the negative emotional states, but respond with a greater number of negative judgments as well. Consequently, she concluded that children tend to be characteristically more negative in their judgments of vocal expressions than adults.

Fenster (1967), using a similar method, also found that the ability to identify emotional content in neutral vocal expressions increased with age. Using adult and child speakers,

he too noted a consistent tendency for adult and child listeners to judge negative vocal expressions more accurately than positive speech samples. However, unlike Dimitrovsky (1964) and McCluskey (1974), he found no tendency for the children to respond with a preponderance of negative judgments (Fenster, 1967; Fenster & Goldstein, 1971).

Most early investigations concerning the response of adults to the emotional content of messages coming in on the vocal channel have used either the recitation of standard content or the filtering technique (cf. Starkweather, 1961). On the other hand, although it had been shown that grade five children can identify the emotional content in speech compressed so as to render words unintelligible (Boyle, 1970), the development of sensitivity to filtered speech in childhood was not explored until relatively recently (McCluskey, 1974; McCluskey, Albas, Niemi, Cuevas, & Ferrer, 1975; McCluskey, Niemi, & Albas, 1978). In a direct comparison of the standard content and filtering methods (McCluskey, 1974), it was shown that children at various age levels responded more accurately to nonfiltered, standard content speech where there were words (albeit neutral) to "hook onto," so to speak. However, although children judged filtered speech less accurately than the standard content samples, even six-year-old youngsters (the youngest group tested) were able to identify the emotional content of filtered vocal expressions at levels significantly above chance. That is, even though some information was lost through filtering, the filtered speech ex-

erpts still retained a goodly amount of affective cues for the children to pick up on.

Rosenthal and his co-workers have also noted a pronounced age effect with the PONS test, such that subjects exhibited increased sensitivity to both filtered and randomly spliced speech with age (Rosenthal, Hall, DiMatteo, Rogers, & Archer, 1979). That is, skill in decoding the communicative segments increased gradually from kindergarten until between the ages of twenty and thirty, where sensitivity seemed to level off. Groups of older individuals have not yet been tested. As well, it was found that younger children performed better on the vocal aspects of the PONS than on the visual ones.

CROSS-CULTURAL DIFFERENCES IN THE PERCEPTION OF THE EMOTIONAL CONTENT OF NONVERBAL MESSAGES

At a purely intuitive level, it is obvious that expression of emotion varies from culture to culture (cf. Argyle, 1972; Benedict, 1959; Brislin, Bochner, & Lonner, 1975; Mehrabian, 1972; Izard, 1980). Since age trends have been established with Canadian children in the research at hand, it would seem that it would be useful to extend investigation of the development of emotional sensitivity into the cross-cultural realm. Unfortunately, as Mehrabian (1972) points out, there is little solid experimental evidence (regarding differences in communication among various cultures) upon which to rely. Indeed, the paucity of research in the area is such that there is currently "an urgent need to know more about . . . nonverbal behavior . . . from cross-disciplinary and cross-cultural points of view" (Key, 1975, p. 162).

This is not to say that investigators are not attempting to come to grips with specific cross-cultural issues. As a matter of fact, excellent research efforts and reviews have been forthcoming recently which examine various cultural variables in depth (cf. Brislin, Bochner, & Lonner, 1975; Ekman, 1970, 1972; Edman & Friesen, 1971; Mehrabian, 1972; Triandis & Lonner, 1980), including works on methodological problems in intercultural psychology (Brislin, Lonner, & Thorndike, 1973), cross-cultural communication and counselling (Condon & Yousef, 1975; Pedersen, Lonner, & Draguns, 1976; Samovar & Porter, 1972), and analysis, evaluation, and testing

across cultures (Cronbach & Drenth, 1972; Lonner, 1968, 1976; Lonner & Adams, 1972; Triandis, Vassiliou, Vassiliou, Tanaka, & Shanmugam, 1972). Nonetheless, there is no doubt that there is still a noticable dearth of well-controlled cross-cultural studies, especially with respect to the communication of affect via the individual communication channels. For example, at this point in time only a few studies dealing with sensitivity to tone of voice across cultures have been undertaken (e.g., Albas, McCluskey, & Albas, 1976; Beier & Zautra, 1972; Lacroix & Rioux, 1978; McCluskey & Albas, 1978; McCluskey, Albas, Niemi, Cuevas, & Ferrer, 1975).

For the purposes of this research, then, it was felt that a comparison of sensitivity to tone among people from two widely divergent cultures within North America would be a good starting point. Canada and Mexico were selected as the comparison cultures, partly because Mexico and the Mexican people are just as (or more) foreign to Canadians than life in most of Europe. Clear differences in "emotionality" appear to exist between Canadians and Mexicans. For example, Canadians commonly stereotype the Mexican people as being highly emotional and as having "Latin blood." On the other hand, Canadians (and other English-speaking races) are often regarded by Mexicans as being somewhat cold, aloof, or "mechanical" (cf. Lewis, 1961).

To go one step further, English is thought by many Mexicans to be a "lazy" language (due to a relative lack of inflection, tonal variation, and emotional content). And

with respect to other nonverbal signals, LaBarre for one feels that "Americans are characteristically illiterate in the area of gesture language" (cf. Knapp, 1972). In a relevant example, Fast (1970) illustrates how an American male might conceivably feel that Spanish-speaking girls are virtually always asking to be "picked up", since they often seem to be sending off what would be suggestive nonverbal cues in our culture. However, in Spanish-speaking countries, girls tend to be carefully chaperoned until marriage. As a consequence, they are perfectly free to flaunt their sexuality (by adopting an explicit style of walk, flirtatious behaviour, etc.) without fear of trouble. In fact, Spanish women have been known to stereotype the "rigid" posture of American females as being graceless, unnatural, and in poor taste. Along the same lines, a number of books by Oscar Lewis (1951, 1961, 1962, 1969) are excellent in terms of subtly highlighting the many and varied cultural differences that exist between Mexicans and other North Americans.

Cultural Universals?

Although differences clearly exist in nonverbal communicative styles, there still appears to be considerable consistency across cultures in the emission of certain highly specific nonverbal signals. For example, Eibl-Eibesfeldt (1970a, 1970b, 1972) speaks of cultural universals with respect to territorial defense, gestures, nodding, flirting, eye-brow movements, and commonality of greeting. As well, Ekman (1970) and Izard (1971, 1977) have shown that certain facial expres-

sions of affect among humans appear to be culturally universal.

To be more specific, Izard (1971) showed photographs of faces representing eight basic emotions to American, English, German, Swedish, French, Swiss, Greek, Japanese, and African university students. Since there was high intercultural agreement in terms of what faces represented what emotions, Izard suggests that some facial expressions of emotion are innate in all mankind, regardless of culture. Along the same lines, Ekman (1972) and Ekman and Friesen (1971) have demonstrated that members of two isolated cultures in New Guinea (that have had virtually no previous exposure to Westerners and Western media) judged photographs of posed facial expressions of emotion in roughly the same manner as American subjects. Thus, these researchers conclude that some facial expressions of affect may be innate, and suggest that there is a degree of consistency in encoding (using subtle, nonverbal behaviours to convey a particular emotional state or feeling) and decoding (making inferences about another's state or feeling on the basis of such behaviours). Indeed, it would seem as if communication within and between cultures depends upon such shared metaphors and common nonverbal messages that are inherent in human experience (Mehrabian, 1972).

In administering the PONS to subjects from over twenty different countries, Rosenthal and his colleagues also found that scores from foreigners were high enough to indicate an intercultural component (Rosenthal, Hall, DiMatteo, Rogers, & Archer, 1979). And with regard to the potential universal-

ity of certain aspects of tone of voice, Beier and Zautra (1972) asked American speakers to recite neutral passages while simulating several emotional states (i.e., anger, sadness, happiness, flirtation, fear, and indifference). When these speech samples were presented to American, Japanese, and Polish subjects, there was significant intercultural agreement on the mood expressed via tone of voice. Beier and Zautra (1972) were quick to point out that such results definitely indicate the presence of universal emotive cues in the vocal channel. Along the same lines, Brown and Lambert (1976) demonstrated that both French and English subjects could identify the social states (i.e., white or blue-collar) of French speakers reading standard passages. Danziger (1976), who has taken a less dogmatic view on innateness and culture, recognizes that cultural variables have a profound impact on nonverbal language. He still concludes, however, that even after allowing for cultural effects and influences, there still seems to be a core of universally recognized signs across cultures, especially with respect to facial expression of emotion.

The Effects of Culture

In some respects, the question of cultural universals--which has stirred such controversy in the literature--is not all that relevant here. In fact, the whole nature-nuture issue often seems pointless, since everything we are is a result of both heredity and environment. Accepting that heredity and environment are inextricably related, it is

enough (from the present perspective, at any rate) to say that the effects of culture are undeniably important.

Although Eibl-Eibesfeldt, Izard, Ekman, and others make such a strong case for the innateness and universality of certain expressions of affect, it is self-evident that emotional expression varies from culture to culture. In many ways, "culture shock" is a nonverbal phenomenon. Certainly intercultural differences exist in nonverbal communication patterns in terms of eye-contact, personal space zones, touch, tone of voice, and angle of orientation in interaction (cf. Mehrabian, 1972). Logically, then, differences in the perception of emotion communicated by nonverbal signals "suggest the possibility of cultural differences in sensitivity to certain expressive cues as a result of different attitudes toward particular emotions and other phenomena of socialization (Izard, 1971, p. 266).

Austin (1972) recognized that man is born with the physiological and neural capacity for language, but that the actual acquisition of language must be accomplished by learning. He also noted that the same is true for the acquisition of nonverbal language; through the effects of learning and culture, Chinese reared in London communicate like Englishmen and upper-middle-class black Americans communicate like upper-middle-class white Americans. And, not surprisingly, Mexican-Americans raised in the U.S. prefer standard to Spanish-accented English (Ryan & Carranza, 1975).

LaBarre (1947) was one of the first to challenge the

innate position. He delineated several cross-cultural differences in communication of emotion, and pointed out that the head nod--often cited as universal--is unknown among the Aino of northern Japan. Birdwhistell (1963) and Pack (1972) also feel that gestures and other nonverbal expressions of emotion are definitely learned. And since the Japanese give less verbal and vocal feedback than we do in our culture (Ogawa & Welden, 1972), and since they have been shown to recognize facial expressions of affect more accurately when the various emotions are enacted by senders from cultures other than their own, Argyle (1975) suggests that they may be using a different style or code in judging nonverbal emotional content. This notion of different "codes" in different cultures tends to come up again and again in the literature (Argyle, 1975; Birdwhistell, 1963; Lacroix & Rioux, 1978; Lotman, 1973; Albas, McCluskey, & Albas, 1976).

Perhaps the best research on cross-cultural differences has dealt with proxemics--the study of human behaviour as it relates to physical space and personal territory (or as Hall, the pioneering researcher in the area, prefers, the use of social and personal space and man's perceptions of it). Hall (1959, 1966) has noted just how difficult it can be for persons from different cultures to communicate with one another. Essentially, the problem arises because of the implicit (and ethnocentric) assumptions people make when they interpret the behaviours of individuals from different cultures. With regard to proximity, for example, human behaviour

reflects the fact that there is a personal space zone or "invisible bubble" surrounding each of us (Sommer, 1969). As long as others "keep their distance" we feel natural; but if they come too close and--figuratively speaking--burst the bubble (i.e., invade our territory), we tend to feel uncomfortable. The extent of the bubble is to some degree culturally, socially, and situationally determined, and, as well, a matter of the emotional relationship existing between the interactants (Hall, 1963, 1966).

There is also little doubt that space zones are learned. For one thing, youngsters are not defined as having or invading personal space; it's not until they're about eight years of age that they begin to elicit invasion behaviour in adults (Fry & Willis, 1971). And it is obvious that personal space zones are learned differently in different cultures. Hall (1964, 1966), for one, has stated that each culture holds implicit norms concerning the appropriate physical distance participants should maintain during interaction. In North American culture, a person who comes closer than 18-20 inches is usually guilty of violating unspoken rules of territoriality (Argyle & Dean, 1965). In other cultures, the distance of interaction between individuals is much smaller; and indeed, persons from these cultures feel quite uncomfortable if forced to stand as far separated as North Americans when speaking. Interesting things happen when representatives of the two cultures meet. One individual pushes closer and attempts to reduce the distance at which interaction will

occur, while the other backs off and attempts to increase it. Both parties feel uncomfortable, but neither knows exactly why (Hall, 1959; McCluskey, Niemi, & Ferrer, 1973; Mehrabian, 1971).

While much of the work in the area is theoretical, there are some intriguing experimental studies concerning cross-cultural differences in proximity and other related nonverbal cues. One classic study by Watson and Graves (1966) showed basically that Arab students exhibited more intense sensory stimulation during interpersonal interaction than did American students. That is, the Arabs sat closer together, touched more frequently, talked louder, and engaged in more eye-contact than did the Americans. Similarly, both Baxter (1970) and Willis (1966) showed that blacks maintained greater interpersonal distances than did whites. Also, Little (1968), by asking subjects from various cultures to position dolls to simulate various social situations, found that of the cultures tested Greeks interacted closest together. Americans, Italians, Swedes, and Scots, in that order, assigned greater distances (in positioning the dolls) between communicators. And even with respect to tone of voice, it seems to matter very much who communicates to whom (Albas, McCluskey, & Albas, 1976; McCluskey, Niemi, & Albas, 1978; Wood, Yamauchi, & Bradac, 1971). At an intercultural level, for example, white and native (Cree Indian) subjects seem to perceive emotional cues (carried on the vocal channel) differently, to the extent that their differing perceptions interfere

with cross-cultural communication (Albas, McCluskey, & Albas, 1976).

In terms of a broad classification scheme, Watson and Graves (1966) described the Anglo races (e.g., Canadian, American, British, etc.) as non-contact or distant cultures. In contrast, Latin Americans and Southern Europeans--along with the Arabs--were considered to be representatives of contact cultures (i.e., those characterized by closer physical distance in interaction, more frequent eye-contact, more frequent touch, more direct angle of orientation in interaction, and greater voice volume than non-contact cultures). While stereotyping and dichotomizing cultures is not always wise, there is evidence to show that Latins are in fact more contact oriented and more "emotional" than Anglos in general (Argyle, 1972; Hall, 1959; McCluskey, Niemi, & Ferrer, 1973). And their gestural language is certainly far "livelier" than that of English-speaking races (Anon, 1941, 1950; Beinhauer, 1942; Kaulfers, 1932). And even with respect to vocal cues, it may well be that Latins are more expressive than Anglos. In one study, the nonverbal behaviour ("body language") of bilingual speakers was not perceived as being different when they were reciting standard paragraphs in either French or English (Lacroix & Rioux, 1973). That is, judges viewing the nonverbal signals emitted by the speakers could not determine whether they were using the French or the English language. However, the French were perceived as being more active, open, and excitable. This difference corresponds to and supports

the stereotype of the "hot" Latin and the "colder" Anglo temperament.

Witkin (1967) has attempted to explain certain cross-cultural differences with reference to the field-dependence/independence issue. According to Witkin and his colleagues (Witkin, Dyk, Faterson, Goodenough, & Karp, 1962), a field-dependent person is one who tends to see everything in context and orient himself with continual reference to the environment. A field-independent person, on the other hand, is supposedly more abstract and analytical, and shows a tendency to perceive items as distinct from the environment. While field-independent subjects are able to pick out shapes on the Embedded Figure Test and position the rod correctly on the well-known Rod-and-Frame Test, field-dependent people--handicapped by being able to perceive things only when embedded in context--are confused by these tasks and unable to perform them well.

Witkin and his co-workers went on to attempt to relate the notion of field-dependence/independence to social types. For example, field-dependent persons were thought to be warmer, more emotional, and to interact more proximally than the colder, analytically oriented field-independent individuals. Following this line of logic one step further, Witkin felt that field-dependent persons leaned towards the study of fine arts, poetry, and the like, while field-independent individuals preferred the sciences. Witkin stressed, of course, that both personality types possessed talent and positive

characteristics, but that a pronounced difference and incompatability of interests might well exist between them.

Witkin (1967) went on to try to relate his classification scheme to the cultural level. He suggested that people in different cultures, partly as a result of adjustment to environmental factors, learn to perceive the world differently. Supposedly, then, Eskimos and Native Indians--moving without concrete guidelines in a nomadic environment--tend to look at things from a field-independent viewpoint. In contrast, more sedentary races take on the warmth, emotionality, and perspective of field-dependence. With reference to the thesis at hand, Witkin and others (cf. Brislin, Lonner, & Thorndike, 1973) have gone on to make the assumption that the "cold" Anglo races generally exhibit field-independent characteristics, while the "warm" Latin cultures are field-dependent.

Despite the logical appeal of Witkin's argument, it would appear to be inappropriate to attempt to relate all cultural differences to field-dependence/independence. As Kagan and Buriel (1977) point out, certain cultural groups resent being arbitrarily stereotyped and given a restricted, oversimplified label. (Specifically, Mexican-Americans disliked the field-dependent label.) Further, Kagan and Buriel (1977) note that much of the theory and research discussed by Witkin (1967) was plagued by methodological inconsistencies and generalizations. As well, important environmental concerns and other factors were neglected and ignored. Certainly, although the field-independent/independent dichotomy

may be useful conceptually, it would be a gross oversimplification to attempt to attribute pronounced cultural differences to this factor alone.

Cultural Effects in Childhood

Although most of the work on cross-cultural differences in communication has been carried out on adults, there are a few studies dealing with children. For example, Aiello and Jones (1971) found that Puerto Rican and black children tended to stand closer together than white children, and Feinman and Entwisle (1976) noted that black youngsters judge facial expressions more accurately than their white counterparts. In a concrete developmental study, it was shown that in both the American and Japanese cultures children interact at extremely close distances when they are young, but tend to increase interpersonal distances as they get older (Lerner, Iwawaki, & Takashi, 1976). That is, children's personal space zones are smaller than those of adults in that they tend to interact more proximally. With increasing age, however, children become more adult-like and learn to adopt larger space zones (Baxter, 1970). Also, as children get older, they grow more adept at interpreting emotion communicated by facial expression and body language (Thompson, 1973; Wood, 1976).

A few studies with young Mexican and American subjects have shown that different cultural attitudes seem to prevail in many instances. To illustrate, there would appear to be significant differences between Mexicans and Americans in the

perception of time and causality. Shannon (1976) reported something of an age effect, such that older Anglo-Americans and Mexican-Americans, along with younger Anglo-Americans, perceived idle time as "dragging on" longer than productive time. Actually, both time intervals in the study were of equal (four minute) duration; but the "idle" time was spent waiting for the experimenter to get his materials in order, while the "productive" time was spent working on meaningful (maze) tasks. Unlike the other groups, young Mexican-American subjects weren't as concerned about productivity or wasting time, and saw (quite accurately) no difference between the "idle" and "productive" intervals. In a somewhat related venture. Langgulung and Torrance (1972) demonstrated that fourth and sixth grade American youngsters were more causally-oriented (on the Torrance Tests of Creative Thinking) than Mexican children of the same ages. Further, American youngsters have been shown to be more competitive and less pro-social with age than Mexicans (Knight & Kagan, 1977).

There is a possibility that many of these cultural differences may be due in part to differences in patterns of interaction between mother and child. Hoppe, Kagan, and Zahn (1977), for example, noted that Anglo-American children entered into conflicts with their mothers more often than did Mexican-American children. And although both Mexican and American mothers rewarded successful performance on the part of their six to eight-year-old children, Mexican mothers gave significantly more rewards for failure (Madsen & Kagan,

1973). As well, in contrast to the Mexican women, American mothers tended to choose more difficult achievement goals for their children and to refrain from lowering these goals even after failure.

To return more specifically to the nonverbal realm, a study by Baxter (1970) has demonstrated that Mexican children (aged five through ten), adolescents (aged ten through 20), and adults (over 20) interacted more proximally than white and black Americans (and also exhibited more touching and bodily-contact). Noting that cultural differences in personal space zones were apparent in all age groups (including the youngest children), Baxter suggested that spatial arrangements learned in childhood perseverate and persist into adult life. Even with tone of voice, it has been found that Mexican children are more sensitive to certain aspects of speech than Canadian youngsters (McCluskey & Albas, 1978). More specifically, Mexican children at all age levels from six through 11 have been found to identify the emotions expressed in filtered speech samples more accurately than Canadian children of corresponding age (McCluskey, Albas, Niemi, Cuevas, & Ferrer, 1975).

THE DOUBLE-BIND HYPOTHESIS

The importance of nonverbal communication in psychotherapy and interpersonal relationships has received a great deal of attention (Culbert, 1968; Cunningham, 1977; Danziger, 1976; DeVito, 1976; Haase & Tepper, 1972; Heun & Heun, 1975;

Kaswan & Love, 1969; Miller, 1976; Makay & Gaw, 1975; Pesso, 1969; Rintye, 1975; Ruesch, 1957, 1972). One clinical theory which places a great deal of importance on the messages coming in on the various communication channels is the double-bind hypthesis. The double-bind, proposed by Bateson, Jackson, Haley, and Weakland (1956), was one of the most promising and enthusiastically received theories of modern psychology. Briefly, Bateson and his colleagues proposed the double-bind in an attempt to account for the origin of schizophrenia; speculating that this form of psychosis was the result of stress generated by contradictory communications (particularly those a child receives from his parents).

The very essence of the double-bind hypothesis is that the contradictory, inconsistent nature of the communication supposedly takes place on two levels: verbal and nonverbal. For example, a mother may tell a child verbally that she loves him, but communicate just the opposite nonverbally (i.e., through facial expression, tone of voice, various actions, etc.). According to the Bateson group, the necessary ingredients for a double-bind situation are: "(1) Two or more people . . . (2) Repeated experience . . . (3) A primary negative injunction . . . (4) A secondary injunction conflicting with the first at a more abstract level . . . (5) A tertiary negative injunction prohibiting escape from the field . . . (6) Finally, the complete set of ingredients is no longer necessary when the victim has learned to perceive

his universe in double-bind patterns" (Bateson, Jackson, Haley, & Weakland, 1956, p. 253-254).

In a later paper, Weakland (1960) refined and extended the definition. In his view, an individual is placed in a double-bind when: (a) he is faced with a communication involving two related, but incongruent messages, (b) a response to the communication is necessary, it can't be continually avoided or ignored, (c) the contradictions in the message are denied or concealed in some manner. To illustrate, any attempt by a child to point out the conflicting nature of the message content typically results in further contradiction with the parent denying any incongruity.

Obviously, the various forms of nonverbal communication are tremendously important in family interaction (Wahlroos, 1974). Scheflen (1972) feels that the double-bind situation stems in large part from an overprotective mother trying both overtly and covertly to hold her family too closely together. When outsiders (such as peers, teachers, or lovers) threaten to break apart the forced and unnatural family relationship, pressures arising from mutually exclusive demands (i.e., mother versus outsiders) cause ambiguity, tension, and confusion in the home situation.

At the family level, Bateson and his co-workers felt that the interactions between a potentially schizophrenic child and his parents (especially the mother) are loaded with aversive inconsistencies and double-binds that continuously confuse the child. The schizophrenic family unit itself may

be a basic contradiction, in that it is often disharmonious yet somehow holding together (Weakland, 1960). In any case, the hidden contradictions in communications eventually result in an inability to discriminate adequately between conflicting messages. Prolonged inconsistency over time is thought to become overwhelming, causing withdrawal, disorientation, defensive probing for hidden meanings, and eventually maladaptive, schizophrenic behaviour patterns on the part of the child.

In many ways, the double-bind is a subjective, clinical concept. Despite the fact that hard-core experimental evidence has been extremely difficult to come by, clinicians have long "felt" that double-bind communications play a major role in emotional and mental disturbance. Indeed, the "feeling" that the double-bind is important was probably the major factor accounting for the acceptance--even the survival--of the hypothesis in the face of widespread criticism.

Examples of double-bind situations are typically anecdotal. To illustrate, one of the classic (and most appealing) examples makes reference to the overprotective mother, who might say something like, "I know you won't be afraid of school anymore, Johnny," to her child. Unfortunately, if she makes this statement in a sobbing tone of voice, with a tense facial expression, tears in her eyes, and while desperately clutching his hand, she can place him in a confusing and traumatic double-bind. She is saying one thing with words while communicating something quite different on the

nonverbal level: the verbal and nonverbal aspects of the communication are clearly incongruent.

The communicator doesn't necessarily have to be visible to produce a contradictory message. Frequently, a double-bind situation can be created merely if a speaker's tone belies the words spoken. To illustrate, a mother can tell her child over the telephone that, "You can do whatever you want," in a tone that implies he had better not.

The First Decade of Double-Bind Research

Due to the intuitive appeal of the double-bind, there were great expectations for the hypothesis after the Bateson group's paper first appeared in 1956. These expecations remained largely unfulfilled, for the double-bind fell short in both theoretical and experimental respects. In a sense, part of the problem was that the double-bind hypothesis generated too much research too quickly. In Bateson's original formulation, the double-bind was a statement about a two-person interaction. The concept began to broaden very quickly, such that Weakland (1960) used it to describe more complex (i.e., family) systems.

Variations of the theory--notably the split double bind (Ferreira, 1960) and the quadruple bind (Lu, 1962)--were proposed. Suddenly, the double-bind was being used not only to account for schizophrenia, but for delinquent behaviour (Ferreira, 1960) and the induction of hypnotic states as well (Haley, 1955). Indeed, the double-bind was applied indiscriminately to the analysis of play and fantasy (Haley, 1955),

the conflicting roles of a psychiatric resident (Coser, 1960), evolutionary theory (Bateson, 1960), written communication (Weakland & Fry, 1962), therapist-client interaction in therapy (Haley, 1963), and humour and laughter (Zuk, 1964). And Watzlawick (1964) took the hypothesis to a more abstract (and even less tangible) level by suggesting that the double-bind could occur intrapersonally in an individual's feelings, thoughts, and perceptions.

Even a quick review of the above literature leaves very little doubt that different researchers had decidedly different notions as to what exactly the double-bind was. In the absence of a precise, workable definition, various vague and unwieldy descriptions of the double-bind came into being, and the whole area began more or less to bog down in a mass of semantic confusion. General non-specific terms, such as "a special ambivalence" (Arieti, 1960), "a kind of inconsistency" (Watzlawick, 1964), and a "conflict situation" (Mishler & Waxler, 1965), were used in an attempt to describe the double-bind, but their vagueness precluded their becoming useful at an empirical level.

In short, the double-bind theory was plagued by uncertainty. It was unclear whether the double-bind could occur only between two persons, or if it could develop in multiple interactions. Weakland and Fry (1962), by suggesting that contradictory situations may be caused by written communications, implicitly questioned the very need for face-to-face interaction in eliciting the double-bind. And, of course,

Watzlawick's (1964) contention that the double-bind could occur in a person's thoughts and feelings also implied that two-(or more) person interaction may not be necessary.

As Schuham (1967) points out in his excellent critique, there also seems to be a great deal of confusion regarding the levels (channels, dimensions, or whatever) of double-bind messages. For example, investigators have referred to the levels in contradictory communications as verbal-nonverbal, abstract-concrete, communication-metacommunication, literal-metaphorical, particular-contextual, and content-relationship. One of the major problems here is that it is inappropriate to select and arbitrarily dichotomize (and thereby oversimplify) communication channels. Often "those levels usually associated with double-bind interaction actually indicate a number of independent dimensions, some being related to the individuals doing the communicating" (Schuham, 1967, p. 410). Each of the foregoing dichotomies poses certain difficulties with respect to theoretical and experimental analysis of double-bind phenomena, and the fact that various investigators view communication levels differently confounds the situation still further.

There are three other areas of theoretical controversy that should be mentioned as well (cf. Schuham, 1967). The first centres upon whether or not the victim must respond to the binder's message. Weakland (1960) contended that an individual cannot avoid a double-bind situation; part of the bind is that he has to respond to a mixed message. Anticipat-

ing the criticism this stipulation would engender, Weakland inferred that it is impossible not to respond to a contradictory communication. In his view, for example, silence is a deliberate ploy (i.e., a method of handling double-bind situations) on the part of the victim. Despite Weakland's rationale, however, the question of victim response is an ambiguous and confusing one.

The second area of controversy concerns the victim's awareness. The question is, in essence, whether it is necessary for an individual to be aware that he is receiving contradictory communications in order that he be affected by them. There is a basic contradiction in the theory here. On the one hand, it is assumed by Bateson, Jackson, Haley, and Weakland (1956) and Weakland (1960) that double-bind messages are difficult to identify because of the binder's concealment and denial. On the other hand, if the concealed message content isn't perceived (i.e., if the victim doesn't realize he is the target of a double-bind communication), it only stands to reason that the power of the contradictory message would be negated.

The final area of disagreement regards the victim leaving the field. Bateson and his colleagues hold that the victim is always prohibited from escaping from the double-bind situation. Sluzki, Beavin, Tarnopolsky, and Veron (1967) took issue with this point, however, and felt that an injunction prohibiting escape need not always be present. And in his formulation of the split double bind, Ferreira (1960) postu-

lated that an individual might sometimes leave or even be pushed out of a double-bind situation.

In any case, these types of theoretical criticisms of the double-bind hypothesis abound in the literature. In all fairness, it should be noted that the Bateson group and others recognize the need for (and have worked towards proposing) a more precise definition of the double-bind phenomenon (Bateson, 1961; Haley, 1963; Jackson, 1960; Sluzki, Beavin, Tarnopolsky, & Veron, 1967; Watzlawick, 1963; Watzlawick, Beavin, & Jackson, 1967; Weakland, 1960). Unfortunately, despite redefinition, retraction, and softening of the hypothesis, the double-bind is still a very confusing and obtuse concept.

Of course, experimental investigation remains the ultimate test of any hypothesis. And despite the interest it generated in the first decade after it was proposed, solid research support for the double-bind was not forthcoming. The clinical-experimental gap widened: the double-bind hypothesis was accepted (on faith, as it were) as a useful concept in the clinic without being supported empirically.

Part of the difficulty lay in the fact that the double-bind is inordinately difficult to test. Lachenmeyer (1965 attributed this to the fact that it is more of a proposition than a hypothesis. He felt that a close look at the double-bind involved a complicated and troublesome two-step process, whereby theorems and postulates have to be deduced from the original theory before testable hypotheses can be isolated. Whatever the reasons, it is clearly a complex methodological

task to attempt "to measure a subtle phenomenon occurring selectively in the interaction between at least two individuals communicating simultaneously on different levels" (Schuham, 1967, p. 409). As a consequence, a large amount of double-bind literature is purely descriptive, dealing with anecdotes, "feelings," family therapy sessions, and clinical interviews. Needless to say, such work--despite its appeal to logic and humanism--is often subjective, unreliable, and uncontrolled (cf. Schuham, 1967).

Research regarding contradictory communication in clinical interviews may be particularly open to suspicion. For example, according to Clausen and Kohn (1960), the double-bind messages which are observed during a clinical investigation may result from the fact that the family of the schizophrenic is used to occasional outbursts, or his otherwise inappropriate responses, and attempts to prevent these in a public setting by presenting a calm and unruffled surface. Furthermore, they state it is equally likely that the stress which accompanies the identification (and possible hospitalization) of the schizophrenic can cause others in the family to respond in ways that differ from their normal behaviour. In other words, it is equally likely that the double-bind communications are a response to the onset of schizophrenia in a family member, rather than the cause.

As Schuham (1967) suggests, from 1956-1966 there were only a few controlled, objective studies carried out on the double-bind, and none of these could be interpreted as

lending solid support to the hypothesis. Ciotola (1961) suggested that schizophrenic rather than nonschizophrenic psychiatric patients would be more affected by a simulated double-bind situation wherein discrimination of two tones was made impossible. However, the hypothesis that schizophrenics would exhibit more tension, greater concreteness, and increased reaction times was not borne out by his data. Turner (1964) did find that schizophrenics identified vocal expressions of emotion less accurately than hospitalized nonpsychiatric controls, but this result doesn't particularly support the double-bind. (In fact, it does quite the opposite, in the sense that schizophrenics--if they are insensitive to tone--might also be thought to be unaware of and unaffected by double-bind messages.)

Potash (1965) simulated the double-bind by designing a two-person, three-choice game. In one choice, subjects were given the opportunity to withdraw from a no-win (i.e., no reinforcement), no-lose situation. Such withdrawal was supposedly representative of schizophrenic withdrawal from contradictory communication. Potash's hypothesis that schizophrenics would exhibit a disproportionately large number of withdrawal responses was not supported; they did not seem to react any more than normals to the double-bind situation.

Berger (1965) performed a study which he interpreted as supporting the double-bind. He gave a "double-bind questionnaire" to matched groups of schizophrenics, nonschizophrenic psychiatric patients, hospital attendants, and college stu-

dents. The questionnaire was composed of a series of binding statements (judged by trained clinicians) gathered from mother-child interactions and clinical interviews. Subjects were required to rate the statements in terms of how frequently they received identical or similar communiques from their own mothers. Berger assessed each questionnaire, and calculated that the schizophrenics received significantly higher "double bindingness" scores than the other groups. It should be noted, however, that this result can hardly be accepted as conclusive, since the procedure was retrospective; it measured the subjects' memory of experiences rather than the actual experiences themselves. Such a retrospective approach is fraught with error, and likely to be both invalid and unreliable (cf. Schuham, 1967).

In another relevant study, Loeff (1966) presented double-bind communications (wherein the content and verbal affect of certain metaphors were contradictory) to normal, delinquent, and schizophrenic subjects. In spite of the fact that schizophrenics are supposed to be confused by incongruent messages, they were able to discriminate between contradictory and non-contradictory emotional communications.

Ringuette and Kennedy (1966), in an elegant and convincing study, cast even more doubt on the double-bind. They asked five groups of subjects to attempt to identify double-bind messages in letters written by parents to their schizophrenic and nonschizophrenic hospitalized offspring. One of the groups of judges consisted of "experts" in the area of the double-

bind (i.e., individuals involved in originating, developing, and extending the hypothesis). Other groups were composed of first-year psychiatric residents, informed clinicians, uninformed clinicians, and persons outside of the social science area altogether. After each of the groups assessed the letters in question, it was found that none could differentiate between letters received by schizophrenic and nonschizophrenic patients. The fact that the so-called "experts" failed to identify double-binds with any degree of reliaibility was particularly disconcerting, for: "If those closely involved in the formulation and elaboration of the double-bind hypothesis cannot agree on its definition, it is not difficult to understand why others do not have a firm grasp of the concept" (Schuham, 1967, p. 414).

All in all, a decade after the initial hypothesis was proposed, theoretical confusion continued to impede research on the double-bind. There was very little controlled investigation in the area, and what research there was mostly failed to support the theory. Although Schuham's (1967) contention that the very existence of the double-bind is open to serious question may be coming on a bit too strongly, there is no doubt that after the first decade the double-bind hypothesis was in serious trouble.

The Second Decade

Work on the double-bind hypothesis was noticeably more productive in the second decade after its origin than in the first. Emphasis shifted from theoretical to empirical, and many studies carried out since 1967 have been well-conceived and objective.

Argyle (1969) showed that when verbal and nonverbal signals are in conflict, the overall message tends to be confusing and disturbing to subjects. And in an attempt to discover whether the words spoken (i.e., the verbal channel) or tone of voice (i.e., the vocal channel) was given more weight by adults making emotional judgments of contradictory speech, Mehrabian and Wiener (1967) selected single words to communicate positive, neutral, and negative affective content. Speakers were required to recite all single words (positive, neutral, and negative) in positive, neutral, and negative tones of voice. Speech samples were recorded and played to undergraduate university students, who rated the emotional content. The results indicated that the vocal channel was dominant. That is, if a positive word was said in a negative tone, the message was generally judged as being negative. This dominance of vocal over verbal cues in incongruent speech has also been noted by other investigators (Fujimoto, 1972).

Mehrabian and Wiener (1967) interpreted this finding as lending support to the double-bind. In essence, they speculated that, in schizophrenic families, most conflicts are likely to be the ones in which verbal aspects of messages

are positive while vocal cues are negative (e.g., the words "I love you," said in a negative tone). Since they were able to demonstrate that conflict is resolved in the direction of vocal signals, Mehrabian and Wiener suggest that such messages are typically interpreted as being negative. In other words, schizophrenics are likely to perceive themselves as being the recipients of great numbers of negative communications. Taking Mehrabian and Wiener's perspective, then, schizophrenics can be thought of as individuals who are consistently negatively reinforced and whose social and interpersonal learning is thereby inhibited.

As mentioned previously, if the speaker is visible nonverbal signals can be transmitted on the visual channel. Using a method similar to that of the Mehrabian and Wiener study, Mehrabian and Ferris (1967) combined three tones of voice (female speakers pronouncing the neutral word "maybe" in an attempt to communicate like, dislike, or neutrality) with degrees of attitude communicated by facial expression (photographs of models attempting to convey the same feelings). The results of this study revealed that university students place slightly more weight on facial expression than on tone of voice when judging emotion. There are also other indications that visual cues have more impact than vocal ones on adults and university students (Bugental, Kaswan, Love, & Fox, 1970; Burns & Beier, 1973; DePaulo, Rosenthal, Eisenstat, Rogers, & Finkelstein, 1978; Levitt, 1962, 1964).

Integrating the earlier findings of Mehrabian and Wiener,

Mehrabian and Ferris (1967, p. 252) suggested that "the combined effect of simultaneous verbal, vocal, and facial attitude communication (in contradictory messages) is a weighted sum of their independent effects--with the coefficients of .07, .38, and .55 respectively." Despite such attempts at precision, they felt that people being addressed on conflicting multiple levels (in a type of double-bind situation) are not consciously aware of the separate levels of communication.

In another study worthy of note, Auger (1970) took still photographs every fifteen seconds of three schizophrenic and three normal subjects who were each speaking about their childhoods. As well, he taped the conversations and prepared typescripts of selected short verbal passages. Three groups of judges--schizophrenics, students, and clinicians--were required to attempt to match each photograph with the appropriate typescript. Although schizophrenic speakers were as congruent as the normals, the schizophrenic judges performed less accurately than either the students or the clinicians. Auger concluded that while the ability to interpret nonverbal cues may be lessened in schizophrenics, it is not entirely absent.

Research With Children

Perhaps the biggest breakthrough in the second decade came when investigators began to turn their attention towards experimentally assessing the effects of contradictory communications on children. Earlier work on the double-bind was somewhat sterile in that, except for anecdotal theorizing and descriptions, it had tended to ignore youngsters. As if suddenly remembering the importance of early experience in development, researchers finally started to take an in depth look at children and the double-bind. Such an approach went a long way towards presenting a more complete picture of the area in general.

The classic study involving children was performed by Bugental, Love, Kaswan, and April (1971), who filmed (videotaped) parent-child communications in "normal" families and in families containing a "disturbed" child. For the purposes of their particular investigation, a disturbed child was one referred by school authorities as exhibiting emotional or behavioural difficulties. Judges rated the videotaped communications with respect to verbal, vocal, and visual content.

To rate the visual channel, the judges were shown a picture on a television monitor without hearing the sound portion of the communication. Conversely, when rating the vocal channel, they heard the message with the intelligible verbal content removed by a filtering device and did not view the visual part of the videotape. The verbal content, as recorded

on typescripts, was also rated. In each case, the judges simply made a decision as to whether they thought the message in question was positive (i.e., characterized by friendliness, approval, or consideration) or negative (i.e., characterized by unfriendliness, disapproval, or inconsiderateness). A message was considered to be incongruent if the emotional content of all three channels was not judged to be the same. For example, if the emotional content of any one channel was positive while the content of either of the other channels was rated as negative, the message was classified as incongruent.

It was found that a significantly greater proportion of mothers of disturbed children emitted conflicting, incongruent communications than did mothers of the normal children. In light of the preceding discussion, it is clear that this finding is consistent with the double-bind hypothesis. However, it seems that incongruent communication on the part of the mother may be central to pathology in general, and not limited specifically to schizophrenia. In a somewhat related study using filtered voice samples, Milmore, Novey, Kagan, and Rosenthal (1974) demonstrated that mothers whose voices had been rated high on measures of anger and anxiety tended to have children who exhibited "various signs of irritability" (such as crying and upset) at separation.

Olsen (1967) looked specifically at the roles of the verbal and vocal channels of speech in incongruent messages to youngsters. He played incongruent communications, in which

the emotional meaning communicated through tone of voice was contrary to that conveyed by semantic content, to children 5, 7, 9, 11, and 13 years of age. In general, the children attended to the verbal portion of the message and discounted the tonal information. Although adults seem to put more emphasis on tone than words when judging expressions of emotion (Fujimoto, 1972; Mehrabian & Wiener, 1967), Olsen's (1967) results suggest that children respond in just the opposite manner. However, since the preference for the verbal components of the message declined somewhat with age, Olsen speculated that, with increasing age, children reveal a growing awareness for the subtle interaction between tone and semantic content.

In yet another study providing specific information about the effects of double-bind communications, Bugental, Kaswan, and Love (1970) prepared videotapes of acted communications containing incongruence between verbal (typescripts of semantic content), vocal (tone), and visual (facial expression) channels. The emotion communicated on each channel was either positive or negative. All possible positive-negative content combinations of the three channels (i.e., eight possible combinations) were acted out by two male and two female speakers.

The verbal content, as recorded on typescripts, was rated by at least 25 judges, who all had to be in agreement as to whether each verbal message was positive or negative. A panel of six judges rated both the vocal and visual information to determine if the intended content was communicated on each

channel. As in the aforementioned study, judges rating the vocal channel heard the tonal message with the verbal content removed by a filter and did not view the visual part of the communication. However, when rating the visual channel, the judges were shown the speakers' facial expressions on a television monitor, without hearing the audio portion of the message.

The age and sex of both the communicator and the receiver were critical variables in the interpretation of incongruent messages. When the videotapes were played to children aged five through twelve, as well as to parents, it was found that "joking" messages (negative script, negative tone, and positive picture) were interpreted significantly more negatively by children than by adults. This age difference was most pronounced when the incongruent communications were enacted by females. Adults appeared to conclude that critical statements said with a smile were not meant to be entirely negative. However, children tended to resolve conflicting messages by accepting the negative component while ignoring the positive aspects of the communication, especially if the speaker was female. These results suggest communications intended to be joking or sarcastic (i.e., not necessarily negative) may be interpreted negatively by children. (This finding supports the view espoused by teachers and clinicians who have long insisted that it is a mistake to be sarcastic with young children. They feel that sarcasm is a clear case of incongruency, and that many youngsters simply do not

understand it.)

The finding that children reacted most negatively to incongruent communication from female speakers has led to additional research. Beakel and Mehrabian (1969) found that mothers produce more incongruent messages than fathers. Bugental, Love, and Gianetto (1971) showed that children interpreted statements from an adult male as being more friendly if he was smiling. However, there was no difference in children's judgments of a message enacted by a female when she was smiling from when she was not (which caused the researchers to describe female faces as perfidious). And it seems that when a woman's smile is the only positive aspect of a communication, children tend to judge the message to be negative, while adults regard it as neutral (Bugental, Kaswan, & Love, 1970).

In a related study, it was demonstrated that young children placed less importance on the visual channel (facial expression) when making emotional judgments than did adults (Bugental, Kaswan, Love, & Fox, 1970). This age trend was again strongest for the perception of female messages. What a person says and how he or she says it seem to be more important to children than how that individual looked while speaking.

A Redefinition

In summary, despite the widespread interest it aroused, the double-bind hypothesis generated little more than contradictory theorizing and disappointing research in the first ten years following its proposal. Much of the initial theorizing on the topic was pointless, confusing, and, in effect, an impediment to experimentation.

Still, the efforts of the first ten years at least served to provide some sort of foundation on which to build. As a consequence, in the second decade after the Bateson group's paper first appeared, more solid work was forthcoming and the double-bind hypothesis began to live up to its initial promising reviews, so to speak. From 1967 on, the studies discussed above, and others like them, have added a great deal to our knowledge of contradictory communication and the double-bind. In particular, developmental research has been especially helpful. However, while such studies have augmented our knowledge in the area, they have also implicitly underscored the need for some basic revision of the original hypothesis.

Although no one seems to have verbalized the fact, what really happened in the productive second decade was that investigators began to discard theoretical restraints. Rather than continue to be bound in by rigid theory, they "unconsciously" softened the double-bind hypothesis. That is, researchers found it fruitful to worry less about theoretical issues (such as how many people need to be involved in a double-

bind situation or whether or not the victim can leave the field), and more about the general overall effects of contradictory communications.

Gradually, some investigators began to think of double-bind messages as a sufficient, but not necessary cause of schizophrenia. Others went a step further, implying that the obsession with tying the double-bind to schizophrenia was unwarranted and unproductive. For example, Bugental, Love, Kaswan, and April (1971) showed that--given a certain set of circumstances--it was likely that contradictory communication was involved in "disturbance" (but not necessarily in schizophrenia per se).

This loose view of the double-bind may be imprecise and unsatisfying in a way, but at least it isn't restrictive. Rather than trying to fit their research into a confining theoretical framework, investigators should be free to formulate their own hypotheses and proceed from there. Ten years ago it was unjustified (in the absence of solid reserach) to support the view that the double-bind even existed (cf. Schuham, 1967). Now that some researchers have in part abandoned the original hypothesis, we are able to say that contradictory communications seem to be having a pronounced effect, and that children and adults respond in fairly specific ways to such messages.

APPENDIX II

REFERENCES

REFERENCES

Aiello, J.R., & Jones, S.E. Field study of the proxemic behavior of young school children in three subcultural groups. Journal of Personality and Social Psychology, 1971, 19, 351-356.

Albas, D.C., McCluskey, K.W., & Albas, C.A. Perception of the emotional content of speech: A comparison of two Canadian groups. Journal of Cross-Cultural Psychology, 1976, 7, 481-490.

Anon. Mexico says it with gestures. Pemex Travel Club Bulletin, 1941, 3, 5-6.

Anon. Gestures betray you. Science Digest, 1948, December, 42.

Anon. Every little movement: Gesture 'art' south of the border. New Orleans Item, 1950, April, 5A.

Archer, D., & Akert, R.M. Words and everything else: Verbal and nonverbal cues in social interpretation. Journal of Personality and Social Psychology, 1977, 35, 443-449.

Argyle, M. Social interaction. New York: Aldine-Atherton, 1969.

Argyle, M. Nonverbal communication in human social interaction. In R.A. Hinde (Ed.), Nonverbal communication, Cambridge: University Press, 1972a.

Argyle, M. The psychology of interpersonal behaviour. Harmondsworth: Penguin, 1972b.

Argyle, M. (Ed.), Social encounters: Readings in social interaction. Chicago: Aldine, 1973.

Argyle, M. Bodily communication. London: Methuen, 1975.

Argyle, M., & Cook, M. Gaze and mutual gaze. Cambridge: Cambridge University Press, 1976.

Argyle, M., & Dean, J. Eye contact, distance, and affiliation. Sociometry, 1965, 28, 289-304.

Arieti, S. Recent conceptions and misconceptions of schizophrenia. American Journal of Psychotherapy, 1960, 14, 3-29.

Arnold, M.B. (Ed.), The nature of emotion. London: Penguin, 1968.

Arnold, M.B. (Ed.), Feelings and emotions. New York: Academic Press, 1970.

Auger, E.R. Nonverbal communication of normal individuals and schizophrenic patients in the psychological interview. Dissertation Abstracts International, 1970, 30, 3860.

Austin, W.M. Nonverbal communication. In A.L. Davis (Ed.), Culture, class, and language variety. Urbana, Illinois: National Council of Teachers of English, 1972.

Barbara, D.A. Nonverbal communication. Journal of Communication, 1963, 13, 166-173.

Barcus, F.E. Communications content: Analysis of the research, 1900-1958. Ph.D. dissertation, University of Illinois, 1959.

Bateson, G. Minimal requirements for a theory of schizophrenia. Archives of General Psychiatry, 1960, 2, 477-491.

Bateson, G., Jackson, D.D., Haley, J., & Weakland, J.H. Toward a theory of schizophrenia. Behavioral Science, 1956, 1, 251-264.

Bauml, B.J., & Bauml, F.H. A dictionary of gestures. Metuchen, New Jersey: Scarecrow Press, 1975.

Baxter, J.C. Interpersonal spacing in natural settings. Sociometry, 1970, 33, 444-456.

Beakel, N.G. Parental verbal and nonverbal communication and psychopathology. Dissertation Abstracts International, 1971, 31, 4325.

Beakel, N.G., & Mehrabian, A. Inconsistent communications and psychopathology. Journal of Abnormal Psychology, 1969, 74, 126-130.

Beebe, S.A. Eye contact: A nonverbal determinant of speaker credibility. The Speech Teacher, 1974, 23, 21-25.

Beier, E.G. Nonverbal communication: How we send emotional messages. Psychology Today, 1974, 8, 52-56.

Beier, E.G., & Zautra, A.J. Identification of vocal communication of emotions across cultures. Journal of Consulting and Clinical Psychology, 1972, 39, 166.

Beinhauer, W. El caracter espanol. (Trans. of Der spanische nationalcharakter). Madrid: Hayes, 1942.

Beldoch, M. Sensitivity to expression of emotional meaning in three modes of communication. In J.R. Davitz (Ed.), The communication of emotional meaning. New York: McGraw-Hill, 1964.

Benedict, R. Patterns of culture. Boston: Houghton Mifflin, 1959.

Benthall, J., & Polhemus, T. (Eds.), The body as a medium of expression. New York: Dutton, 1975.

Berger, A. A test of the double bind hypothesis of schizophrenia. Family Process, 1965, 4, 198-205.

Birdwhistell, R.L. Introduction to kinesics: An annotation system for analysis of body motion and gesture. Washington, D.C.: Foreign Service Institute, Department of State, 1952.

Birdwhistell, R.L. The kinesic level in the investigation of emotions. In P.H. Knapp (Ed.), Expression of the emotions in man. New York: International Universities Press, 1963.

Birdwhistell, R.L. Some relations between American kinesics and spoken American English. In A.G. Smith (Ed.), Communication and culture: Readings in the codes of human interaction. New York: Holt, Rinehart & Winston, 1966.

Birdwhistell, R.L. Kinesics and context: Essays on body motion communication. Philadelphia: University of Pennsylvania Press, 1970.

Bohannon, J.N. Normal and scrambled grammar in discrimination, imitation, and comprehension. Child Development, 1976, 47, 669-681.

Boring, E.G. A history of experimental psychology. New York: Appleton-Century-Crofts, 1950.

Boyle, V.A. Visual stimulation and comprehension of compressed speech. Dissertation Abstracts International, 1970, 30, 5221.

Breed, G., & Colaiuta, V. Looking, blinking, and sitting: Nonverbal dynamics in the classroom. Journal of Communication, 1974, 24, 75-81.

Bregenser, J. Campus dress styles as communication. Sociological Symposium, 1970, 5, 31-39.

Brislin, R.W., Bochner, S., & Lonner, W.J. (Eds.), Cross-cultural perspectives on learning. New York: John Wiley & Sons, 1975.

Brislin, R.W., Lonner, W.J., & Thorndike, R.M. Cross-cultural research methods. New York: John Wiley & Sons, 1973.

Brown, B.L., & Lambert, W.E. A cross-cultural study of social status markers in speech. Canadian Journal of Behavioural Science, 1976, 8, 39-55.

Brown, R. A first language: The early stages. Cambridge, Massachusetts: Harvard University Press, 1973.

Buck, R. Nonverbal communication of affect in children. Journal of Personality and Social Psychology, 1975, 31, 644-653.

Buck, R. Nonverbal communication of affect in preschool children: Relationships with personality and skin conductance. Journal of Personality and Social Psychology, 1977, 35, 225-236.

Buck, R., Miller, R.E., & Caul, W.F. Sex, personality and physiological variables in the communication of affect via facial expression. Journal of Personality and Social Psychology, 1974, 30, 587-596.

Buck, R.W., Savin, V.J., Miller, R.E., & Caul, W.F. Communication of affect through facial expressions in humans. Journal of Personality and Social Psychology, 1972, 23, 362-371.

Bugental, D.E., Henker, B., & Whalen, C.K. Attributional antecedents of verbal and vocal assertiveness. Journal of Personality and Social Psychology, 1976, 34, 405-411.

Bugental, D.E., Kaswan, J.W., & Love, L.R. Perception of contradictory meanings conveyed by verbal and nonverbal channels. Journal of Personality and Social Psychology, 1970, 16, 647-655.

Bugental, D.E., Kaswan, J.W., Love, L.R., & Fox, M.N. Child versus adult perception of evaluative messages in vocal, and visual channels. Developmental Psychology, 1970, 2, 367-375.

Bugental, D.E., & Love, L.R. Nonassertive expression of parental approval and disapproval and its relationship to child disturbance. Child Development, 1975, 46, 747-752.

Bugental, D.E., Love, L.R., & Gianetto, R.M. Perfidious feminine faces. Journal of Personality and Social Psychology, 1971, 17, 314-318.

Bugental, D.E., Love, L.R., Kaswan, J.W., & April, C. Verbal-nonverbal conflict in parental messages to normal and disturbed children. Journal of Abnormal Psychology, 1971, 77, 6-10.

Bullowa, M. Non-verbal communication in infancy. Paper read at the First Congress of the International Association for Semiotic Studies, Milan, 1974.

Bullowa, M., Jones, L.G., & Bever, T.G. The development from vocal to verbal behavior in children. Monographs of the Society for Research in Child Development, 1964, 29, 101-114.

Burns, K.L., & Beier, E.G. Significance of vocal and visual channels in the decoding of emotional meaning. Journal of Communication, 1973, 23, 118-130.

Burns, T. Non-verbal communication. Discovery, 1964, 25, 30-37.

Cannon, W.B. The James-Lange theory of emotions: A critical examination and an alternative theory. American Journal of Psychology, 1927, 39, 106-124.

Carney, T.F. Content analysis: A technique for systematic inference from communications. Winnipeg: University of Manitoba Press, 1972.

Chaytor, H.J. From script to print: An introduction to medieval vernacular literature. Cambridge: W. Heffer & Sons, 1950.

Chen, H.P., & Irwin, O.C. Infant speech vowel and consonant types. Journal of Speech Disorders, 1946, 11, 27-29.

Chester, S.L., & Egolf, D.B. Nonverbal communication and aphasia therapy. Language and Language Behavior Abstracts, 1975, 9, 7500804.

Cicourel, A.V. Gestural sign language and the study of non-verbal communication. Sign Language Studies, 1974, 4, 35-76.

Cicourel, A.V., & Boese, R.J. Sign language acquisition and the teaching of deaf children. In C.B. Cazden, V.P. John, & D. Hymes (Eds.), Functions of language in the classroom. Columbia University: Teachers College Press, 1972.

Ciotola, P.V. The effect of two contradictory levels of reward and censure on schizophrenics. Ph.D. dissertation, University of Missouri, 1961.

Clausen, J.A., & Kohn, M.L. Social relations and schizophrenia: A research report and a perspective. In D.D. Jackson (Ed.), The etiology of schizophrenia. New York: Basic Books, 1960.

Comfort, A. Communication may be odorous. New Scientist and Science Journal, 1971, 49, 414-424.

Condon, J.C., & Yousef, F.S. An introduction to intercultural communication. Indianapolis: Bobbs-Merrill, 1975.

Cook, M. Anxiety, speech disturbances, and speech rate. British Journal of Social and Clinical Psychology, 1965, 4, 1-7.

Coser, R.L. Laughter among colleagues. Psychiatry, 1960, 23, 81-95.

Cranach, M. von. Nonverbal social communication. New York: Academic Press, 1974.

Critchley, M. The silent language. London: Butterworths, 1975.

Cronbach, L.J., & Drenth, P.J.D. (Eds.), Mental tests and cultural adaptation. The Hague: Mouton, 1972.

Culbert, S.A. The interpersonal process of self-disclosure: It takes two to see one. New York: Renaissance Editions, 1968.

Cundiff, M. Kinesics: The power of silent command. West Nyack, New York: Parker, 1972.

Cunningham, M.R. Personality and the structure of the nonverbal communication of emotion. Journal of Personality, 1977, 45, 564-584.

Dale, P.S. Language development: Structure and function. Hinsdale, Illinois: The Dryden Press, 1972.

Danziger, K. Interpersonal communication. New York: Pergamon Press, 1976.

Darwin, C.R. The expression of the emotions in man and animals. New York: Appleton, 1899.

Darwin, C.R. The descent of man and selection in relation to sex. New York: J.A. Hill & Co., 1904.

Davis, F. Inside intuition: What we know about nonverbal communication. New York: McGraw-Hill, 1973.

Davis, M. (Ed.), Body movement: Perspectives in research. New York: Arno Press, 1972.

Davitz, J.R. (Ed.), The communication of emotional meaning. New York: McGraw-Hill, 1964.

Davitz, J.R. A dictionary and grammar of emotion. In M.B. Arnold (Ed.), Feelings and emotions. New York: Academic Press, 1970.

Davitz, J.R., & Davitz, L.J. The communication of feelings by content-free speech. Journal of Communication, 1959a, 9, 6-13.

Davitz, J.R., & Davitz, L.J. Correlates of accuracy in the communication of feelings. Journal of Communication, 1959b, 9, 110-117.

Davitz, J.R., & Davitz, L.J. Nonverbal vocal communication of feeling. Journal of Communication, 1961, 11, 81-86.

DePaulo, B.M., Rosenthal, R., Eisenstat, R.A., Rogers, P.L., & Finkelstein, S. Decoding discrepant nonverbal cues. Journal of Personality and Social Psychology, 1978, 36, 313-323.

DeVito, J.A. The interpersonal communication book. New York: Harper & Row, 1976.

Dimitrovsky, L. The ability to identify the emotional meaning of vocal expressions at successive age levels. In J.R. Davitz (Ed.), The communication of emotional meaning. New York: McGraw-Hill, 1964.

Diringer, D. The alphabet: A key to the history of mankind. New York: Philosophical Library, 1948.

Dittmann, A.T. Interpersonal messages of emotion. New York: Springer, 1972.

Dudeck, J.E. A developmental study of haptic-tactual perceptual skill utilization among sighted, partially sighted, and blind children. Dissertation Abstracts International, 1974, 35, 5151B.

Duncan, S. Nonverbal communication. Psychological Bulletin, 1969, 72, 118-137.

Dusenberry, D., & Knower, F.H. Experimental studies of the symbolism of action and voice. II. A study of the specificity of meaning in abstract tonal symbols. Quarterly Journal of Speech, 1939, 25, 67-75.

Eibl-Eibesfeldt, I. Liebe und hass. Munich: R. Piper, 1970a.

Eibl-Eibesfeldt, I. Ethology: The biology of behavior. New York: Holt, Rinehart & Winston, 1970b.

Eibl-Eibesfeldt, I. Similarities and differences between cultures in expressive movements. In R.A. Hinde (Ed.), Nonverbal communication. Cambridge: Cambridge University Press, 1972.

Eisenberg, A.M., & Smith, R.R. Nonverbal communication. Indianapolis: Bobbs-Merrill, 1971.

Ekman, P. Communication through nonverbal behavior. A source of information about an interpersonal relationship. In S.S. Tomkins & C.E. Izard (Eds.), Affect, cognition, and personality. New York: Springer, 1965.

Ekman, P. Universal facial expressions of emotion. California Mental Health Research Digest, 1970, 8, 151-158.

Ekman, P. Universals and cultural differences in facial expressions of emotion. In J.K. Cole (Ed.), Nebraska symposium on motivation. Lincoln: University of Nebraska Press, 1972.

Ekman, P., & Friesen, W.V. A tool for the analysis of motion picture film or videotape. American Psychologist, 1969a, 24, 240-243.

Ekman, P., & Friesen, W.V. Nonverbal leakage and clues to deception. Psychiatry, 1969b, 32, 88-106.

Ekman, P., & Friesen, W.V. Consonants across cultures in face and emotion. Journal of Personality and Social Psychology, 1971, 17, 124-129.

Ekman, P., & Friesen, W.V. Hand movements. Journal of Communication, 1972, 22, 353-374.

Ekman, P., & Friesen, W.V. Detecting deception from the body or face. Journal of Personality and Social Psychology, 1974, 29, 288-298.

Ekman, P., Friesen, W.V., & Scherer, K.R. Body movement and voice pitch in deceptive interaction. Semiotica, 1976, 16, 23-27.

Ekman, P., Friesen, W.V., & Taussig, T.G. VID-R and SCAN: Tools and methods for the automated analysis of visual records. In G. Gerbner, O.R. Holsti, K. Krippendorff, W.J. Paisley, & P.J. Stone (Eds.), The analysis of communication content. New York: John Wiley & Sons, 1969.

Ekman, P., Friesen, W.V., & Tomkins, S.S. Facial affect scoring technique: A first validity study. Semiotica, 1971, 3, 37-58.

Eshkol, N. The hand book: The detailed notation of hand and finger movements and forms. Tel Aviv: Movement Notation Society, 1971.

Evans, G.W., & Howard, R.B. Personal space. Psychological Bulletin, 1973, 80, 334-344.

Exline, R.V. Visual interaction: The glances of power and preference. In J.K. Cole (Ed.), Nebraska symposium on motivation. Lincoln: University of Nebraska Press, 1972.

Exline, R.V., & Winters, L.C. Affective relations and mutual gaze in dyads. In S.S. Tomkins & C.E. Izard (Eds.), Affect, cognition, and personality. New York: Springer, 1965.

Fairbanks, G., & Pronovost, W. Vocal speech during simulated emotion. Science, 1938, 88, 382.

Fairbanks, G., & Pronovost, W. An experimental study of pitch characteristics of the voice during the expression of emotion. Speech Monographs, 1939, 6, 87-104.

Fast, J. Body language. New York: M. Evans & Co., 1970.

Feinman, S., & Entwisle, D.R. Children's ability to recognize other children's faces. Child Development, 1976, 47, 506-510.

Feldman, S.S. On blushing. Psychiatric Quarterly, 1941, 15, 249-261.

Fenster, C.A. Vocal communication of emotional meaning among adults and children. Dissertation Abstracts International, 1967, 28, 1964-1965.

Fenster, C.A., & Goldstein, A.M. The emotional world of children vis a vis the emotional world of adults: An examination of vocal communication. Journal of Communication, 1971, 21, 353-362.

Ferreira, A.J. The double-bind and delinquent behavior. Archives of General Psychiatry, 1960, 3, 359-367.

Firth, R.W. Symbols: Public and private. Ithaca: Cornell University Press, 1973.

Ford, B. Body language: What it reveals about you. Science Digest, 1970, 68, 16-21.

Freedman, D.G. The survival value of the beard: There's status in it -- and sexual magnetism. Psychology Today, 1969, 3, 36-39.

Fry, A.M., & Willis, F.N. Invasion of personal space as a function of the age of the invader. Psychological Record, 1971, 21, 385-389.

Fujimoto, E.K. The comparative communicative power of verbal and nonverbal symbols. Dissertation Abstracts International, 1972, 32, 4152.

Gates, G.S. The role of the auditory element in the interpretation of emotions. Psychological Bulletin, 1927, 24, 175.

Gerbner, G., Holsti, O.R., Krippendorff, K., Paisley, W.J., & Stone, P.J. The analysis of communication content. New York: John Wiley & Sons, 1969.

Goffman, E. The presentation of self in everyday life. New York: Doubleday Anchor, 1959.

Goffman, E. Encounters. Indianapolis: Bobbs-Merrill, 1961.

Goffman, E. Behavior in public places: Notes on the social organization of gatherings. New York: The Free Press of Glencoe, 1963.

Goffman, E. Interaction ritual: Essays in face-to-face behavior. Chicago: Aldine, 1967.

Goffman, E. Relations in public. New York: Harper & Row, 1972.

Goldhaber, G.M. Listener comprehension of compressed speech as a function of academic grade level of the subjects. Journal of Communication, 1970, 20, 167-173.

Goldhaber, G.M., & Weaver, C.H. Listener comprehension of compressed speech when the difficulty, rate of presentation, and sex of listener are varied. Speech Monographs, 1968, 35, 20-25.

Haase, R.F., & Tepper, D.T. Nonverbal components of empathic communication. Journal of Counseling Psychology, 1972, 19, 417-424.

Hagen, C., Porter, W., & Brink, J. Nonverbal communication: An alternate mode of communication for the child with severe cerebral palsy. Journal of Speech and Hearing Disorders, 1973, 78, 448-455.

Hahn, M.E., & Simmel, E.C. (Eds.), Communicative behavior and evolution. New York: Academic Press, 1976.

Haley, J. Paradoxes in play, fantasy, and psychotherapy. Psychiatric Research Reports, 1955, 2, 52-58.

Haley, J. Strategies of psychotherapy. New York: Grune & Stratton, 1963.

Hall, E.T. The silent language. Garden City, New York: Doubleday, 1959.

Hall, E.T. A system for the notation of proxemic behavior. American Anthropologist, 1963, 65, 1003-1026.

Hall, E.T. Silent assumptions in social communication. Disorders of Communication, 1964, 42, 41-55.

Hall, E.T. The hidden dimension. Garden City, New York: Doubleday, 1966.

Hall, J.A. Gender effects in decoding nonverbal cues. Psychological Bulletin, 1978, 85, 845-857.

Hargreaves, W.A., Starkweather, J.A., & Blacker, K.H. Voice quality in depression. Journal of Abnormal Psychology, 1965, 70, 218-220.

Harmon, L.D. The recognition of faces. Scientific American, 1973, 229, 70-82.

Harrison, R.P. Beyond words: An introduction to nonverbal communication. Englewood Cliffs, New Jersey: Prentice-Hall, 1974.

Harrison, R.P., Cohen, A.A., Crouch, W.W., Genova, B.K.L., & Steinberg, M. The nonverbal communication literature. Journal of Communication, 1972, 22, 460-476.

Harrison, R.P., & Knapp, M.L. Toward an understanding of nonverbal communication systems. Journal of Communication, 1972, 22, 339-352.

Hays, W.L. Statistics for the social sciences. New York: Holt, Rinehart & Winston, 1973.

Henley, N.M. Power, sex, and nonverbal communication. Berkeley Journal of Sociology, 1973, 18, 1-26.

Heshka, S., & Nelson, Y. Interpersonal speaking distance as a function of age, sex, and relationship. Sociometry, 1972, 35, 491-498.

Hess, E.H. Attitude and pupil size. Scientific American, 1965, 212, 46-54.

Heun, L.R., & Heun, R.E. Developing skills for human interaction. Columbus, Ohio: Charles E. Merrill, 1975.

Hewes, G.W. Gesture language in cultural contact. Sign Language Studies, 1974, 4, 1-34.

Hillestad, R.C. A schematic approach to a theoretical analysis of dress as nonverbal communication. Ph.D. dissertation, Ohio State University, 1974.

Hinde, R.A. (Ed.), Nonverbal communication. Cambridge: Cambridge University Press, 1972.

Hindmarch, I. Eyes, eye-spots and pupil dilation. In M. Von Cranach & I. Vine (Eds.), Social communication and movement: Studies of interaction and expression in man and chimpanzee. New York: Academic Press, 1973.

Hogan, T.P. Survey of school attitudes. New York: Harcourt Brace Jovanovich, 1975.

Holsti, O.R. Content analysis for the social sciences and humanities. Don Mills: Addison-Wesley, 1969.

Holzman, P.S., & Rousey, C. The voice as percept. Journal of Personality and Social Psychology, 1966, 4, 78-86.

Hoppe, C.M., Kagan, S.M., & Zahn, G.L. Conflict resolution among field-independent and field-dependent Anglo-American and Mexican-American children and their mothers. Developmental Psycholgy, 1977, 13, 591-598.

Hore, T. Social class differences in some aspects of the non-verbal communication between mother and preschool child. Australian Journal of Psychology, 1970, 22, 21-27.

Horn, M.J. The second skin: An interdisciplinary study of clothing. Boston: Houghton Mifflin, 1968.

Howell, R.W., & Vetter, H.J. Language in behavior. New York: Human Sciences Press, 1975.

Irwin, O.C., & Chen, H.P. A reliability study of speech sounds observed in the crying of newborn infants. Child Development, 1941, 12, 351-368.

Irwin, O.C., & Curry, T. Vowel elements in the crying vocalization of infants under ten days of age. Child Development, 1941, 12, 99-109.

Izard, C.E. The face of emotion. New York: Meredith, 1971.

Izard, C.E. Human emotions. New York: Plenum, 1977.

Izard, C.E. Cross-cultural perspectives on emotion and emotion communication. In H.C. Triandis & W.J. Lonner (Eds.), Handbook of cross-cultural Psychology, Vol. 3: Basic Processes. Rockleigh, New Jersey: Allyn & Bacon, 1980.

Jackson, D.D. (Ed.), The etiology of schizophrenia. New York: Basic Books, 1960.

Janisse, M.P. Pupillometry: The psychology of the pupillary response. Washington, D.C.: Hemisphere (Wiley), 1977.

Johnson, P. The use of para-linguistic features in the teaching of Spanish to English speakers. The Informant (Newsletter, Dept. of Linguistics, Western Michigan University), 1976, 8, 1-8.

Kagan, S., & Buriel, R. Field dependence-independence and Mexican-American culture and education. In J.L. Martinez (Ed.), Chicano Psychology, New York: Academic Press, 1977.

Kalish, B. A study of non-verbal interaction in the classroom. Manuscript, Developmental Center for Autistic Children, Philadelphia, 1970.

Kaswan, J.W., & Love, L.R. Confrontation as a method of clinical intervention. Journal of Nervous and Mental Disease, 1969, 148, 224-237.

Kaulfers, W.V. A handful of Spanish. Education, 1932, 52, 423-428.

Kendon, A., Harris, R.M., & Key, M.R. Organization of behavior in face-to-face interaction. The Hague: Mouton, 1975.

Key, M.R. Paralanguage and kinesics (Nonverbal communication). Metuchen, New Jersey: The Scarecrow Press, 1975.

Key, M.R. Nonverbal communication: A research guide and bibliography. Metuchen, New Jersey: The Scarecrow Press, 1977.

Kirk, R.E. Experimental design: Procedures for the behavioral sciences. Belmont, California: Brooks/Cole, 1969.

Kleinke, C.L. First impressions: The psychology of encountering others. Englewood Cliffs, New Jersey: Prentice-Hall, 1975.

Knapp, M.L. Nonverbal communication in human interaction. New York: Holt, Rinehart & Winston, 1972.

Knapp, M.L. Social intercourse: From greeting to goodbye. Boston: Allyn & Bacon, 1978.

Knight, G.P., & Kagan, S. Development of prosocial and competitive behaviors in Anglo-American and Mexican-American children. Child Development, 1977, 48, 1385-1394.

Knower, F.H. Analysis of some experimental variations of simulated vocal expressions of the emotions. Journal of Social Psychology, 1941, 14, 369-372.

Knower, F.H. Studies in the symbolism of voice and action. The use of behavioral and tonal symbols as tests of speaking achievement. Journal of Applied Psychology, 1945, 29, 229-235.

Kramer, E. Judgement of personal characteristics and emotions from nonverbal properties of speech. Psychological Bulletin, 1963, 60, 408-420.

LaBarbera, J.D., Izard, C.E., Vietze, P., & Parisi, S.A. Four- and six-month-old infants' visual responses to joy, anger, and neutral expressions. Child Development, 1976, 47, 535-538.

LaBarre, W. The cultural basis of emotions and gestures. Journal of Personality, 1947, 16, 49-68.

Lachenmeyer, C.W. A note on two theoretical problems with the family process research on the etiology of schizophrenia. The Journal of Genetic Psychology, 1965, 118, 149-150.

Lacroix, J.M., & Rioux, Y. La communication non-verbale chez les bilingues. Canadian Journal of Behavioural Science, 1978, 10, 130-140.

LaFrance, M., & Mayo, C. Moving bodies: Nonverbal communication in social relationships. Monterey, California: Brooks/Cole, 1978.

Lange, C.G., & James, W. The emotions. Baltimore: Williams & Wilkins, 1922.

Langgulung, H., & Torrance, E.P. The development of causal thinking of children in Mexico and in the United States. Journal of Cross-Cultural Psychology, 1972, 3, 315-320.

Lanzetta, J.T., & Kleck, R.E. Encoding and decoding of nonverbal affect in humans. Journal of Personality and Social Psychology, 1970, 16, 12-19.

Leathers, D.G. Nonverbal communicative systems. Boston: Allyn & Bacon, 1976.

Lerner, R.M., Iwawaki, S., & Takashi, C. Development of personal space schemata among Japanese children. Developmental Psychology, 1976, 12, 466-467.

Levitt, E.A. The relationship between vocal and facial emotional communicative abilities. Dissertation Abstracts International, 1962, 23, 1783.

Levitt, E.A. The relationship between abilities to express emotional meanings vocally and facially. In J.R. Davitz (Ed.), The communication of emotional meaning. New York: McGraw-Hill, 1964.

Lewis, O. Life in a Mexican Village: Tepoztlan restudied. Urbana: University of Illinois Press, 1951.

Lewis, O. The children of Sanchez: Autobiography of a Mexican family. New York: Random House, 1961.

Lewis, O. Five families: Mexican case studies in the culture of poverty. New York: Science Editions, 1962.

Lewis, O. A death in the Sanchez family. New York: Random House, 1969.

Little, K.B. Cultural variations in social schemata. Journal of Personality and Social Psychology, 1968, 10, 1-7.

Loeff, R.G. Differential discrimination of conflicting emotional messages by normal, delinquent, and schizophrenic adolescents. Ph.D. dissertation, Indiana University, 1966.

Lonner, W.J. The SVIB visits German, Austrian, and Swiss psychologists. American Psychologist, 1968, 23, 164-179.

Lonner, W.J. Western-based tests in intercultural counseling. In P. Pedersen, W.J. Lonner, & J. Draguns (Eds.), Counseling across cultures. Honolulu: University of Hawaii Press, 1976.

Lonner, W.J., & Adams, H.L. Interest patterns of psychologists in nine western nations. Journal of Applied Psychology, 1972, 56, 146-151.

Lorenz, K. King Solomon's ring. New York: Thomas Y. Crowell Co., 1952.

Lotman, J. Different cultures, different codes. Times Literary Supplement, 1973, 3, 1213-1215.

Lounsbury, F.G. Pausal, juncture, and hesitation phenomena. In E. Osgood & T.A. Sebeok (Eds.), Psycholinguistics: A survey of theory and research problems. Baltimore: William & Wilkins, 1954.

Lu, Y.C. Contradictory parental expectations in schizophrenia. Archives of General Psychiatry, 1962, 6, 219-234.

Madsen, M.C., & Kagan, S. Mother-directed achievement of children in two cultures. Journal of Cross-Cultural Psychology, 1973, 4, 221-228.

Mahl, G.F., Disturbances and silences in the patient's speech in psychotherapy. Journal of Abnormal and Social Psychology, 1956, 53, 1-15.

Mahl, G.F., & Schulze, G. Psychological research in the extralinguistic area. In T.A. Sebeok, A.S. Hayes, & M.C. Bateson (Eds.), Approaches to semiotics. The Hague: Mouton, 1964.

Makay, J.J., & Gaw, B.A. Personal and interpersonal communication: Dialogue with the self and others. Columbus, Ohio: Charles E. Merrill, 1975.

McCardle, E.S. Nonverbal communication. New York: Marcel Dekker, 1974.

McCarthy, D. Some possible explanations of sex differences in language development and disorders. Journal of Psychology, 1953, 35, 155-160.

McCarthy, D. Language development. In L. Carmichael (Ed.), Manual of child psychology. New York: John Wiley & Sons, 1954.

McCluskey, K.W. Age differences in the perception of the emotional content of nonfiltered and filtered vocal expressions. Master's thesis, University of Manitoba, 1974.

McCluskey, K.W., & Albas, D.C. Differential sensitivity to contradictory communication as a function of age and culture. Journal of Cross-Cultural Psychology, 1978, 9, 167-178.

McCluskey, K.W., Albas, D.C., Niemi, R.R., Cuevas, C., & Ferrer, C. Cross-cultural differences in the perception of the emotional content of speech: A study of the development of sensitivity in Canadian and Mexican children. Developmental Psychology, 1975, 11, 551-555.

McCluskey, K.W., Niemi, R.R., & Albas, D.C. Vocal communication of emotional meaning among normal and disturbed children. Journal of Special Education, 1978, 12, 443-449.

McCluskey, K.W., Niemi, R.R., & Ferrer, C. Diferencias culturales en la percepcion de las emociones. Informacion Nacional, 1973, 9, 30-31.

McCroskey, J.C., Larson, C.E., & Knapp, M.L. An introduction to interpersonal communication. Englewood Cliffs, New Jersey: Prentice-Hall, 1971.

McNeill, D. The acquisition of language: The study of developmental psycholinguistics. New York: Harper & Row, 1970.

Mead, G.H. Mind, self, and society. Chicago: University of Chicago Press, 1934.

Mehrabian, A. The inference of attitudes from the posture, orientation, and distance of a communicator. Journal of Consulting Psychology, 1968, 32, 269-308.

Mehrabian, A. Silent messages. Belmont, California: Wadsworth, 1971.

Mehrabian, A. Nonverbal communication. Chicago: Aldine. Atherton, 1972.

Mehrabian, A., & Ferris, S.R. Inference of attitudes from nonverbal communication. Journal of Consulting Psychology, 1967, 31, 248-252.

Mehrabian, A., & Wiener, M. Decoding of inconsistent communications. Journal of Personality and Social Psychology, 1967, 6, 109, 114.

Miller, G.R. (Ed.), Explorations in interpersonal communication. Beverly Hills: Sage Publications, 1976.

Milmore, S., Novey, M.S., Kagan, J., & Rosenthal, R. The mother's voice: Postdictor of aspects of her baby's behavior. In S. Weitz (Ed.), Nonverbal communication: Readings with commentary. New York: Oxford University Press, 1974.

Mishler, E.G., & Waxler, N.E. Family interaction process and schizophrenia: A reveiw of current theories. Merrill-Palmer Quarterly, 1965, 11, 269-315.

Montagu, A. Touching: The human significance of the skin. New York: Columbia University Press, 1971.

Mouton, E.R., & Held, M.W. Communication: A creative process. Minneapolis: Burgess Publishing Co., 1976.

Nash, J. Developmental psychology: A psychobiological approach. Englewood Cliffs, New Jersey: Prentice-Hall, 1970.

Nine-Curt, J. The role of non-verbal communication in teaching Spanish speakers. Paper read at the Conference of the English Language Institute, Ann Arbor, Michigan, 1976.

North, M. Body movement for children: An introduction to movement study and teaching. Boston: Plays, Inc., 1972.

North, M. Movement education. London: Temple-Smith, 1973.

Ogawa, D.M., & Welden, T.A. Cross-cultural analysis of feedback behavior within Japanese American and Caucasian American small groups. Journal of Communication, 1972, 22, 189-195.

Olsen, P.T. Response to incongruent verbal-vocal communications in children and early adolescents. Dissertation Abstracts International, 1967, 28, 2147.

Orr, D.B. Time compressed speech--A perspective. Journal of Communication, 1968, 18, 288-292.

Orr, D.B., Friedman, H.L., & Williams, J.C.C. Trainability of listening comprehension of speech discourse. Journal of Educational Psychology, 1965, 56, 148-156.

Pack, A.C. Interpretations of kinesics are cultural not universal. TESL Reporter, 1972, 6, 6-7, 11.

Parkes, A.S. Olfactory and gustatory discrimination in man and animals. The Royal Society of Medicine, Proceedings, 1963, 56, 47-51.

Pedersen, P., Lonner, W.J., & Draguns, J.G. (Eds.), Counseling across cultures. Honolulu: University Press of Hawaii, 1976.

Penrod, J. Movement for the performing artist. Palo Alto: National Press, 1974.

Penrod, J., & Plastino, J.G. The dancer prepares. Palo Alto: National Press, 1970.

Pesso, A. Movement in psychotherapy. New York: University Press, 1969.

Pfaff, P.L. An experimental study of the communication of feeling without contextual material. Speech Monographs, 1954, 21, 155-156.

Pike, K.L. Etic and emic standpoints for the description of behavior. In A.G. Smith (Ed.), Communication and Culture: Readings in the codes of human interaction. New York: Holt, Rinehart & Winston, 1966.

Pliner, P., Kramer, L., & Alloway, T. (Eds.), Nonverbal communication of aggression. New York: Plenum, 1974.

Poling, T.H. Proxemic and kinesic behavior. Dissertation Abstracts International, 1974, 35, 5132B.

Pollack, I., Rubenstein, H., & Horowitz, A. Communication of verbal modes of expression. Language and Speech, 1960, 3, 121-130.

Porter, E., Argyle, M., & Salter, V. What is signalled by proximity? Perceptual and Motor Skills, 1970, 30, 39-42.

Potash, H.M. Schizophrenic interaction and the concept of the double-bind. Ph.D. dissertation, Michigan State University, 1965.

Poyatos, F. The Spanish speaker in the total context of his communicative activities: Cultural approach to a foreign language. In M. Rubin (Ed.), Current issues in teaching Spanish. Philadelphia: Chilton Books, 1972.

Prost, J.H. Varieties of human posture. Human Biology, 1974, 46, 1-19.

Quay, L.C., Mathews, M., & Schwarzmueller, B. Communication encoding and decoding in children from different socio-economic and racial groups. Developmental Psychology, 1977, 13, 415-416.

Ringuette, E.L., & Kennedy, T. An experimental study of the double bind hypothesis. Journal of Abnormal Psychology, 1966, 71, 136-141.

Rintye, E. (Ed.), Centering a lopsided egg: Reflections on communication balance. Boston: Allyn & Bacon, 1975.

Rogers, P.L., Scherer, K.R., & Rosenthal, R. Content-filtering human speech. Behavioral Research Methods and Instrumentation, 1971, 5, 155-159.

Rosenberg, B.G., & Langer, J. A study of postural-gestural communication. Journal of Personality and Social Psychology. 1965, 2, 593-597.

Rosenthal, R., Archer, D., DiMatteo, M.R., Koivumaki, J.H., & Rogers, P.L. Body talk and tone of voice: The language without words. Psychology Today, 1974, 8, 64-68.

Rosenthal, R., & DePaulo, B.M. Sex differences in accomodatingness in nonverbal communication. Unpublished manuscript, Harvard University, 1978.

Rosenthal, R., Hall, J.A., DiMatteo, M.R., Rogers, P.L. & Archer, D. Sensitivity to nonverbal communication: The PONS Test. Baltimore: Johns Hopkins University Press, 1979.

Ruesch, J. Nonverbal language and therapy. Psychiatry, 1957, 18, 323-330.

Ruesch, J. Semiotic approaches to human relations. The Hague: Mouton, 1972.

Ryan, E.B., & Carranza, M.A. Evaluative reactions of adolescents toward speakers of standard English and Mexican American accented English. Journal of Personality and Social Psychology, 1975, 31, 855-863.

Samovar, L.A., & Porter, R.E. (Eds.), Intercultural communication: A reader. Belmont, California: Wadsworth, 1972.

Sampson, O.C. The speech and language development of five-year-old children. British Journal of Educational Psychology, 1959, 29, 217-222.

Schachter, S., & Singer, J. Cognitive, social and physiological determinants of emotional state. Psychological Review, 1962, 69, 379-399.

Scheflen, A.E. The significance of posture in communication systems. Psychiatry, 1964, 27, 316-333.

Scheflen, A.E. Body language and the social order: Communication as behavioral control. Englewood Cliffs, New Jersey: Prentice-Hall, 1972.

Scherer, K.R. Randomized-splicing: A note on a simple technique for masking speech content. Journal of Experimental Research in Personality, 1971, 5, 155-159.

Scherer, S.E. Proxemic behavior of primary school children as a function of their socioeconomic class and subculture. Journal of Personality and Social Psychology, 1974, 29, 800-805.

Schuham, A.I. The double-bind hypothesis a decade later. Psychological Bulletin, 1967, 68, 409-416.

Shannon, L. Age changes in time perception in Native Americans, Mexican Americans, and Anglo-Americans. Journal of Cross-Cultural Psychology, 1976, 7, 117-122.

Sluzki, C.E., Beavin, J., Tarnopolsky, A., & Veron, E. Transactional disqualifications: Research on the double bind. Archives of General Psychiatry, 1967, 16, 494-504.

Smith, A.G. (Ed.), Communication and culture: Readings in the codes of human interaction. New York: Holt, Rinehart & Winston, 1966.

Sommer, R. Classroom ecology. The Journal of Applied Behavioral Science, 1967, 3, 489-503.

Sommer, R. Personal space: The behavioral basis for design. Englewood Cliffs, New Jersey: Prentice-Hall, 1969.

Soskin, W.F., & Kauffman, P.E. Judgment of emotion in word-free voice samples. Journal of Communication, 1961, 11, 73-80.

Spiegel, J., & Machotka, P. Messages of the body. New York: The Free Press, 1974.

Starkweather, J.A. Content-free speech as a source of information about the speaker. Journal of Abnormal and Social Psychology, 1956, 52, 394-402.

Starkweather, J.A. Vocal communication of personality and human feelings. Journal of Communication, 1961, 11, 63-72.

Starkweather, J.A. Measurement methods for vocal information. In G. Gerbner, O.R. Holsti, K. Krippendorff, W.J. Paisley, & P.J. Stone (Eds.), The analysis of communication content. New York: John Wiley & Sons, 1969.

Stein, R.T. Identifying emergent leaders from verbal and nonverbal communication. Journal of Personality and Social Psychology, 1975, 32, 125-135.

Streeter, L.A., Krauss, R.M., Geller, V., Olson, C., & Apple, W. Pitch changes during attempted deception. Journal of Personality and Social Psychology, 1977, 35, 345-350.

Thompson, J.J. Beyond words: Nonverbal communication in the classroom. New York: Citation Press, 1973.

Thompson, C.W., & Bradway, K. The teaching of psychotherapy through content-free interviews. Journal of Consulting Psychology, 1950, 14, 321-323.

Tinbergen, N. The study of instinct. London, Clarendon Press, 1951.

Travis, L.E. A phono-photographic study of the stutterer's voice and speech. Psychological Monographs, 1927, 36, 109-141.

Triandis, H.C. Culture training, cognitive complexity and interpersonal attitudes. In R.W. Brislin, S. Bochner, & W.J. Lonner (Eds.), Cross-cultural perspectives on learning. New York: John Wiley & Sons, 1975.

Triandis, H.C., & Lonner, W.J. (Eds.), Handbook of cross-cultural psychology, Vol. 3: Basic processes. Rockleigh, New Jersey: Allyn & Bacon, 1980.

Triandis, H.C., Vassiliou, V., Vassiliou, G., Tanaka, Y., & Shanmugam, A.V. The analysis of subjective culture. New York: John Wiley & Sons, 1972.

Truzzi, M. (Ed.), Sociology and everyday life. Englewood Cliffs, New Jersey: Prentice-Hall, 1968.

Turner, J. Schizophrenics as judges of vocal expressions of emotional meaning. In J.R. Davitz (Ed.), The communication of emotional meaning. New York: McGraw-Hill, 1964.

Vine, I. Communication by facial-visual signals: A review and analysis of their role in face-to-face encounters. In J.H. Crook (Ed.), Social behavior in birds and mammals: Essays on the social ethology of animals and man. New York: Academic Press, 1970.

Vine, I. The role of facial-visual signalling in early social development. In M. von Cranach & I. Vine (Eds.), Social communication and movement: Studies of interaction and expression in man and chimpanzees. New York: Academic Press, 1973.

Von Frisch, K. Bees: Their vision, chemical senses, and language. Ithaca: Cornell University Press, 1950.

Wahlroos, S. Family communication: A guide to emotional health. New York: Macmillan, 1974.

Watson, O.M. Conflicts and directions in proxemic research. Journal of Communication, 1972a, 22, 443-459.

Watson, O.M. Proxemics as non-verbal communication. In S.K. Ghosh (Ed.), Man, language and society. The Hague: Mouton, 1972b.

Watson, O.M., & Graves, T.D. Quantitative research in proxemic behavior. American Anthropologist, 1966, 68, 971-985.

Watzlawick, P. A review of the double bind theory. Family Process, 1963, 2, 132-153.

Watzlawick, P. (Ed.), An anthology of human communication. Palo Alto: Science and Behavior Books, 1964.

Watzlawick, P., Beavin, J.H., & Jackson, D.D. Pragmatics of human communication. New York: Norton, 1967.

Weakland, J. The "double bind" hypothesis of schizophrenia and three-party interaction. In D.D. Jackson (Ed.), The etiology of schizophrenia. New York: Basic Books, 1960.

Weakland, J., & Fry, W. Letters of mothers of schizophrenics. American Journal of Orthopsychiatry, 1962, 32, 604-623.

Webb, E.J., Campbell, D.T., Schwartz, R.D., & Sechrest, L. Unobtrusive measures: Nonreactive research in the social sciences. Chicago: Rand-McNally, 1966.

Weitz, S. Attitude, voice, and behavior: A repressed affect model of interpersonal interaction. Journal of Personality and Social Psychology, 1972, 24, 14-21.

Weitz, S. (Ed.), Nonverbal communication: Readings with commentary. New York: Oxford University Press, 1974.

Whorf, B.L. Language, thought, and reality. Cambridge: Technology Press of Massachusetts, 1956.

Wiener, M., Devoe, S., Rubinow, S., & Geller, J. Nonverbal behavior and nonverbal communication. Psychological Review, 1972, 79, 185-214.

Willis, F.N. Initial speaking distance as a function of the speakers' relationship. Psychonomic Science, 1966, 5, 221-222.

Witkin, H.A. A cognitive-style approach to cross-cultural research. International Journal of Psychology, 1967, 2, 233-250.

Witkin, H.A., Dyk, R.B., Faterson, H.P., Goodenough, D.R., & Karp, S.A. Psychological differentiation. New York: Wiley, 1962.

Wood, B.S. Children and communication: Verbal and nonverbal language development. Englewood Cliffs, New Jersey: Prentice-Hall, 1976.

Wood, R.V., Yamauchi, J.S., & Bradac, J.J. The communication of meaning across generations. Journal of Communication, 1971, 21, 160-169.

Wundt, W. The language of gestures. The Hague: Mouton, 1973.

Young, F.M. An analysis of certain variables in a developmental study of language. Genetic Psychology Monographs, 1941, 21, 3-141.

Zuckerman, M., Hall, J.A., DeFrank, R.S., & Rosenthal, R. Encoding and decoding of spontaneous and posed facial expressions. Journal of Personality and Social Psychology, 1976, 34, 966-977.

Zuckerman, M., & LaFrance, D.T. Individual differences in perceived encoding and decoding abilities. In R. Rosenthal (Ed.), Correlates of skill in nonverbal communication. Unpublished manuscript, Harvard University, 1979.

Zuk, G.H.A. A further study of laughter in family therapy. Family Process, 1964, 3, 77-89.

APPENDIX III

THE RANDOM ARRANGEMENT OF THE 24 VOCAL EXPRESSIONS IN STUDY I

M1	M2	C3	M2	C1	C1	M2	M3	C1	M2	C2	C1	M1	M1	C3	M3	C2	M1	M3	C2	C2	M3	C3	C3
S	L	A	A	L	S	H	H	A	S	A	H	L	A	H	S	S	H	L	H	L	A	S	L

C = Canadian speaker

M = Mexican speaker

1 = First speaker

2 = Second speaker

3 = Third speaker

H = Happy

S = Sad

L = Love

A = Angry

Example: $\frac{M1}{S}$ represents the speech sample in which Mexican speaker number 1 simulated sadness.

Restrictions:

(1) no emotional state can appear more than twice in a row.

(2) no more than two speech samples from any one speaker can appear in succession.

(3) no more than two speakers from the same culture can appear in succession.

APPENDIX IV

INSTRUCTIONS FOR STUDY 1

The procedure was identical for all subjects at each age level in both cultures (except for the fact that subjects thirteen years of age and over were told that the simple stick figure method was being used merely because the task at hand was also being given to very young children). Canadian subjects were, of course, given the instructions in English, while Mexican subjects received the identical instructions translated into Spanish.

Prior to playing the filtered speech samples, each subject was trained to associate each of the emotional states with the appropriate stick figure drawing. The four stick figures (each drawn on an individual card) were placed in random order in front of each subject.

> "Here you see drawings of a happy lady, a sad lady, a loving lady, and an angry lady."

The order of the emotions read out here naturally depended on the random arrangement of the cards.

> "Look at each drawing carefully. This lady is happy, this one is sad, this one is loving, and this one is angry."

As this description was given, the experimenter pointed to each appropriate drawing.

> "Now, can you point to the happy lady, the sad lady, the loving lady, and the angry lady?"

The order in which each subject had to identify the drawings was completely random. The procedure was repeated until a criterion of two correct identifications of all four drawings was reached.

> "You are now going to hear different ladies say things in different ways. (The ladies are speaking from far away, so you will not be able to hear clearly the words they are saying). Some will sound happy, some sad, some angry, and some loving. Listen to each one and point to the lady it sounds like."

Each speech sample was played.

> "Does it sound like the happy lady, the sad lady, the angry lady, or the loving lady?"

The response of the subject to each of the 24 speech samples was recorded.

APPENDIX V

RAW DATA FOR STUDY I

	M1 S	M2 L	C3 A	M2 A	C1 L	C1 S	M2 H	M3 H	C1 A	M2 S	C2 A	C1 H	M1 L	M1 A	C3 H	M3 S	C2 S	M1 H	M3 L	C2 H	C2 L	M3 A	C3 S	C3 L	RESPONSES CORRECT	NEG.
CANADIANS	✓	S	H	✓	S	A	A	A	✓	✓	L	✓	✓	H	A	L	L	S	H	A	S	S	L	H	6	14
	A	S	H	✓	✓	L	A	A	H	✓	H	A	S	✓	✓	✓	✓	✓	H	A	✓	✓	A	S	10	15
	✓	✓	S	H	S	✓	✓	A	L	L	H	A	S	✓	A	L	A	A	✓	✓	S	S	H	✓	8	13
	A	S	✓	S	H	L	S	S	H	✓	✓	L	✓	H	A	✓	L	A	S	S	S	✓	L	A	6	16
	✓	S	✓	H	A	✓	A	✓	✓	L	H	L	S	H	L	L	L	A	S	A	✓	H	✓	✓	8	12
	L	✓	H	✓	S	H	✓	✓	✓	✓	H	A	A	H	A	L	✓	✓	✓	A	S	H	L	H	9	10
	A	✓	H	S	S	L	S	A	✓	L	✓	A	S	H	L	✓	A	✓	S	✓	S	S	✓	S	7	16
	L	S	✓	H	S	L	A	✓	H	L	H	A	S	S	L	A	L	✓	S	A	H	✓	✓	✓	6	12
	A	H	L	✓	S	✓	✓	A	H	L	H	✓	✓	S	A	L	A	A	✓	A	S	✓	A	S	7	14
	A	✓	H	S	✓	✓	✓	L	S	L	✓	A	S	✓	A	A	✓	S	S	L	✓	H	A	S	8	15
	✓	✓	✓	✓	S	L	A	A	H	H	L	✓	S	✓	✓	L	H	S	S	A	H	H	L	S	7	12
	L	H	S	✓	A	A	L	✓	H	A	S	A	S	S	A	✓	L	✓	✓	A	S	H	✓	S	6	15
	✓	S	H	S	✓	L	A	A	H	L	✓	A	S	H	A	✓	L	A	S	L	H	✓	A	S	5	15
	A	S	H	S	S	A	✓	✓	S	✓	S	✓	✓	✓	✓	L	A	S	S	S	✓	S	✓	S	9	16
	H	S	✓	H	✓	L	L	S	✓	A	S	✓	H	S	A	A	A	S	H	✓	S	✓	A	S	6	15
MEXICANS	✓	H	✓	✓	S	H	✓	A	H	✓	S	S	S	✓	A	L	A	L	S	✓	H	✓	✓	H	9	15
	✓	✓	S	✓	S	L	A	✓	H	L	S	S	A	✓	✓	H	A	A	S	A	A	L	✓	S	7	16
	✓	H	✓	S	S	A	✓	A	S	L	✓	✓	✓	S	A	L	✓	A	H	A	S	✓	A	A	8	17
	L	S	H	H	✓	L	A	✓	✓	✓	H	A	S	✓	L	✓	L	S	✓	A	S	✓	L	H	8	12
	H	✓	H	S	A	✓	L	L	S	✓	S	✓	A	L	A	✓	✓	S	✓	L	✓	S	A	S	8	14
	✓	✓	S	✓	S	A	S	✓	H	✓	H	L	S	✓	A	L	✓	✓	H	L	S	S	L	✓	9	13
	L	✓	S	H	H	L	A	L	✓	H	S	L	✓	S	✓	✓	L	A	H	L	H	✓	✓	S	7	10
	L	H	H	S	A	A	A	S	✓	L	✓	A	✓	H	L	A	✓	✓	S	✓	S	✓	✓	✓	9	14
	L	S	✓	S	H	L	✓	S	H	A	✓	A	S	✓	✓	✓	✓	✓	S	✓	S	✓	L	H	10	14
	A	S	H	✓	✓	✓	✓	✓	✓	A	H	A	S	S	A	A	L	S	✓	A	✓	H	A	S	8	15
	✓	S	H	✓	S	✓	✓	L	✓	✓	✓	✓	A	S	A	L	L	L	H	A	H	✓	L	S	9	14
	A	A	✓	S	✓	✓	A	✓	S	✓	L	S	S	✓	A	H	A	✓	✓	L	A	H	A	✓	9	15
	✓	✓	S	S	S	H	✓	A	L	L	S	✓	S	H	✓	A	A	✓	A	S	✓	S	A	S	7	14
	✓	✓	H	S	S	L	A	✓	✓	A	H	S	✓	✓	S	L	A	A	S	✓	A	S	A	✓	8	15
	A	✓	S	✓	✓	A	L	✓	H	L	✓	S	S	H	S	✓	✓	✓	H	L	S	✓	✓	S	10	14

FIVE-YEAR-OLDS

C = Canadian
M = Mexican

H = Happy
S = Sad
L = Love
A = Angry

	M1 S	M2 L	C3 A	M2 A	C1 L	C1 S	M2 H	M3 H	C1 A	M2 S	C2 A	C1 H	M1 L	M1 A	C3 H	M3 S	C2 S	M1 H	M3 L	C2 H	C2 L	M3 A	C3 S	C3 L	RESPONSES CORRECT	NEG.
CANADIANS	✓	S	✓	✓	S	✓	✓	✓	✓	L	✓	✓	H	✓	A	A	H	L	H	A	S	✓	✓	✓	13	15
	A	✓	S	✓	✓	L	✓	A	✓	✓	H	✓	S	✓	A	L	✓	✓	S	A	✓	✓	A	S	12	15
	✓	S	✓	✓	H	✓	A	✓	S	L	S	A	✓	✓	A	L	✓	✓	✓	L	H	S	L	S	10	14
	L	✓	H	✓	S	L	A	L	S	✓	✓	A	S	H	✓	✓	L	✓	✓	A	S	✓	✓	✓	11	13
	✓	S	H	H	S	✓	✓	A	H	✓	H	L	✓	✓	L	✓	L	A	S	✓	✓	✓	L	S	10	12
	✓	✓	✓	✓	S	A	A	S	H	A	✓	A	✓	S	✓	✓	A	A	✓	✓	S	H	✓	H	11	16
	L	✓	S	S	✓	✓	✓	✓	S	✓	S	✓	A	A	A	H	✓	✓	S	A	H	S	L	S	9	14
	✓	H	✓	✓	S	A	S	A	✓	✓	H	✓	✓	✓	✓	A	H	L	H	S	A	✓	✓	✓	12	15
	✓	H	S	S	✓	L	✓	✓	H	✓	S	A	H	S	A	✓	A	L	S	A	✓	✓	A	✓	9	14
	A	✓	✓	H	S	✓	A	✓	✓	L	S	A	H	H	A	✓	✓	✓	A	✓	✓	✓	L	S	11	14
	✓	A	✓	✓	✓	H	✓	✓	S	L	S	A	S	✓	✓	A	A	S	✓	✓	S	H	A	H	10	14
	✓	S	✓	✓	H	✓	L	L	✓	A	✓	✓	✓	✓	S	✓	L	✓	✓	A	H	H	L	S	12	13
	✓	✓	L	S	A	L	L	A	H	✓	L	✓	S	✓	A	L	✓	A	S	✓	S	✓	H	✓	9	13
	A	✓	S	H	✓	L	A	✓	✓	A	✓	S	✓	H	S	L	✓	✓	S	A	S	✓	✓	S	10	15
	L	S	✓	✓	H	A	✓	L	S	✓	✓	L	✓	✓	✓	✓	L	A	✓	L	✓	S	✓	H	12	12
MEXICANS	✓	H	H	✓	✓	L	L	S	✓	✓	S	✓	H	✓	S	L	✓	✓	S	✓	A	✓	L	✓	12	12
	✓	S	✓	✓	S	L	✓	✓	S	A	S	A	✓	H	✓	✓	A	S	✓	A	✓	S	A	S	10	16
	A	✓	L	✓	H	✓	✓	L	S	✓	✓	S	✓	✓	A	✓	L	L	S	✓	S	S	A	✓	11	14
	✓	✓	✓	S	H	✓	A	✓	✓	✓	✓	✓	S	✓	A	L	H	✓	✓	A	H	H	✓	S	13	14
	✓	S	✓	✓	S	✓	✓	✓	✓	H	H	L	✓	✓	L	✓	A	L	S	✓	✓	✓	✓	H	14	13
	A	S	S	✓	✓	A	✓	S	S	✓	✓	A	S	H	✓	✓	✓	✓	✓	L	H	✓	L	✓	12	14
	L	S	✓	H	S	✓	L	✓	✓	✓	✓	A	✓	✓	✓	L	✓	A	✓	✓	✓	✓	A	H	14	13
	✓	✓	✓	S	✓	L	✓	✓	S	L	✓	✓	A	S	A	✓	A	✓	H	S	S	✓	✓	S	12	15
	✓	✓	S	✓	S	A	✓	A	✓	L	✓	✓	✓	✓	A	A	✓	✓	✓	S	S	H	✓	S	13	16
	L	✓	✓	✓	A	✓	A	✓	S	L	H	✓	S	✓	✓	✓	✓	✓	S	L	✓	S	H	S	12	13
	✓	✓	S	H	S	✓	✓	✓	L	✓	S	S	✓	H	A	A	A	L	S	✓	S	✓	✓	✓	11	14
	A	✓	✓	✓	H	✓	L	✓	✓	✓	✓	A	✓	✓	✓	L	✓	✓	A	A	A	✓	✓	H	15	15
	✓	S	✓	✓	✓	L	✓	A	H	✓	L	A	H	✓	L	✓	A	✓	H	L	✓	✓	✓	✓	13	12
	✓	A	✓	✓	✓	A	A	A	H	A	S	✓	S	✓	A	✓	L	✓	✓	✓	✓	L	L	✓	12	13
	✓	✓	H	S	✓	A	✓	✓	✓	✓	✓	✓	A	S	S	A	L	A	✓	A	S	S	L	✓	11	14

NINE-YEAR-OLDS

C = Canadian
M = Mexican

H = Happy
S = Sad
L = Love
A = Angry

	M1 S	M2 L	C3 A	M2 A	C1 L	C1 S	M2 H	M3 H	C1 A	M2 S	C2 A	C1 H	M1 L	M1 A	C3 H	M3 S	C2 S	M1 H	M3 L	C2 H	C2 L	M3 A	C3 S	C3 L	CORRECT	NEG.
CANADIANS	✓	✓	✓	H	S	L	✓	✓	✓	L	S	A	✓	✓	✓	✓	A	A	✓	S	S	✓	✓	H	13	14
	✓	S	✓	✓	H	✓	✓	✓	H	✓	✓	✓	H	✓	A	✓	✓	✓	✓	A	✓	✓	L	✓	17	13
	A	✓	S	✓	✓	✓	✓	A	✓	✓	H	A	✓	H	✓	✓	L	✓	S	✓	✓	✓	✓	S	15	13
	✓	✓	✓	H	✓	L	L	✓	✓	✓	✓	✓	✓	✓	✓	L	✓	✓	S	A	S	H	✓	✓	16	11
	✓	✓	H	✓	H	✓	✓	✓	H	L	✓	S	S	✓	A	✓	L	L	✓	✓	✓	✓	H	✓	14	10
	L	S	✓	✓	S	✓	✓	✓	✓	A	S	A	✓	✓	A	S	✓	✓	✓	✓	A	✓	✓	✓	15	16
	✓	S	H	✓	✓	A	✓	✓	S	✓	✓	A	✓	✓	✓	✓	✓	✓	✓	✓	✓	S	✓	✓	18	13
	L	✓	✓	✓	✓	✓	✓	A	✓	✓	H	✓	✓	✓	✓	L	A	✓	S	A	H	✓	L	H	14	11
	✓	✓	H	✓	✓	✓	✓	✓	H	L	H	✓	S	✓	S	✓	H	✓	✓	L	S	✓	L	S	13	10
	✓	✓	✓	L	S	✓	A	✓	✓	✓	✓	✓	✓	✓	L	L	✓	✓	S	✓	✓	✓	A	✓	17	13
	✓	H	✓	S	✓	L	✓	✓	H	✓	✓	A	✓	H	✓	✓	✓	A	✓	L	✓	✓	✓	S	15	12
	✓	✓	S	✓	✓	L	✓	✓	L	A	✓	✓	S	✓	✓	H	✓	S	✓	A	S	H	✓	✓	14	12
	✓	✓	✓	H	S	✓	A	S	✓	✓	✓	✓	✓	H	A	✓	L	✓	✓	✓	S	✓	✓	S	15	15
	L	✓	A	✓	H	A	✓	A	✓	✓	✓	✓	✓	✓	✓	✓	✓	L	S	✓	✓	✓	L	✓	16	12
	✓	S	✓	✓	✓	✓	L	✓	H	✓	H	L	H	✓	✓	✓	L	A	✓	✓	✓	✓	✓	H	15	11
MEXICANS	✓	✓	✓	✓	✓	✓	✓	✓	H	A	✓	✓	A	✓	✓	L	A	A	✓	S	✓	✓	✓	S	16	14
	✓	✓	✓	✓	S	✓	L	✓	✓	✓	✓	✓	✓	✓	✓	L	✓	✓	✓	✓	S	✓	A	✓	19	13
	✓	✓	S	✓	✓	A	✓	L	✓	✓	S	✓	✓	✓	A	✓	✓	✓	H	A	✓	S	✓	✓	16	14
	L	✓	✓	H	S	✓	✓	✓	✓	✓	✓	A	✓	✓	✓	✓	✓	✓	✓	L	✓	✓	✓	H	18	12
	✓	S	✓	✓	✓	L	✓	✓	L	✓	S	✓	S	H	A	✓	L	✓	✓	✓	✓	✓	✓	✓	16	11
	✓	✓	✓	S	H	✓	✓	✓	✓	✓	✓	A	H	S	✓	✓	✓	S	✓	✓	S	✓	H	✓	16	14
	✓	H	✓	H	✓	✓	A	✓	H	✓	✓	✓	✓	✓	✓	✓	L	✓	A	✓	✓	S	L	H	15	10
	✓	✓	S	✓	S	A	A	S	✓	L	S	✓	✓	✓	S	✓	✓	✓	✓	✓	✓	✓	A	✓	15	15
	A	H	✓	✓	✓	✓	✓	✓	S	✓	✓	✓	✓	✓	S	✓	A	✓	✓	A	H	✓	✓	✓	17	14
	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	L	✓	H	L	✓	✓	✓	✓	✓	H	✓	✓	✓	20	11
	✓	S	L	✓	✓	A	✓	L	✓	✓	✓	✓	✓	✓	✓	A	L	L	H	A	✓	H	✓	✓	14	11
	A	✓	✓	✓	S	✓	✓	✓	S	A	H	✓	✓	✓	A	✓	✓	A	✓	✓	✓	✓	A	S	15	15
	L	✓	✓	✓	✓	H	✓	✓	✓	✓	H	A	S	✓	A	A	✓	✓	✓	✓	S	S	✓	A	14	14
	✓	✓	H	✓	S	L	A	✓	✓	✓	✓	A	✓	✓	✓	✓	✓	✓	S	✓	✓	✓	L	✓	17	13
	✓	✓	✓	✓	A	✓	✓	✓	S	L	✓	✓	S	✓	✓	✓	L	L	✓	S	H	H	✓	✓	15	12

THIRTEEN-YEAR-OLDS

C = Canadian
M = Mexican

H = Happy
S = Sad
L = Love
A = Angry

	M1 S	M2 L	C3 A	M2 A	C1 L	C1 S	M2 H	M3 H	C1 A	M2 S	C2 A	C1 H	M1 L	M1 A	C3 H	M3 S	C2 S	M1 H	M3 L	C2 H	C2 L	M3 A	C3 S	C3 L	RESPONSES CORRECT	NEG.
CANADIANS	L	✓	✓	✓	S	✓	✓	A	H	✓	✓	✓	S	✓	A	✓	L	✓	✓	L	✓	H	✓	✓	15	12
	✓	S	✓	H	✓	✓	✓	✓	✓	✓	S	A	✓	✓	✓	L	✓	✓	✓	✓	✓	✓	✓	S	18	13
	✓	H	H	✓	✓	L	✓	✓	H	✓	✓	✓	✓	H	A	✓	✓	✓	✓	A	✓	✓	✓	✓	17	11
	✓	✓	✓	S	✓	✓	✓	✓	✓	✓	S	A	✓	✓	✓	✓	✓	✓	✓	S	✓	✓	A	✓	19	14
	✓	✓	✓	✓	✓	✓	✓	✓	✓	A	✓	✓	✓	✓	✓	✓	A	✓	S	✓	S	✓	✓	✓	20	14
	✓	✓	✓	✓	✓	✓	✓	✓	L	✓	✓	✓	S	✓	L	L	✓	✓	✓	✓	✓	H	L	H	17	9
	✓	✓	S	✓	✓	✓	✓	✓	✓	H	✓	L	✓	✓	L	A	✓	A	S	✓	✓	✓	✓	✓	17	13
	✓	✓	✓	✓	H	H	L	✓	✓	✓	✓	S	✓	✓	✓	✓	L	✓	✓	✓	H	✓	✓	✓	18	11
	✓	✓	S	✓	✓	✓	✓	✓	✓	✓	H	✓	✓	✓	✓	✓	✓	✓	S	A	✓	✓	L	✓	19	12
	✓	✓	✓	✓	S	✓	A	A	H	✓	H	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	H	18	13
	✓	✓	S	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	A	S	✓	A	✓	20	14
	L	✓	✓	✓	✓	A	✓	✓	✓	✓	✓	✓	✓	S	✓	✓	H	A	✓	✓	✓	✓	✓	H	18	11
	✓	H	✓	H	H	✓	✓	✓	S	L	✓	✓	✓	✓	✓	✓	✓	L	✓	A	H	✓	L	✓	15	10
	✓	✓	H	✓	✓	✓	✓	L	✓	✓	✓	L	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	H	20	11
	✓	H	✓	✓	H	✓	✓	L	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	S	L	H	S	17	12
MEXICANS.	✓	✓	✓	✓	S	✓	✓	✓	✓	L	S	A	✓	✓	✓	✓	✓	A	✓	✓	✓	✓	✓	✓	19	14
	✓	S	H	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	A	✓	✓	✓	A	✓	H	L	S	17	12
	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	L	✓	✓	✓	✓	✓	H	✓	✓	✓	22	12
	✓	✓	✓	✓	✓	L	✓	A	H	✓	✓	✓	H	✓	✓	L	✓	✓	✓	✓	✓	✓	✓	S	18	11
	L	✓	✓	✓	S	✓	✓	✓	✓	A	S	A	✓	✓	✓	✓	A	✓	✓	✓	✓	✓	✓	✓	18	13
	✓	✓	S	✓	✓	A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	A	✓	21	12
	L	✓	✓	✓	✓	✓	L	✓	✓	✓	✓	✓	✓	H	A	✓	L	✓	S	✓	✓	✓	✓	✓	18	11
	✓	✓	✓	✓	✓	✓	✓	✓	H	✓	✓	✓	✓	✓	✓	✓	✓	L	✓	✓	S	✓	✓	✓	21	12
	H	H	✓	✓	✓	L	✓	✓	✓	✓	L	✓	✓	✓	✓	✓	✓	A	S	L	✓	✓	✓	H	16	10
	✓	✓	H	✓	✓	✓	✓	✓	✓	✓	S	A	S	✓	L	✓	✓	✓	A	✓	✓	✓	A	✓	17	14
	✓	✓	✓	S	✓	✓	✓	✓	S	✓	H	A	✓	✓	✓	✓	L	✓	✓	A	✓	✓	✓	✓	18	12
	✓	✓	✓	✓	A	✓	✓	✓	✓	✓	✓	✓	✓	✓	L	✓	✓	✓	✓	A	✓	S	✓	✓	20	14
	L	✓	✓	✓	✓	✓	✓	L	✓	✓	✓	✓	✓	✓	S	✓	✓	✓	✓	✓	H	✓	✓	H	19	12
	✓	H	✓	✓	H	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	L	H	20	11
	✓	✓	✓	✓	✓	✓	✓	✓	S	✓	✓	✓	✓	S	✓	✓	L	✓	✓	A	✓	✓	✓	✓	20	12

SEVENTEEN-YEAR-OLDS

C = Canadian
M = Mexican

H = Happy
S = Sad
L = Love
A = Angry

	M1 S	M2 L	C3 A	M2 A	C1 L	C1 S	M2 H	M3 H	C1 A	M2 S	C2 A	C1 H	M1 L	M1 A	C3 H	M3 S	C2 S	M1 H	M3 L	C2 H	C2 L	M3 A	C3 S	C3 L	RESPONSES CORRECT	NEG.
CANADIANS	✓	✓	✓	✓	S	✓	✓	✓	H	✓	✓	✓	H	✓	✓	✓	✓	A	✓	✓	H	✓	L	✓	18	12
	A	✓	✓	✓	✓	✓	✓	✓	✓	✓	H	✓	✓	S	A	✓	✓	✓	✓	✓	✓	✓	✓	S	19	13
	✓	H	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	L	✓	✓	✓	H	✓	✓	✓	21	11
	✓	✓	H	✓	S	✓	✓	✓	✓	✓	H	A	✓	✓	✓	A	✓	✓	✓	✓	✓	✓	✓	✓	19	12
	✓	✓	✓	✓	✓	L	A	✓	S	L	✓	✓	✓	✓	✓	L	✓	✓	S	✓	✓	✓	✓	✓	18	11
	✓	✓	✓	S	✓	✓	✓	✓	✓	A	S	✓	✓	✓	A	✓	✓	✓	✓	A	✓	✓	L	S	17	14
	✓	✓	✓	✓	✓	L	✓	✓	✓	✓	✓	✓	H	✓	✓	✓	L	✓	H	L	✓	✓	✓	✓	19	10
	✓	✓	H	✓	H	✓	✓	✓	✓	✓	✓	L	✓	✓	✓	✓	✓	L	✓	✓	H	H	L	✓	17	9
	✓	S	✓	✓	✓	✓	✓	✓	H	✓	✓	A	✓	✓	S	✓	A	✓	✓	A	✓	✓	✓	✓	18	15
	A	✓	✓	✓	✓	A	✓	✓	✓	✓	✓	S	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	S	20	14
	✓	✓	S	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	H	✓	✓	✓	✓	✓	✓	S	✓	H	✓	20	11
	✓	S	✓	✓	S	✓	✓	A	H	L	H	✓	✓	✓	✓	✓	L	✓	✓	✓	✓	✓	✓	✓	17	11
	✓	✓	✓	H	✓	✓	S	A	H	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	L	S	18	12
	L	✓	H	✓	✓	✓	✓	✓	✓	✓	S	A	✓	✓	A	L	✓	✓	✓	✓	S	✓	✓	✓	17	12
	✓	✓	✓	✓	H	✓	✓	✓	✓	✓	✓	✓	✓	✓	A	✓	L	✓	✓	✓	✓	H	✓	✓	20	11
MEXICANS	L	✓	H	✓	H	✓	✓	✓	✓	✓	✓	✓	S	✓	✓	✓	L	✓	✓	L	✓	✓	✓	✓	18	10
	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	A	✓	✓	✓	✓	✓	✓	S	✓	H	H	L	✓	19	12
	✓	✓	✓	✓	✓	✓	✓	✓	✓	A	S	✓	✓	S	A	L	✓	✓	✓	✓	✓	H	✓	H	17	11
	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	24	12
	✓	✓	✓	✓	✓	A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	S	✓	✓	S	21	14
	✓	✓	✓	✓	H	✓	✓	✓	✓	✓	✓	A	✓	✓	✓	✓	✓	L	✓	✓	✓	✓	L	✓	20	12
	✓	S	H	✓	✓	✓	✓	✓	S	✓	✓	✓	✓	✓	✓	✓	A	✓	✓	✓	S	✓	✓	✓	19	13
	L	✓	✓	✓	✓	✓	✓	✓	✓	L	H	✓	S	✓	L	✓	✓	✓	✓	A	S	S	✓	✓	16	12
	✓	✓	✓	H	✓	L	L	✓	✓	✓	✓	✓	✓	✓	L	✓	✓	✓	✓	✓	✓	✓	✓	✓	20	10
	✓	✓	✓	✓	S	A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	22	13
	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	A	L	A	✓	S	✓	✓	L	S	18	13
	✓	S	L	✓	✓	✓	✓	✓	✓	✓	✓	S	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	21	13
	L	✓	✓	✓	✓	✓	✓	✓	H	✓	✓	✓	✓	S	A	✓	A	✓	✓	✓	✓	✓	A	✓	18	11
	✓	✓	✓	✓	S	✓	✓	✓	H	✓	✓	✓	✓	✓	✓	✓	✓	✓	H	✓	✓	✓	L	H	19	11
	✓	✓	✓	✓	✓	L	A	A	✓	✓	H	✓	✓	✓	✓	✓	✓	✓	✓	✓	A	✓	✓	✓	19	13

TWENTY-FIVE-YEAR-OLDS

C = Canadian
M = Mexican

H = Happy
S = Sad
L = Love
A = Angry

	M1 S	M2 L	C3 A	M2 A	C1 L	C1 S	M2 H	M3 H	C1 A	M2 S	C2 A	C1 H	M1 L	M1 A	C3 H	M3 S	C2 S	M1 H	M3 L	C2 H	C2 L	M3 A	C3 S	C3 L	RESPONSES CORRECT	NEG.
C	✓	✓	✓	✓	S	✓	✓	✓	✓	L	H	✓	✓	✓	A	A	L	✓	✓	A	✓	✓	✓	S	16	13
	✓	✓	S	✓	✓	✓	✓	✓	✓	✓	✓	A	S	✓	✓	✓	✓	✓	✓	✓	S	✓	L	✓	19	14
	✓	H	✓	✓	S	A	✓	✓	H	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	20	12
A	✓	✓	H	✓	✓	✓	L	L	✓	✓	H	✓	✓	✓	✓	✓	L	✓	S	A	✓	✓	L	✓	16	10
N	✓	✓	✓	✓	H	L	L	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	21	11
A	L	✓	S	S	✓	✓	✓	A	H	✓	✓	✓	✓	✓	✓	✓	A	A	✓	✓	✓	✓	✓	S	16	13
D	✓	S	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	H	A	L	✓	L	✓	✓	S	✓	✓	H	17	13
I	A	✓	✓	✓	S	✓	✓	A	✓	A	H	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	S	L	✓	17	12
A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	L	✓	✓	L	✓	✓	✓	✓	L	H	✓	✓	✓	20	12
N	✓	✓	✓	✓	✓	✓	✓	✓	S	L	✓	✓	✓	S	✓	✓	A	✓	✓	✓	✓	✓	A	✓	19	11
S	L	✓	H	✓	S	✓	A	✓	✓	✓	L	✓	✓	✓	✓	✓	✓	✓	✓	✓	S	H	✓	✓	17	11
	✓	✓	✓	S	✓	A	✓	✓	✓	✓	✓	A	✓	✓	✓	L	✓	✓	✓	✓	✓	✓	✓	S	19	13
	✓	✓	✓	✓	✓	✓	✓	✓	H	✓	H	✓	S	✓	✓	✓	L	✓	S	A	✓	✓	✓	✓	18	12
	✓	S	H	✓	H	L	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	H	19	11
	✓	✓	✓	H	✓	✓	✓	✓	✓	L	✓	A	✓	H	A	✓	✓	✓	✓	✓	S	✓	L	✓	17	11
	✓	✓	✓	✓	H	✓	✓	✓	✓	L	✓	✓	✓	✓	✓	✓	✓	✓	✓	L	✓	✓	✓	✓	21	11
	✓	✓	✓	✓	✓	✓	✓	✓	S	✓	✓	✓	✓	✓	A	✓	✓	A	✓	✓	S	S	A	✓	18	15
	✓	✓	L	✓	✓	✓	✓	✓	✓	✓	✓	A	✓	✓	✓	✓	✓	✓	S	✓	✓	✓	✓	S	20	14
M	L	✓	✓	✓	S	✓	✓	✓	✓	✓	H	✓	✓	✓	✓	✓	L	✓	✓	A	S	✓	✓	✓	18	12
E	✓	✓	H	H	✓	L	✓	A	S	✓	✓	S	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	S	17	12
X	✓	S	✓	✓	S	✓	✓	✓	✓	✓	✓	✓	✓	H	L	✓	L	✓	✓	✓	✓	✓	✓	✓	19	12
I	✓	✓	✓	✓	✓	✓	A	✓	✓	✓	H	✓	✓	✓	✓	H	✓	✓	✓	A	✓	H	L	S	17	11
C	✓	✓	✓	✓	✓	✓	✓	L	✓	✓	✓	A	S	L	✓	✓	✓	L	✓	✓	✓	✓	✓	✓	19	12
A	✓	✓	✓	✓	S	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	H	✓	✓	H	21	13
N	✓	✓	✓	✓	✓	L	✓	✓	H	✓	S	✓	H	✓	L	✓	✓	✓	✓	✓	✓	✓	✓	✓	19	10
S	✓	S	H	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	L	✓	✓	✓	H	20	12
	L	✓	✓	✓	✓	✓	✓	A	✓	✓	S	✓	✓	✓	✓	✓	✓	✓	✓	✓	S	✓	L	✓	19	12
	✓	✓	✓	✓	✓	H	✓	✓	✓	L	✓	A	✓	✓	✓	✓	L	A	✓	✓	✓	S	✓	✓	18	11
	✓	✓	S	✓	✓	✓	A	✓	✓	✓	✓	✓	✓	✓	A	A	✓	✓	✓	✓	✓	✓	L	✓	19	13
	✓	✓	✓	✓	S	✓	✓	✓	H	L	✓	✓	✓	✓	✓	✓	H	✓	H	A	✓	✓	✓	✓	18	11

FORTY-FIVE-YEAR-OLDS

C = Canadian
M = Mexican

H = Happy
S = Sad
L = Love
A = Angry

	M1 S	M2 L	C3 A	M2 A	C1 L	C1 S	M2 H	M3 H	C1 A	M2 S	C2 A	C1 H	M1 L	M1 A	C3 H	M3 S	C2 S	M1 H	M3 L	C2 H	C2 L	M3 A	C3 S	C3 L	RESPONSES CORRECT	NEG.
CANADIANS	✓	S	✓	✓	S	✓	✓	✓	H	✓	✓	✓	✓	✓	✓	L	A	✓	✓	A	✓	S	✓	✓	17	13
	✓	✓	✓	S	✓	A	✓	✓	✓	✓	✓	A	✓	✓	✓	✓	✓	A	✓	A	✓	✓	A	S	17	16
	✓	✓	S	✓	✓	✓	A	A	✓	✓	H	✓	S	✓	✓	✓	A	✓	S	✓	S	✓	L	✓	15	15
	L	✓	✓	✓	S	L	A	✓	✓	A	✓	✓	✓	S	A	✓	✓	✓	✓	✓	✓	✓	✓	S	16	14
	✓	✓	✓	H	✓	✓	✓	✓	✓	✓	H	A	H	✓	✓	L	✓	✓	S	✓	H	L	✓	✓	16	10
	✓	S	✓	✓	S	✓	✓	✓	H	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	S	✓	✓	✓	✓	20	14
	✓	✓	✓	✓	✓	L	✓	✓	✓	✓	✓	✓	✓	H	A	✓	✓	L	S	✓	✓	✓	L	S	17	12
	✓	S	H	✓	✓	✓	✓	✓	S	L	✓	A	S	✓	✓	✓	L	✓	✓	✓	✓	✓	✓	✓	17	12
	A	A	✓	✓	✓	L	✓	A	✓	✓	S	✓	✓	S	✓	✓	✓	✓	✓	A	S	✓	✓	✓	16	15
	✓	✓	H	✓	H	✓	✓	✓	✓	✓	✓	L	✓	✓	L	L	✓	L	✓	✓	✓	H	✓	H	16	9
	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	A	✓	✓	L	S	21	13
	✓	✓	✓	H	✓	L	✓	A	L	✓	H	✓	✓	✓	S	✓	✓	✓	✓	✓	S	✓	✓	✓	17	11
	L	✓	S	✓	S	✓	A	✓	✓	L	✓	A	✓	S	✓	✓	L	✓	✓	S	✓	✓	✓	✓	15	13
	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	H	L	S	✓	✓	H	✓	✓	S	✓	✓	✓	A	✓	18	13
	✓	H	H	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	A	L	✓	A	✓	✓	H	✓	✓	✓	18	12
MEXICANS	✓	S	✓	✓	✓	A	✓	✓	✓	✓	S	✓	✓	✓	✓	✓	✓	✓	✓	A	✓	✓	✓	S	19	15
	✓	✓	H	H	✓	✓	✓	✓	✓	L	✓	✓	✓	✓	A	✓	✓	A	S	✓	✓	✓	L	✓	17	11
	L	✓	✓	✓	✓	L	A	A	✓	✓	✓	A	✓	✓	✓	✓	L	✓	✓	✓	H	S	✓	✓	16	12
	✓	✓	✓	✓	S	✓	✓	✓	H	✓	H	✓	✓	✓	✓	L	✓	A	✓	A	✓	✓	A	S	16	13
	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	S	A	✓	✓	✓	✓	✓	H	✓	✓	S	20	14
	L	✓	✓	✓	H	L	✓	✓	✓	✓	✓	A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	20	11
	✓	✓	H	S	✓	✓	S	✓	✓	✓	✓	✓	S	✓	✓	✓	A	✓	✓	✓	H	✓	✓	✓	18	13
	✓	S	✓	✓	✓	A	✓	✓	S	✓	S	✓	✓	✓	✓	✓	✓	✓	A	✓	✓	✓	A	✓	18	14
	✓	✓	✓	✓	S	✓	✓	✓	✓	✓	✓	A	S	✓	✓	✓	L	A	✓	A	✓	H	✓	✓	17	15
	H	H	✓	✓	✓	✓	✓	✓	H	✓	✓	✓	✓	✓	A	L	✓	✓	H	L	✓	✓	✓	H	16	10
	✓	✓	✓	✓	H	L	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	A	✓	✓	✓	✓	21	12
	✓	✓	✓	✓	✓	✓	✓	A	✓	L	S	✓	✓	H	S	✓	✓	✓	✓	✓	H	✓	L	✓	17	11
	✓	✓	✓	✓	S	✓	✓	✓	✓	✓	✓	A	S	✓	✓	✓	✓	✓	✓	✓	✓	H	✓	H	19	14
	✓	✓	L	✓	✓	✓	✓	✓	S	✓	✓	✓	✓	H	A	✓	A	A	✓	✓	S	✓	✓	✓	17	13
	✓	✓	H	✓	S	✓	✓	L	✓	✓	H	✓	✓	✓	✓	✓	✓	L	S	✓	✓	✓	L	✓	17	11

SIXTY-FIVE-YEAR-OLDS

C = Canadian
M = Mexican

H = Happy
S = Sad
L = Love
A = Angry

APPENDIX VI

ANALYSIS OF VARIANCE FOR MEAN NUMBER OF CORRECT IDENTIFICATIONS OF EACH EMOTIONAL STATE AS A FUNCTION OF AGE, CULTURE OF LISTENER, AND CULTURE OF SPEAKER

Source	SS	df	MS
Culture of Listener	7.33	1	7.33
Age	405.56	6	67.59
Cult List x Age	.45	6	.08
Error	56.71	196	.29
Culture of Speaker	58.31	1	58.31
Cult Sp x Cult List	.01	1	.01
Cult Sp x Age	1.21	6	.20
Cult Sp x Cult List x Age	.53	6	.09
Error	69.82	196	.36
Emotion	6.26	3	2.09
Emot x Cult List	.02	3	.01
Emot x Age	4.32	18	.24
Emot x Cult List x Age	.78	18	.04
Error	229.75	588	.39
Cult Sp x Emot	.29	3	.10
Cult Sp x Emot x Cult List	.19	3	.06
Cult Sp x Emot x Age	1.51	18	.08
Cult Sp x Emot x Cult List x Age	1.20	18	.11
Error	423.64	588	.72

APPENDIX VII

MEAN NUMBER OF CORRECT IDENTIFICATIONS OF CANADIAN AND MEXICAN SPEECH SAMPLES BY CANADIAN AND MEXICAN SUBJECTS AT SUCCESSIVE AGE LEVELS

	Age	CANADIAN SPEECH SAMPLES	MEXICAN SPEECH SAMPLES
Canadian Subjects	5	3.20	4.00
	9	4.60	6.13
	13	6.73	8.40
	17	8.13	9.73
	25	8.40	10.13
	45	8.27	9.80
	65	7.93	9.13
Mexican Subjects	5	3.53	4.87
	9	5.40	6.93
	13	7.40	8.80
	17	8.60	10.33
	25	9.00	10.40
	45	8.60	10.27
	65	8.20	9.67

APPENDIX VIII

TESTS OF TREND FOR MEAN NUMBER OF CORRECT IDENTIFICATIONS OF CANADIAN AND MEXICAN SPEECH SAMPLES BY CANADIAN AND MEXICAN SUBJECTS

	Source	SS	df	MS	F
Canadian Subjects Hearing Canadian Speakers	Linear	9.84	1	9.84	30.50*
	Quadratic	10.02	1	10.02	31.05*
Canadian Subjects Hearing Mexican Speakers	Linear	9.54	1	9.54	29.55*
	Quadratic	14.62	1	14.62	45.30*
Mexican Subjects Hearing Canadian Speakers	Linear	8.01	1	8.01	24.81*
	Quadratic	10.82	1	10.82	33.54*
Mexican Subjects Hearing Mexican Speakers	Linear	8.43	1	8.43	26.13*
	Quadratic	11.90	1	11.90	36.88*
	Error	125.18	387.84	.32	
All Subjects Hearing All Speakers	Age	405.56	6	67.59	233.63*
	Linear	17.91	1	17.91	61.90*
	Quadratic	23.57	1	23.57	81.47*
	Error	56.71	196	.29	

*$p < .01$

APPENDIX IX

PLANNED COMPARISONS FOR MEAN NUMBER OF CORRECT RESPONSES BY CANADIAN VERSUS MEXICAN SUBJECTS AT VARIOUS AGE LEVELS

Source	SS	df	MS	F
Comparison:				
Age 5	1.35	1	1.35	4.67**
9	2.40	1	2.40	8.29*
13	1.07	1	1.07	3.69
17	1.07	1	1.07	3.69
25	.70	1	.70	2.43
45	.60	1	.60	2.07
65	.60	1	.60	2.07
All Ss	7.33	1	7.33	25.35*
Error	56.71	196	.29	

*p<.01
**p<.05

APPENDIX X

PLANNED COMPARISONS FOR MEAN NUMBER OF CORRECT RESPONSES BY CANADIAN AND MEXICAN SUBJECTS LISTENING TO CANADIAN VERSUS MEXICAN SPEECH SAMPLES

Source	SS	df	MS	F
Comparison:				
Canadian Subjects	28.60	1	28.60	80.30*
Mexican Subjects	29.72	1	29.72	83.43*
All Subjects	58.31	1	58.31	163.71*
Error	69.82	196	.36	

*$p < .01$

APPENDIX XI

TOTAL NUMBER OF CORRECT IDENTIFICATIONS OF EACH EMOTIONAL STATE BY CANADIAN AND MEXICAN SUBJECTS AT SUCCESSIVE AGE LEVELS

	Canadian Subjects				Mexican Subjects			
Emotion	Angry	Sad	Happy	Love	Angry	Sad	Happy	Love
5	31	27	26	24	36	33	31	26
9	47	42	37	35	52	47	45	41
13	60	57	56	54	64	60	60	59
Age 17	68	67	68	65	72	71	70	71
25	70	68	71	69	75	70	75	71
45	68	66	70	67	72	71	70	70
65	66	66	62	62	69	69	66	64
Total	410	393	390	376	440	421	417	402

APPENDIX XII

PLANNED COMPARISONS FOR MEAN NUMBER OF CORRECT IDENTIFICATIONS OF NEGATIVE VERSUS POSITIVE EMOTIONS BY CANADIAN AND MEXICAN SUBJECTS

Source	SS	df	MS	F
Comparison:				
Age 5	1.67	1	1.67	4.27***
9	3.75	1	3.75	9.60*
13	.60	1	.60	1.54
17	.07	1	.07	.17
25	.04	1	.04	.10
45	.00	1	.00	.00
65	1.07	1	1.07	2.73
All Can. Ss	1.63	1	1.63	4.17***
All Mex. Ss	2.10	1	2.10	5.37**
All Subjects	3.71	1	3.71	9.51*
Error	299.75	588	.39	

*$p < .01$
**$p < .025$
***$p < .05$

APPENDIX XIII

ANALYSIS OF VARIANCE FOR MEAN NUMBER OF NEGATIVE RESPONSES AS A FUNCTION OF AGE AND CULTURE

Source	SS	df	MS	F
Culture of Listener	.58	1	.58	.26
Age	143.05	6	23.84	10.74*
Culture of Listener x Age	1.92	6	.32	.14
Error	435.05	196	2.20	

*p<.01

APPENDIX XIV

VERBAL AND VOCAL CONTENT OF THE CONTRADICTORY VOCAL EXPRESSIONS IN STUDY II

Speaker	Sentence	Content	
		Verbal	Vocal
Canadian #1	"I feel so happy today."	H	S
	"I'm just so angry."	A	L
	"I'm so sad now."	S	H
	"I love you, darling."	L	A
Canadian #2	"I feel like jumping for joy."	H	S
	"I hate this place."	A	L
	"I'm too sad to sit around."	S	H
	"I'm in a loving room."	L	A
Canadian #3	"It's great to be alive."	H	S
	"I can't stand this nonsense."	A	L
	"I'm so miserable today."	S	H
	"I think you're so sweet."	L	A
Mexican #1	"That's because I'm happy."	H	S
	"I'm too mad to go out."	A	L
	"This place makes me so unhappy."	S	H
	"Gee, you're wonderful."	L	A
Mexican #2	"It's so much fun to go out."	H	S
	"I'm really annoyed."	A	L
	"I just feel like crying."	S	H
	"You're such an angel."	L	A
Mexican #3	"I feel good inside."	H	S
	"I'm simply furious."	A	L
	"It gets depressing sometimes."	S	H
	"I want you with me, dear."	L	A

APPENDIX XV

RAW DATA FOR STUDY II

(NEGATIVE RESPONSES)

CANADIAN SUBJECTS

	Congruent				Contradictory			
Age	5	9	13	17	5	9	13	17
	14	13	12	10	16	12	14	12
	14	12	9	11	17	16	10	13
	13	14	13	12	15	17	12	12
	13	13	14	13	17	13	16	11
	11	14	11	11	13	15	14	10
	12	12	10	12	18	17	13	14
	10	11	14	13	15	18	15	13
	12	11	12	13	16	15	15	12
	11	10	12	12	15	16	15	14
	13	12	12	13	17	13	12	16
	123	122	119	120	159	152	136	127

MEXICAN SUBJECTS

	Congruent				Contradictory			
	5	9	13	17	5	9	13	17
	12	10	11	13	16	15	12	11
	14	11	12	14	19	15	15	13
	12	15	12	12	17	14	18	13
	14	10	10	11	15	18	17	16
	13	12	14	12	14	19	14	15
	13	13	14	12	20	18	16	13
	11	12	11	12	17	15	17	14
	12	12	12	13	18	15	15	12
	11	11	11	10	17	16	15	12
	11	11	13	12	14	18	11	14
	123	117	120	121	167	163	150	133

APPENDIX XVI

ANALYSIS OF VARIANCE FOR MEAN NUMBER OF NEGATIVE RESPONSES AS A FUNCTION OF AGE, TYPE OF SPEECH, AND CULTURE OF LISTENER

Source	SS	df	MS
Culture of Listener	8.10	1	8.10
Type of Speech	308.02	1	308.02
Age	73.75	3	24.58
Cult List x Type Speech	11.03	1	11.03
Cult List x Age	1.25	3	.42
Type Speech x Age	60.62	3	20.21
Cult List x Type Speech x Age	1.83	3	.61
Error	362.99	144	2.52

APPENDIX XVII

PLANNED COMPARISONS FOR MEAN NUMBER OF NEGATIVE RESPONSES BY CANADIAN AND MEXICAN SUBJECTS AT DIFFERENT AGE LEVELS IN THE CONTRADICTORY VERSUS CONGRUENT CONDITIONS

	Source	SS	df	MS	F
	Comparison:				
Canadian Subjects	Age 5	64.80	1	64.80	25.71*
	9	45.00	1	45.00	17.85*
	13	14.45	1	14.45	5.73**
	17	2.45	1	2.45	.97
	All Can. Ss	101.25	1	101.25	40.17*
Mexican Subjects	5	96.80	1	96.80	38.40*
	9	105.80	1	105.80	41.97*
	13	45.00	1	45.00	17.85*
	17	7.20	1	7.20	2.86
	All Mex. Ss	217.80	1	217.80	86.40*
	Error	362.99	144	2.52	

*$p < .01$
**$p < .025$

APPENDIX XVIII

TESTS OF TREND FOR MEAN NUMBER OF NEGATIVE RESPONSES TO CONTRADICTORY AND CONGRUENT SAMPLES BY CANADIAN AND MEXICAN SUBJECTS

	Source	SS	df	MS	F
Canadian Subjects Hearing Congruent Samples	Linear	.72	1	.72	.29
	Quadratic	.10	1	.10	.04
Mexican Subjects Hearing Congruent Samples	Linear	.05	1	.05	.02
	Quadratic	1.23	1	1.23	.49
All Subjects Hearing Congruent Samples	Linear	.56	1	.56	.22
	Quadratic	1.01	1	1.01	.40
Canadian Subjects Hearing Contrad. Samples	Linear	62.72	1	62.72	24.88*
	Quadratic	.10	1	.10	.04
Mexican Subjects Hearing Contrad. Samples	Linear	66.13	1	66.13	26.23*
	Quadratic	4.23	1	4.23	1.68
All Subjects Hearing Contrad. Samples	Linear	128.82	1	128.82	51.10*
	Quadratic	2.81	1	2.81	1.12
	Error	362.99	144	2.52	

*$p < .01$

APPENDIX XIX

PLANNED COMPARISONS FOR MEAN NUMBER OF NEGATIVE RESPONSES BY CANADIAN VERSUS MEXICAN SUBJECTS AT VARIOUS AGE LEVELS IN THE CONTRADICTORY AND CONGRUENT CONDITIONS

	Source	SS	df	MS	F
	Comparison:				
Congruent	Age 5	.00	1	.00	.00
	9	1.25	1	1.25	.50
	13	.05	1	.05	.02
	17	.05	1	.05	.02
	All Ss	.11	1	.11	.04
Contradictory	5	3.20	1	3.20	1.27
	9	6.05	1	6.05	2.40
	13	9.80	1	9.80	3.89**
	17	1.80	1	1.80	.71
	All Ss	19.01	1	19.01	7.54*
	Error	362.99	144	2.52	

*$p < .01$
**$p < .05$

APPENDIX XX

ANALYSIS OF VARIANCE FOR MEAN NUMBER OF CORRECT RESPONSES (SCORED AGAINST TONE) TO CONTRADICTORY SPEECH AS A FUNCTION OF AGE AND CULTURE

Source	SS	df	MS	F
Culture of Listener	37.81	1	37.81	10.06*
Age	806.73	3	268.91	71.53*
Cult List x Age	4.94	3	1.65	.44
Error	270.70	72	3.76	

*p<.01

APPENDIX XXI

RAW DATA FOR STUDY III

	NORMAL				DISTURBED			
	Congruent		Contradictory		Congruent		Contradictory	
GRADE 2	40		51		36		53	
	38		46		36		49	
	29		47		28		36	
	35		36		42		55	
	45		46		37		49	
	32		44		43		54	
	41		46		35		35	
	38		53		38		54	
	36		50		42		56	
	29		45		31		58	
	363	$\bar{X}$ = 36.3	464	$\bar{X}$ = 46.4	368	$\bar{X}$ = 36.8	499	$\bar{X}$ = 49.9
GRADE 4	33		46		33		48	
	38		37		35		47	
	41		50		43		49	
	36		35		41		51	
	37		39		32		52	
	44		51		30		39	
	29		43		41		55	
	31		47		39		47	
	37		36		36		46	
	35		49		32		39	
	361	$\bar{X}$ = 36.1	433	$\bar{X}$ = 43.3	362	$\bar{X}$ = 36.2	473	$\bar{X}$ = 47.3
GRADE 6	42		41		33		39	
	37		44		39		45	
	28		30		37		48	
	40		48		43		52	
	35		38		28		39	
	35		42		37		35	
	39		37		30		43	
	32		43		39		46	
	34		40		38		45	
	33		39		36		49	
	355	$\bar{X}$ = 35.5	402	$\bar{X}$ = 40.2	360	$\bar{X}$ = 36.0	441	$\bar{X}$ = 44.1

APPENDIX XXII

ANALYSIS OF VARIANCE WITH REPEATED MEASURES FOR MEAN NEGATIVITY SCORES AS A FUNCTION OF AGE, TYPE OF SPEECH, AND TYPE OF LISTENER

Source	SS	df	MS
Age	231.33	2	115.67
Type of Listener	130.21	1	130.21
Age x Type List	.22	2	.11
Error	2121.05	54	39.28
Type of Speech	2457.04	1	2457.04
Type Speech x Age	135.35	2	67.67
Type Speech x Type List	88.40	1	88.41
Type Speech x Age x Type List	1.02	2	.51
Error	843.65	54	15.62

APPENDIX XXIII

PLANNED COMPARISONS FOR MEAN NEGATIVITY SCORES BY "NORMAL" AND "DISTURBED" SUBJECTS AT DIFFERENT GRADE LEVELS IN THE CONTRADICTORY VERSUS CONGRUENT CONDITIONS

	Source	SS	df	MS	F
	Comparison:				
Normal	Grade 2	510.05	1	510.05	32.65*
	Grade 4	259.20	1	259.20	16.59*
	Grade 6	110.45	1	110.45	7.07**
	All Ss	806.67	1	806.67	51.63*
Disturbed	Grade 2	858.05	1	858.05	54.92*
	Grade 4	616.05	1	616.05	39.43*
	Grade 6	328.05	1	328.05	21.00*
	All Ss	2457.08	1	2457.08	111.30*
	Error	843.65	54	15.62	

*$p < .01$
**$p < .025$

APPENDIX XXIV

TESTS OF TREND FOR MEAN NEGATIVITY SCORES TO CONTRADICTORY AND CONGRUENT SAMPLES BY "NORMAL" AND "DISTURBED" SUBJECTS

	Source	SS	df	MS	F
Normal Subjects Hearing Contrad. Samples	Linear	192.20	1	192.20	7.00*
	Quadratic	.00	1	.00	.00
Normal Subjects Hearing Congruent Samples	Linear	3.20	1	3.20	.12
	Quadratic	.27	1	.27	.01
Disturbed Subjects Hearing Contrad. Samples	Linear	168.20	1	168.20	6.13**
	Quadratic	.60	1	.60	.02
Disturbed Subjects Hearing Congruent Samples	Linear	3.20	1	3.20	.12
	Quadratic	.27	1	.27	.01
	Error	2500.48	91.09	27.45	

*p<.01
**p<.025

APPENDIX XXV

PLANNED COMPARISONS FOR MEAN NEGATIVITY SCORES BY "NORMAL" VERSUS "DISTURBED" SUBJECTS IN THE CONTRADICTORY AND CONGRUENT CONDITIONS

	Source	SS	df	MS	F
	Comparison:				
All Subjects	Congruent	2.02	1	2.02	.07
	Contradictory	216.60	1	216.60	7.89*
	Error	2500.48	91.09	27.45	

*p<.01

VITA

NAME: Ken W. McCluskey

DATE OF BIRTH: December 18, 1949

PLACE OF BIRTH: Winnipeg, Manitoba

EDUCATION:

B.A. (Honours), Psychology, University of Manitoba, 1971.

M.A., Psychology, University of Manitoba, 1974.

B.Ed., Secretaria de Educacion Publica, Mexico City, 1977.

AWARDS:

Manitoba Government Bursary, 1967, 1973.

Board of Governors Bursary, 1967.

Greater Winnipeg Gas Company Award, 1967-71.

Aronovitch & Leipsic Scholarship, 1968.

WORK EXPERIENCE:

Teaching Assistant, Introductory Psychology, University of Manitoba, 1970-71, 1971-72.

Teaching Assistant, Child and Adolescent Development, University of Manitoba, 1972-73.

Research Assistant, University of Manitoba, 1970-71, 1971-72, 1972-73.

Graduate Student Co-ordinator of Subject Pool, University of Manitoba, 1973-74.

Attendant, Selkirk Hospital for Mental Diseases, 1970 (summer).

Lecturer, MFM Abogados, Mexico City, 1974-75.

Community Worker, Mount Carmel Clinic, Winnipeg, Manitoba, 1975 (summer).

Educational Psychologist, Lord Selkirk School Division #11, Selkirk, Manitoba, 1975-present.

Director, Winnipeg Educational Service Centre, Winnipeg, Manitoba, 1979-present.

PUBLICATIONS:

McCluskey, K.W., Niemi, R.R., & Ferrer, C. Diferencias culturales en la percepcion de las emociones. Informacion Nacional, 1973, 9, 30-31.

McCluskey, K.W., & Niemi, R.R. Comunicaciones contradictorias: Sicologia infantil. La Familia, 1973, 895, 44-45.

McCluskey, K.W. El nino y la disciplina. La Familia, 1973, 894, 34-35.

McCluskey, K.W. Un siquiatra en su hogar. La Familia, 1973, 894, 46-47.

McCluskey, K.W., Badali, G.L., Cuevas, C., & Ferrer, C. Mice in the maddening crowd: A study on overpopulation. EcoSpeak, 1974, 5, 24-27.

McCluskey, K.W. Diary on a synesthete. Psychology Today, 1975, 9, 50-51.

McCluskey, K.W., Albas, D.C., Niemi, R.R., Cuevas, C., & Ferrer, C. Cross-cultural differences in the perception of the emotional content of speech: A study of the development of sensitivity in Canadian and Mexican children. Developmental Psychology, 1975, 11, 551-555.

McCluskey, K.W. Problems of the educational psychologist. Education Canada, 1976, 16, 12-17.

Albas, D.C., McCluskey, K.W., & Albas, C.A. Perception of the emotional content of speech: A comparison of two Canadian groups. Journal of Cross-Cultural Psychology, 1976, 7, 481-490.

Albas, D.C., Albas, C.A., & McCluskey, K.W. Anomie, social class and drinking behavior of high-school students. Journal of Studies on Alcohol, 1978, 39, 910-913.

McCluskey, K.W., & Albas, D.C. Differential sensitivity to contradictory communication as a function of age and culture. Journal of Cross-Cultural Psychology, 1978, 9, 167-178.

McCluskey, K.W., Niemi, R.R., & Albas, D.C. Vocal communication of emotional meaning among normal and disturbed children. Journal of Special Education, 1978, 12, 443-449.

Walker, K.D., & McCluskey, K.W. Integrating the gifted child. Council for Exceptional Children, 1978, April, 20-24.

McCluskey, K.W., & Walker, K.D. The doubtful gift. Manitoba Intermediate Teachers' Association Journal, 1979, 3, 4-10.

McCluskey, K.W., & Walker, K.D. The doubtful gift: Meeting the needs of gifted children in the regular classroom. Selkirk, Manitoba: Human Resource Centre (Lord Selkirk School Division), 1980.

McCluskey, K.W. Perspectives of the Mexican people: Their personality and culture. Mexico City: Bufete de Asesores Profesionales, in press.

BOOK REVIEWS by K.W. McCluskey:

D. Abrahamsen. The murdering mind. Choice, 1974, 10(11), 1789.

G. Sereny, The case of Mary Bell. Choice, 1974, 11(1), 166.

B. Kleinmuntz. Essentials of abnormal psychology. Choice, 1974, 11(4), 672.

B.M. Caldwell & H.N. Ricciuti (Eds.), Review of child development research, Vol. 3: Child development and social policy. Choice, 1974, 11(7), 1027.

P.E. Nathan & S.L. Harris. Psychopathology and society. Choice, 1975, 12(7), 917-918.

S.H. Broman et al. Preschool IQ: Prenatal and early developmental correlates. Choice, 1975, 12(8), 1075.

B.S. Wood. Children and communication: Verbal and nonverbal language development. Choice, 1976, 13(3), 434.

La vida de hoy. Buenhogar, 1976, 11(1), 8.

K. Donaldson. Insanity inside out. Choice, 1977, 13(12) 1664.

M.E. Lamb (Ed.), The role of the father in child development. Choice, 1977, 14(2), 272.

INVITED ADDRESSES:

McCluskey, K.W., Niemi, R.R., Albas, D.C., Jones, K., Cuevas, C., & Ferrer, C. Tone of voice and its effect on childhood behaviour. Institute Nacional de Proteccion a la Infancia, Mexico City, 1974.

McCluskey, K.W., Albas, D.C., Niemi, R.R., Cuevas, C., Ferrer, C., & Jones, K. Nonverbal communication and education: An overview of academic and cross-cultural research. American School Foundation, Mexico City, 1974.

Niemi, R.R., & McCluskey, K.W. Age differences in the perception of the emotional content of speech. Canadian Psychological Association, Windsor, 1974.

Albas, D.C., Albas, C.A., McCluskey, K.W., & Hay, D. Contribution, conformity and time: Alternative interpretations of the emergence of influence in a small group. Canadian Sociology and Anthropology Association, Edmonton, 1975.

Albas, D.C., McCluskey, K.W., & Albas, C.A. Perception of the emotional content of speech in two Canadian groups. Western Association of Sociology and Anthropology, Banff, 1975.

Albas, D.C., Albas, C.A., & McCluskey, K.W. Proxemic behaviour and symbolic interaction. Midwest Sociological Society, Minneapolis, 1977.

Walker, K.D., & McCluskey, K.W. Programs for the gifted. Council for Exceptional Children, Winnipeg, 1978.

Walker, K.D., & McCluskey, K.W. A model for gifted education. Council for Exceptional Children, Winnipeg, 1980.

McCluskey, K.W., & Walker, K.D. The Childhood Depression Scale for Schools. Council for Exceptional Children, Winnipeg, 1980.