(DRAFT)

PSYCHOLOGICAL STUDIES of TELECOMMUNICATIONS

J.W. BERRY

PSYCHOLOGY DEPARTMENT

QUEEN'S UNIVERSITY at KINGSTON

and the NETHERLANDS INSTITUTE for ADVANCED STUDY

with the assistance of

T. MAWHINNEY, J. KANE, N. ATLOOKEN,

R. COSCO, I. LAYARDE, L. LONGPETER,

I. PAPASSAY and F. TOWEDO

REPORT of THE PSYCHOLOGICAL PORTION of the PROJECT: "THE APPLICATION of DYNAMIC MODELLING to the STUDY of TELECOMMUNICATIONS DEVELOPMENT in CANADA". DEPARTMENT of COMMUNICATIONS, GOVERNMENT of CANADA CONTRACTS OPJ2-0051, OSP3-0129, OSU4-0076 (1972, 1973, 1974) with QUEEN'S UNIVERSITY, J.C. BEAL, PRINCIPLE INVESTIGATOR.

THE SUPPORT OF COMMUNICATIONS CANADA (L. HATTON, PROJECT DIRECTOR), and THE COOPERATION and TOLERANCE of the PEOPLE of AROLAND, LONG LAC and SIOUX LOOKOUT ARE VERY MUCH APPRECIATED.

INTRODUCTION

The purpose of conducting psychological studies as part of the "QUIST" project was to examine at the individual level those behaviours which may be implicated in the reception of, orientation to and consequences of telecommunications. Obviously a large array of behaviours could be included within the scope of such a study, and so a selection of behaviours was made based upon three criteria. The first was that the study meet some of the basic questions of interest to telecommunications policy-makers; these were considered to be largely in the area of attitudes toward telecommunications use, and the effects of them. A second criterion was that the behaviours be relevant to the cultural setting in which the study was to take place; for reasons of validity the behaviours must be characteristic of the life style of the people. And thirdly, the study must not be isolated from the extant body of psychological knowledge; otherwise the interpretation of such novel data would be extremely difficult.

With these criteria in mind, it was decided to work with samples of individuals from a number of communities which varied along a dimension of acculturation ("traditional" to "acculturated"), and to work in four areas of psychological testing and interviewing. There were "Perceptual Skills", "Personal Style", "Attitudes" toward ways of relating to the larger society, and problems of "Acculturative Stress". These areas of research are outlined below; details of the tests and interview materials are presented in Appendix I.

Perceptual Skills.

A fairly substantial literature has grown up around the topic of cultural group differences in perceptual and cognitive skills (e.g. Berry, 1966, 1971a; Berry and Dasen, 1974). Briefly, the findings are that in a variety of

cultures, people develop ability patterns which are adapted to the ecological press and cultural forms in their particular area. Specifically, it has been found that those peoples who have traditionally pursued a nomadic hunting and gathering life style have a high level of skills in the detection and disembedding of visual cues, in organizing these cues into an awareness of spatial relations, and in the analysis of visual materials. In contrast, those peoples who have pursued a sedentary farming existence typically have lower levels of these skills. On the basis of this literature, it was expected that the Ojibway people in this study (being traditionally a hunting and gathering people) would be well-developed in this skill area. However the state of our knowledge was far below that of a confirmed generalization (or "law"), and it was important to study these behaviours to check the skill level and pattern which was characteristic of these samples. And from the point of view of relevance to telecommunications use, the importance of visual skills is obvious; without them, there can be no use or impact, or if they are relatively undeveloped, the use or impact may be minimal.

However this joint rationale for studying visual skills may be extended to a second perceptual problem, and that is the question of auditory skills. Very little information was available on this topic with respect to cultural groups, but its importance was at least equal to the study of visual functioning. It was decided, therefore, to develop auditory tests which would parallel the visual tests being used.* The basic questions of interest were the level of auditory skills in these samples, and the relationship between auditory and visual skills.

---

* See Appendix II for details of this test and its development.

For tests of visual and analytic skills three standard tasks were employed. The first was the Portable Rod and Frame Test (PRFT) which provides an estimate of the ease with which an individual can visually disembed an item from its context. The second was the Kohs Blocks Test which requires the analyses and construction of geometric designs. And the third was the Ravens Matrices Test which involves the perceptual analysis of a sequence of designs, and an inference to the next design in the sequence. For auditory tests, two were developed which required the detection of a sound in the context of a cluster of sounds. In the first, termed the Sequential Tones Set (SETT) the one sound was a short sequence of notes hidden in a longer sequence of notes. And in the second, termed the Simultaneous Tones Test (SITT), the one sound was a single tone embedded in a chord.

Personal Style

Over and above the question of the skill or ability to handle visual or auditory aspects of communication is the personal preference one may have for engaging in the communication process. One may be able, but not interested in either giving out information or being influenced by communications. From the point of view of the culture of northern native peoples, there is some evidence that a "reticence" (Preston, 1970) or "reserve" (Berry, 1971b) characterizes most hunting societies in Northern Canada (Hallowell, 1946). This personal communication style is usually described as one involving a limited interest in revealing information about oneself, and a strong sense of independence during social encounters (Honigmann, 1968). Such a characteristic is thought to exist not only when northern Native peoples interact with Eurocanadians, but more basically in their own interactions in traditional life. Once again this description was not at the

level of a valid generalization, but had to be checked with the samples in this study.

A second rationale for exploring these behaviours lay in their relevance to communications policy. If it were the case that interest in giving and receiving information was generally low in these samples, then the use of telecommunications might be low. And if low, then decisions about the installation and operating of such services might be affected.

Two tests were employed to estimate behaviour in this area of psychological functioning. The first, termed Social Influence, is a task which requires the individual to make a judgement about some materials after he is confronted with an erroneous judgement attributed to a group of his peers. An acceptance of this group influence is represented in the judgement the individual makes. The second task, termed Social Reserve, requires the individual to indicate whether he would release certain kinds of personal information to his parents or peers. The proportion of refusals over a series of questions is taken as an indication of reserve in social interaction.

Attitudes

A third area to be explored was the way in which an individual thought this group (in this case, the Ojibway) should relate to the larger society (that is, the Canadian society as a whole). These attitudes were conceptualized in more general terms than telecommunications alone for a variety of reasons. Firstly, there is a current debate among Native peoples (and to a lesser extent among "immigrant" ethnic groups) about the nature of their overall relationship to the society. One general view is that a distinctive culture is no longer of value, and that all people should merge into a fairly homogeneous Canadian culture; this has been termed the Assimilation alternative (Berry, 1974b).

Another general view is that a distinctive native culture is of great value, and that the only sure way to retain and develop it is by avoiding major contacts with the larger society; this has been termed the Rejection alternative. Thirdly, there is a general view that a distinctive native culture is of value, but that it can be developed within the larger Canadian "mosaic"; this has been termed the Integration alternative.

With the Multicultural Policy now being implemented (Government of Canada, 1971), and a national assessment of its acceptance now being conducted (Berry, Kalin and Taylor, 1975), the general importance of this topic is self-evident. But specifically for telecommunications policy, the patterning to be discovered among these three attitudes may be able to provide some guidance for those responsible for "culture content" decisions.

To assess these attitudes, a scale previously developed for use with Australian Aboriginal and northern Amerindian samples was modified for use with the Ojibway and Eurocanadian samples in this study. For use with the native samples, the questions are phrased in terms of how the respondents feel Amerindian peoples should relate to the larger society, while for use with the Eurocanadian samples the phrasing is in terms of how the Eurocanadian respondents think the Amerindian peoples should relate. Thus in this latter case, the Rejection alternative becomes, for Eurocanadian respondents, a Segregation alternative.

Acculturative Stress

In the psychological literature on social change there are two kinds of changes usually observed with acculturation. One is a general "shift" in behaviour toward the norms of the larger society; these shifts may be observed directly over time, or may be inferred from behavioural differences

between samples which have differential exposure to the larger society.* A second change which is often observed is a rise in "acculturative stress" which appears as a function of the pressures being exerted on a cultural group by the larger society. If we consider the general set of pressures, it is possible to include a large variety of indicators, but three (education, wage employment, and media use) are often thought to be most central (see for example Berry, 1976).

As a general response to pressures from the larger society, including telecommunications, measures Acculturative Stress may be used as an indicator of the likely consequences of continuing acculturation. In this study, two tests were employed. The first, termed Stress, is a checklist of psychosomatic symptoms often employed in this kind of study. The second, termed Marginality, is a scale which assesses the degree to which the individual feels "poised in psychological uncertainty" between two cultural traditions, and has been employed often in acculturation studies. These two measures, then, are used to estimate the degree of psychological distress being experienced in the samples; and by analysis of responses in relation to extant indicators of acculturation, we may anticipate its likely course with further pressure.

Interview

Finally, in addition to psychological testing in these four areas, an interview was conducted with each individual in the sample; a copy of the record form is attached as Appendix III. Moreover, a good deal of the general information collected by other members of the QUIST team, particularly

---

* This point will be considered further when the design of the studies is presented.

by the sociological members*, have been used to supplement this set of background materials. The interview sought to gather specific details about age, education, work experience, travel history, ownership of various "modern" conveniences, language use, literacy and early socialization experience.

Design and Samples

An ideal design which would meet the goals of this study would be both cross-sectional and longitudinal in nature. That is, to study the relationships between these behaviours and telecommunications, it would be best to select a cross-section of samples, ranging from very traditional to highly acculturated, and to follow them through a period before, during, and after the introduction of major changes in telecommunications in their area. The latter (longitudinal) dimension was not possible for practical reasons (time and funding), and so the design was based solely on the former (cross-sectional) dimension. This is not a serious problem, for if the cross-section of samples is relatively well-controlled, it may still be possible to infer some of the longitudinal and dynamic features of the relationships in addition to describing behaviour in each sample.

Even this other half of the ideal design was not met fully, for a variety of reasons. The shortfall lies in the absence of a very traditional sample. The operation of the Northern Pilot Project (NPP) and the general political climate for research in traditional communities (among other factors) led to the decisions not to force the study toward the ideal traditional pole, but to make do with those samples which met the other criteria for a cross-

---

* K. Herman, G. Weinreb and Lois Mombourguette.

sectional design.

In all, five samples were included in the study; three were Ojibway representing three degrees of acculturation to the larger society, and two were Eurocanadian. One of the latter samples was drawn from the same area as the Ojibway samples, and is employed as a local example of the norms toward which acculturation may be taking place. The other Eurocanadian sample was drawn from a village well-removed from the other four samples, and provided an indication of non-northern, and non-urban life style. The location, names, numbers of these samples are provided in Table I.

TABLE I SAMPLES IN THE STUDY

NAME	CULTURAL GROUP	LOCATION	NUMBER of PERSONS			AGE	
			Male	Fem.	Total	Mean	Sd.
1. AROLAND	OJIBWAY	N.W. ONTARIO	20	19	39	33.3	15.5
2. LONGLAC	OJIBWAY	N.W. ONTARIO	17	20	37	31.8	8.4
3. SIOUX LOOKOUT	OJIBWAY	N.W. ONTARIO	13	18	31	28.4	10.3
4. SIOUX LOOKOUT	EURO-CANADIAN	N.W. ONTARIO	19	21	40	35.7	15.3
5. WEST PORT	EURO-CANADIAN	S.E. ONTARIO	23	25	48	35.0	15.1
	SUB TOTAL OJIBWAY		50	57	107		
	SUB TOTAL EUROCANADIAN		42	46	88		
	TOTAL PERSONS IN SAMPLES ...		92	103	195		

The sampling of individuals was intended to provide a total of 40 persons with an equal number of males and females, and to sample over the age range 18 to around 65. This goal was sought in order to provide a diverse and approximately balanced and representative sample of the communities. The sex distribution in Table I indicates a fair success in that goal, and the age (mean and standard deviation) also indicates fair success. The one clear deviation lies in the shorfall of males in Sioux Lookout (Ojibway); an inspection of the age data indicates that this

shortfall was primarily among older men. It was the case that very few older Ojibway men were resident in Sioux Lookout, and so the sample may still be fairly representative if not balanced.

Further background characteristics of these samples are provided in Table II. In particular it was important to check on the degree of acculturation which was intended during the selection of the communities, so that our assumptions could be verified. As indicators of acculturation, mean years of formal education are provided, along with the "ownership index", based upon the respondents' ownership of various "modern" conveniences. For the two Eurocanadian samples, equivalent information is provided for comparative purposes.

TABLE II SAMPLE ACCULTURATION

SAMPLE	CULTURE	ACCULTURATION				DESIGNATION
		EDUCATION		OWNERSHIP		
		Mean	Sd.	Mean	Sd.	
1. AROLAND	OJ	5.7	4.6	3.7	1.1	"Relatively Traditional
2. LONGLAC	OJ	6.9	2.9	2.8	1.1	"Transitional"
3. SIOUX LOOKOUT	OJ	8.1	6.2	3.2	1.4	"Relatively Acculturated"
4. SIOUX LOOLOUT	EC	10.9	2.4	4.6	0.7	"Northern EC Norm"
5. WESTPORT	EC	12.2	2.1	4.9	0.3	"Southern EC Norm"

It is clear that the samples are spread and ordered on the educational index as intended; there is a perfect rank ordering from Aroland to Sioux Lookout, while the two Eurocanadian samples have higher levels as expected. However on the ownership index, the ordering within the Ojibway communities did not turn out as expected (Aroland low, Sioux Lookout high). On the contrary, Aroland yielded the highest index, and this reflects their substantial economic position in relation to the two other Ojibway samples.

The low level in Longlac, and higher level in Sioux Lookout, however, is much as we had expected. Further, it should be noted that there is a clear division between the three Ojibway and two Eurocanadian samples.

In our discussion of an ideal design we noted the lack of a really traditional Ojibway community. This lack is highlighted by the more than 5 years (on the average) of educational experience in our most "traditional" sample of Aroland, and as already noted, by their high ownership index in relation to the other Ojibway samples. What had been intended ideally was to obtain a more traditional sample of, for example, mean education around 2 or 3 years, and an ownership index of around 2. But for the reasons already stated, this proved impossible. Nevertheless, the evidence from the education data in particular, and from general community observations, alows us to designate the three Ojibway communities as "Relatively Traditional" "Transitional" and "Relatively Acculturated" respectively, and to employ the two Eurocanadian samples as the "Northern Eurocanadian Norm" and "Southern Eurocanadian Norm" respectively.

Results

The data which were collected may be analysed and presented in a variety of ways. Perhaps the most informative display is to provide the means and standard deviations for each test for each of the five samples, and then to examine the relationships which obtain among the various tests and between test scores and some of the background variables. In the discussion section, we will then be in a position to explore the meaning of these results, and we will do so by comparison across the samples within this study, and by comparison of these results with those from other studies in the literature.

Firstly in Table III, the means and Standard Deviations for all tests are displayed. Analyses of Variance were carried out across the three

Ojibway samples and the Sioux Lookout Eurocanadian sample. The resultant F ratio (and probability level) are indicated. The rationale for including the Sioux Lookout in, but excluding the Westport sample from, the ANOVA is based upon the assumption that the closest Eurocanadian towns provide the norm towards which acculturation may be taking place. The Westport data are included only for comparison purposes and do not enter into the analyses across samples.

Table III here

Note that in Aroland, it proved impossible to acquire a good sample for the SETT test because of administration difficulties. Note also that to maintain a common direction in test scores, PRFT and Influence means have been subtracted from 50 and 20 respectively. Finally, note that the Attitude means are given as positive or negative deviations from the neutral or mid-point of their respective scales.

Turning to the relationships which obtain among the various tests and some of the background variables, Table IV presents a correlation matrix for the three Ojibway samples combined, and Table V presents the same matrix for the Eurocanadian Sioux Lookout sample.

Tables IV and V here

Although there are some variations among the three Ojibway samples, and between the two Eurocanadian samples, these two matrices provide the essential overview of the patterning of these variables. Note that since "male" is scored 1 and "female" is scored 2, a positive coefficient in the sex row indicates a higher score for females.

TABEL III MEANS and Sd's on TWELVE TEST VARIABLES

SAMPLE	STATIS-TIC	PERCEPTUAL SKILLS					PERSONAL STYLE		ATTITUDES			ACC. STRESS	
		VISUAL			AUDITORY								
		PRFT	BLOCKS	MATRICES	SITT	SETT	INFLUENCE	RESERVE	ASSIMILATION	INTEGRATION	REJ	STRESS	MARG.
1. AROLAND	M	33.5	101.1	27.3	13.5	-	10.8	10.7	+ 0.50	+ 1.76	+ 1.08	3.9	3.3
	Sd	15.4	32.9	5.4	2.9	-	3.7	5.1				2.3	2.2
2. LONGLAC	M	34.0	99.1	27.2	13.2	12.7	10.8	8.3	+ 0.92	+ 1.33	+ 1.58	5.9	5.8
	Sd	9.3	29.0	5.4	2.7	2.2	4.9	5.3				4.4	3.4
3. SIOUX LOOKOUT	M	33.3	106.1	28.7	14.4	14.7	9.6	8.1	+ 0.97	+ 2.20	- 1.53	5.1	3.8
	Sd	10.0	28.9	5.2	2.8	2.5	5.5	4.1				3.3	2.8
4. SIOUX LOOKOUT	M	31.1	94.1	29.7	15.0	16.4	7.9	6.5	+ 2.35	+ 1.20	- 4.15	2.9	1.8
	Sd	13.9	29.8	5.9	3.9	4.1	5.1	3.5				2.7	1.9
5. WESTPORT	M	22.8	101.6	30.5	13.2	13.9	10.2	9.8	+ 3.50	+ 0.98	- 2.86	1.8	1.9
	Sd	8.7	24.0	3.4	2.5	3.3	3.9	4.0				2.3	2.3
	F	0.31	0.83	1.71	2.41	6.93	2.96	5.57	1.96	0.66	22.8	6.11	11.28
	P	NS	NS	NS	NS	.001	.05	.01	NS	NS	.001	.001	.001

TABLE IV INTERCORRELATIONS AMONG TEST and BACKGROUND VARIABLES in THREE OJIBWAY SAMPLES COMBINED

	TEST VARIABLES											
	PRFT	BLOCKS	MATRICES	SITT	SETT	INFLUENCE	RESERVE	ASSIM	INTEG	REJ	STRESS	MARGINALITY
PRFT	-											
BLOCKS	+.47	-										
MATRICES	+.39	+.62	-									
SITT	+.23	+.28	+.32	-								
SETT	+.14	+.26	+.01	+.20	-							
INFLUENCES	-.21	+.02	+.22	+.10	+.11	-						
RESERVE	+.08	+.09	+.31	+.10	-.05	0	-					
ASSIM	+.17	+.16	+.14	-.11	0	-.27	-.11	-				
INTEG	-.08	+.19	-.02	+.14	-.24	+.22	+.25	-.40	-			
REJ	-.26	-.28	-.29	-.42	-.16	-.07	-.02	-.11	-.27	-		
STRESS	-.51	-.58	-.37	-.29	-.21	-.13	-.27	-.01	-.04	+.25	-	
MARG	-.31	-.25	-.19	-.30	-.18	-.09	-.23	+.04	-.12	+.33	+.57	-
EDUC	+.13	+.37	+.32	+.34	0	+.29	+.02	+.13	+.05	-.16	-.09	+.08
AGE	-.05	-.36	-.45	-.21	0	-.16	-.13	-.24	-.02	+.12	+.09	-.09
SEX	-.12	-.02	-.05	-.17	+.01	-.04	+.02	+.27	-.22	-.04	+.20	+.25

TABLE V INTERCORRELATIONS AMONG TEST and BACKGROUND VARIABLES in EUROCANADIAN SIOUX LOOKOUT SAMPLE

	TEST VARIABLES											
	PRFT	BLOCKS	MATRICES	SITT	SETT	INFLUENCE	RESERVE	ASSIM	INTEG	REJ	STRESS	MARGINALITY
PRFT	-											
BLOCKS	+.07	-										
MATRICES	+.21	+.64	-									
SITT	+.31	+.12	+.17	-								
SETT	+.06	+.34	+.28	-.41	-							
INFLUENCES	-.11	-.07	-.31	+.09	-.02	-						
RESERVE	-.02	+.07	-.15	+.10	-.24	-.13	-					
ASSIM	-.20	-.07	-.09	-.31	-.32	-.29	-.04	-				
INTEG	-.05	+.08	-.04	+.26	+.06	+.23	+.11	-.25	-			
REJ	+.03	-.03	-.50	-.02	-.25	+.34	+.48	+.02	+.19	-		
STRESS	+.11	-.29	-.11	-.08	-.30	+.09	+.14	-.02	+.07	+.15	-	
MARG	-.24	-.20	+.14	+.07	-.06	+.23	+.25	-.18	+.08	-.08	+.64	-
EDUC	+.11	+.36	+.29	+.04	+.09	+.18	-.05	-.09	+.25	+.10	-.05	0
AGE	0	-.48	-.64	-.07	-.13	+.16	-.16	+.14	-.03	+.23	+.04	-.13
SEX	+.26	-.11	-.12	+.28	-.01	+.11	+.31	+.02	+.11	+.07	+.30	+.20

DISCUSSION

Considering firstly the performance of the samples on the tests of perceptual skills, it is apparent that the Ojibway and Eurocanadian samples do not differ very much at all from one another. The most consistent finding (Table III) is that in visual perceptual skills (PRFT, Blocks and Matrices) there are no sample differences. On the basis of the nomadic hunting and gathering background, this is what had been expected; this result is in sharp contrast with those for peoples who were traditionally agriculturalists (Berry, 1966, 1971a; Witkin and Berry, 1975). We are observing once again, then, a high level of visual skills in a hunting population, a skill which does not vary significantly across samples differing in degree of acculturation. However, in Tables IV and V we may note that for all three tests, there is a consistent set of positive correlations with educational experience when the relationship is analysed within samples.

For the two auditory skill tasks (SITT and SETT) we have no differential performance for the first, while in the second there is a significant spread. It will be remembered that the latter test encountered some difficulties in Aroland, and indeed there appeared to be a general problem of comprehending the task. Thus this single example of differential performance on a perceptual task might be interpreted either as a real difference in skill, or as an artifact due to problems of test administration. We may note again in Tables IV and V a tendency for education to correlate positively with test performance, especially for SITT among the Ojibway samples.

Overall, then, we have found generally no differences across the samples on tests of perceptual skill, much as we had expected. Exceptions to this general result are the significant variation on SETT, and the somewhat lower performance on PRFT in the Westport sample. But the general finding is strong and fairly consistent, and stands in contrast to the usual results found with

non-hunting samples.

This first result also contrasts with the pattern of results across samples for the other seven tests, where five of them are significantly spread. Considering first the two personal style tests, we find that there is a significant spread for both tests across the Ojibway samples, and the drift in sample means is toward that of the Sioux Lookout Eurocanadian population. These trends confirm the expectation that behaviour is shifting during acculturation. And the somewhat different means for Westport support the decision to employ a Eurocanadian sample in the same regional setting in the examination of the patterning of these behavioural shifts with acculturation. Of course only further research will enable us to clarify this separation of means between the two Eurocanadian samples on these tests.

With respect to the Attitude measures, we find that only one of the three (Rejection) is significantly spread across the four samples, while one other (Assimilation) is just short of significance ($p < .06$) The third (Integration) displays no significant variation or trend. For Assimilation, there is a slight increase across the Ojibway samples with acculturation in the selection of this mode of relating to the larger society, and this is confirmed by the low positive correlation with education in Table IV. The greatest contrast, however, lies between the low Ojibway acceptance of this option and the fairly strong view of the Eurocanadian samples at Amerindian peoples should assimilate.

A reverse pattern is displayed for the Rejection alternative with a moderately positive response in the two less acculturated Ojibway samples, a moderately negative response in the Sioux Lookout Ojibway sample and a strongly negative response in the two Eurocanadian samples. This pattern is an extremely interesting one, and deserves some more discussion. In Aroland, which is

fairly smoothly functioning and prosperous, even though remote, it is probably the case that this moderate acceptance of the Rejection alternative represents a desire to be left alone by the larger society. In Longlac, which is a somewhat disrupted community, the view is more in favour of Rejection; it appears that the source of the ills of the community are being attributed to the larger society. And finally in Sioux Lookout, since most of the sample has migrated to the town, and is fairly well settled there, it is reasonable to view their negative view of the Rejection alternative as confirmation of their position in the town.

For the Integration alternative, the level of support is fairly high in all samples and, as we saw, does not vary across samples. Since this attitude includes elements of cultural retention and positive intergroup relations, it appears to be the compromise most generally acceptable. Since it is also the model currently pursued by the Multicultural Policy, and since it is the one attitude which does not exhibit contrasts between the Ojibway and Eurocanadian samples, it is perhaps the alternative to consider the most seriously in policy formulation.

Our last behavioural domain, that of Acculturative Stress, exhibits a striking variation across samples, and one that is not linear. For both Stress and Marginality, the highest scores are for the Longlac community which, as we have noted, suffers some degree of community disorganization. Levels are lower in Aroland, and intermediate in the Sioux Lookout Ojibway sample. Thus we find a relatively unstressed sample in the relatively traditional and economically comfortable sample, rising dramatically in the transitional sample, and falling off somewhat in the relatively acculturated sample. This non-linear trend is in contrast to the linearity of sample differences on the other tests, but it is consistent with the patterning of

stress in relation to acculturation found in other Amerindian samples (Berry and Annis, 1974; Berry, 1975). Consistent with this non-linearity is the low level of correlations with education in the three samples combined. When examined separately, we find negative correlations (-.21 and -.11 with Stress and Marginality) in Longlac, low positive in Sioux Lookout (+.04 and +.01 respectively), and a mixed set in Aroland (-.16 and +.21) respectively.

The strongest contrasts in these data are between the Ojibway and Eurocanadian samples on both tests. It is clear that life is considerably more stressful for those in the Ojibway communities, than for the Eurocanadian samples. This finding, too, is also consistent with the literature.

We turn now to a consideration of some patterns among the variables. Firstly we will consider task correlations within each of the four behavioural areas, then the correlations between the four areas, and finally the test correlations with age and sex.

For the three tests of visual skills, the correlations are all positive and generally substantial. The one exception (+.07 in the Sioux Lookout sample between PRFT and Blocks) is not repeated in Westport (where it is +.65) nor in the general literature. This overall pattern suggests that we are measuring an interrelated set of skills fairly consistently, and confirms their designation as tests belonging to the same area of behaviour. This conclusion is also true of the relationships between SITT and SETT, where positive correlations exist in both Tables IV and V, but here the level of correlations is somewhat reduced.

A similar pattern emerges when we consider the correlations between the visual and auditory tasks: all correlations are positive, and range from +.01 to +.32, with an average of a little over +.20. Thus we appear to be

tapping a more general perceptual skill pattern (across sensory modes), one which tends to be well-developed in these traditionally hunting samples. This is consistent with the high level of performance (in relation to the Eurocanadian samples) noted earlier for the three visual tests, and by the performance level and pattern for one auditory test (SITT); and is only inconsistent for the other auditory test (SETT) for which we noted some administration difficulties.

Correlations between these perceptual tasks and those of personal style and attitude measures tend to be variable, with no consistent pattern emerging. But for the acculturative stress variables, we find support for a previous result (Berry and Annis, 1974); in the Ojibway samples (where the acculturative stress concept has its inherent meaning) correlations with all perceptual skill test scores are negative, ranging from -.18 to -.58, with a mean of -.32. Two interpretations of this substantial result are logically possible. One is that those who are perceptually skilled, are better able to ward off the stress of acculturation; or secondly, that the stress reactions interfere with optimal performance on these tests. There are probably elements of both at work, but for reasons beyond the scope of this report, the first interpretation is more in keeping with the psychological literature on stress in general.

Finally we may note that age tends to be negatively correlated with these perceptual tests, but that sex has no consistent correlation. Since these samples are all adult, it is not unexpected to find a general performance decline on these tasks. Note that the strength of the decline is greatest for the Blocks and Matrices tests, while it is only minimal for the others. The question of sex differences is a difficult one, and there is a substantial literature on the topic for hunting and gathering populations (e.g. Berry, 1966, 1971a). But since there is no consistent or significant patterning

of the data by sex in these samples, it is possible to ignore the broader discussion in this report.

Turning to the area of personal style we notice that there is no relationship between the two tasks (Influence and Reserve) in the Ojibway samples, and only a low positive one in the Eurocanadian samples. We are thus dealing with essentially unrelated behaviours, which may not even belong together in the same descriptive category. Although the two tests are patterned consistently (and significantly) across the three Ojibway samples, there is no individual correspondence within samples. The same random patterning appears in their relationships with the other behavioural areas, and in their relationship with age and sex. Thus, although the cross-sample differences may be interpreted meaningfully, the within sample analyses appear to provide only random relationships.

In the set of Attitude measures, we find a clear negative relation between Assimilation and Integration; these two are being viewed as alternative modes of intergroup relations by both Ojibway and Eurocanadian samples. This negative relation extends to the other two coefficients in the Ojibway samples, with Integration and Rejection being viewed as more negatively related than Assimilation and Rejection. However in the Eurocanadian samples these latter two are viewed as positively related, perhaps because they are not clearly distinguishable by non-native respondents.

A strong positive relationship emerges between Rejections and the Acculturative Stress variables in the Ojibway samples, indicating that those who wish to opt out of further relations may have sound reasons for doing so. With respect to age, we find that in the Ojibway samples it is the older (more traditional) respondents who have lower interest in Assimilation, and higher in Rejection, while in the Sioux Lookout Eurocanadian sample

the older respondents tend to consider both Assimilation and/or Segregation the most suitable relationship. Finally, with respect to sex, in the three Ojibway samples, women are more in favour of Assimilation than the men, while there is no sex difference on the Rejection alternative.

Finally turning to the area of Acculturative Stress, we find very strong correlations in both Tables IV and V between the two measures; this confirms their allocation to the same behavioural area. And, as we have already noted, there is a very clear patterning of negative relationship in all Ojibway samples between these two measures and the five tests of visual and auditory skills. With respect to age, there are no relationships, although it is common to find a slight increase in these scores with age (e.g. Berry, 1975). The reasons for this lack of a relationship are unknown, but it may be due to the relatively better social and health services which are available to these communities when compared to other Amerindian samples where such an age relationship has been observed. Finally, with respect to sex, there are substantial relationships in both Tables IV and V, with females exhibiting both higher stress and higher Marginality scores. For stress this is a common finding, both in the cross cultural literature and in conventional studies. But for Marginality, the pattern in the literature is variable; for some reasons, it is the females who feel most caught between the two cultural systems. However, it should be noted that, while this is true for Aroland and Sioux Lookout, it tends to be the males who experience greater feelings of Marginality in Longlac.

CONCLUSIONS

What conclusions may be drawn from this set of studies, both for general psycho-cultural purposes, and for those of telecommunications policy?

With respect to the general conclusions, we may say that the primary aims have been met to a fair degree. The design of the study (employing a cross section of communities varying in degree of acculturation) allow for meaningful interpretations of the data, and permit some inferences to the longitudinal course of behavioural changes with acculturation. In general, those behaviours which are well-developed in traditional life (perceptual skills) do not show any substantial change with acculturation, while some aspects of personal style do. The two behavioural areas which were selected specifically for their relevance to the process of acculturation (Attitudes and Stress) however, exhibited a clear patterning with degree of acculturation; in the former there was a definite reciprocal shift between Assimilation and Rejection, while in the latter there was a non-linear shift in which Stress levels rose and fell with degree of acculturation.

Materials which were adapted or developed for use in this study appear to have been well received (with the exception of SETT), and appear to have been relevant to the individual behaviours and problems of transition which existed in the communities at the time of the study.

Finally, the data gathered in this study both enhance, and is enhanced by, the general knowledge in this field of enquity. It contributes to the information available about hunting and gathering peoples, and their experience of acculturation; and its consistency with the bulk of the extant information enhances its validity and meaning. Overall, then, the study has made a contribution, both methodologically and empirically to the literature. Some of the general uses of these results are indicated in the second portion of the reference section.

More importantly, what are the specific conclusions which may be drawn for telecommunications policy? Taking each of the four behavioural areas in turn, we may discern a number of indicators in the patterns and relationships among these data. Firstly, for perceptual skills, especially for those visual and analytic skills, there is substantial evidence for their high development in these populations. There is also evidence for their lack of variation with degree of acculturation, suggesting that they constitute a firm base for developing telecommunications. There is some evidence that the visual skills are better-developed than auditory ones, and that the latter are influenced by acculturation; however the importance of this difference is probably less than originally thought.* Such differences may, of course, be due to a common ear difficulty in the North (otitis media?) and therefore dock be amenable to medical change. Overall, then, there is a solid perceptual skill base for the development of telecommunications in this region.

Secondly, in the area of Personal Style there is a significant variation across samples on both tests employed. The Ojibway samples exhibit greater Reserve and are more Independent in the issue and reception of information, and this difference shifts across the acculturation dimension. This finding which is consistent with anthropological observations of northern Amerindian life, suggests that the response to telecommunications may be different in these populations than in Eurocanadian communities. It would be hazzardous to attempt to predict the nature of this differential response on the basis of these findings alone. It is thus very important to monitor concrete situations such as Radio Kenomadiwin, the NPP, and the Inuit demands. However, some aspects of these situations are consistent with our psychological

---

* See page 47 of 2nd progress report, and pages 50-51 and 53 of 3rd progress report.

data, and suggest a waryness of, or controlled interest in, the development of telecommunications.

Thirdly (and consistent with the evidence from the Personal Style area) there is a strong and clear differential attitude toward intergroup relations in the Ojibway and Eurocanadian samples. Assimilation tends to be favoured by the latter, while Rejection has some support among the former. These differences, however appear to be shifting with continuing acculturation. The one area where no differential response is apparent is that Integration, where retained cultural integrity and mutual goals within a larger mosaic are indicated. This is consistent with current Multicultural policy, and for both reasons, may provide the firmest base for the development of telecommunications policy.

Finally, there is a high level of Stress in the Ojibway samples, which rises and then falls with acculturation. In relatively traditional and relatively acculturated settings stresses are lower than for those undergoing transition. At the very least, telecommunications policy should not contribute to the rise of such psychological discomfort; on the contrary, it may be possible to contribute to its decline. The patterning of the datassuggests that this would be possible either by strengthening Amerindian cultural worth or by eliminating it; however the latter option is inconsistent both with the Attitudes displayed, and with current Multicultural policy. Thus, the direction is clear - to employ telecommunications for the enhancement of Amerindian cultural values and identity.

Overall, few inconsistencies are apparent in these four behavioural areas. The skill base is present, there is a stylistic and attitudinal

waryness of further intrusion from the larger society, and if there is such intrusion, psychological stresses will probably increase, at least in the short run. All this suggests that if telecommunications are to be developed for Amerindian use, then it should be under the control of those for whom it is being developed. Such a suggestion is consistent with our data, with current cultural policy and with current educational policy (NIB, 1973) for Amerindian peoples. Further it is important to note that such a course would be appropriate not only for the above reason, but also for technical reasons. That is, the very perceptual (and analytic) skills which are characteristic of these populations form the psychological basis for technological and scientific competence; operational control, it is predicted, could soon be mastered as well.

REFERENCES

BERRY, J.W. (1966) "Temne and Eskimo perceptual skills". International Journal of Psychology, 1, 207-229.

BERRY, J.W. (1971a) "Ecological and cultural factors in spatial perceptual development." Canadian Journal of Behavioural Science, 3, 324-336.

BERRY, J.W. (1971b) "Psychological research in the North." Anthropologica 13, 143- 157.

BERRY, J.W. (1974) "Psychological aspects of cultural pluralism: unity and identity reconsidered." Topics in Culture Learning 2: 17-22.

BERRY, J.W. (1975) Acculturative Stress Among James Bay Cress: Prelude to a Hydro Electric Project. Paper presented to Meetings of the Society for Applied Anthropology. Amsterdam, March.

BERRY, J.W. and P.R. DASEN (eds.) (1974) Culture and Cognition. London: Methuen.

BERRY, J.W., KALIN, R. and TAYLOR, D. (1975) Majority Attitudes Study. Work in Progress for Department of Secretary of State.

GOVERNMENT of CANADA, (1971) Multicultural Policy Statement. House of Commons, October.

HALLOWELL, A.I. (1946) "Some psychological characteristics of Northeastern Indians" pp.195-225 in F. Johnson (ed.) Man in Northeastern North America, Peabody Foundation for Archaeology, 3.

HONIGMANN, J. (1968) "Interpersonal relations in atomistic societies." Human Organization 27:220-229.

NATIONAL INDIAN BROTHERHOOD, (1972) Indian Control of Indian Education (and response of DIAND). Ottawa:NIB.

PRESTON, R.J. (1970) "The development of self-control in the Eastern Cree life cycle." Paper presented to Northeastern Anthropological Association, Ottawa.

WITKIN, H.A. and J.W. BERRY, (1975) "Psychological differentiation in cross-cultural perspective." Journal of Cross-Cultural Psychology 6: 4-87.

APPENDIX I : PSYCHOLOGICAL TESTS

For readers of this report who are unfamiliar with the tests employed in this study, brief descriptions of them are provided here. All of the tests (with the exception of the two Tones Tests which are discussed in Appendix II) are described in the psychological literature; further details may be obtained by referring to the articles which are cited.

Portable Rod and Frame Test. This test requires the setting of a tilted rod to a vertical position while it is being viewed against a tilted frame background. (Oltman 1968; Witkin et al, 1962). Over 8 trials the deviations from true vertical are summed to provide a total error score. In this study, this total has been subtracted from 50, to provide a score in which a high number is indicative of low error (high skill).

Kohs Blocks. This tests requires the analysis and construction of 17 designs employing blocks with various colours on the faces. A high score (maximum possible is 131) indicates a successful performance (Kohs, 1923).

Ravens Matrices. This test requires the analysis of a series of patterns, and an inference to the next (missing) one in the series. The response is to be selected from a set of six alternatives which is provided In this study sets A, Ab and B are employed (Raven, 1963). A high score indicates successful performance; maximum possible is 36.

(SITT and SETT : see Appendix II)

Influence. This is a test of the ability of an individual to make a judgement of line length (to select the correct alternative) in the face of a suggestion of a group norm which is not correct. It is based on a test by Asch (1956) and was developed for field use by Berry (1967). The

score is a sum over four trials; a high score indicates an independent style in making the judgements.

Reserve. This test requires the respondent to say whether he would, or would not, tell others (parent or peers) about some common personal experiences. It is based upon the self-disclosure test of Jourard (1971); a high score indicates a high degree of reserve, and the maximum possible score is 20.

Attitudes. These three scales consist of 24 attitutde statements which suggest ways in which Amerindian people may relate to the larger society. There are nine items each in the Assimilation and Integration scales, and six in the rejection scale. Respondents indicate their agreement or disagreement on a 5 point scale, and a summed score is derived for each of the three scales. Scores are presented as positive or negative means relative to the mid points of the scales (Sommerlad and Berry, 1970).

Stress. This test is a version of Cawte's et al (1968) adaption of the Cornell Medical Index (Brodman et al, 1952). It consists of a checklist of 20 psychosomatic symptoms, and the respondent indicates which of them pertain to him. A high score is indicative of high stress, with a maximum possible score of 20.

Marginality. This scale is an adaptation of the one developed by Mann (1958) for use in South Africa. It has been used previously in Australia by Berry (1970) and with Amerindian samples by Berry and Annis (1974b). The content of items is intended to express the feeling of "being poised in psychological uncertainty between two cultures" (Park, 1928). Each item is responded to on an agree/disagree basis. A maximum possible score is 14, and a high score is indicative of a high level of marginality.

REFERENCES.

ASCH, S.E., (1956) "Studies in independence and conformity 1: a minority of one against a unanimous majority" Psychological monographs. 70 : no. 416

BERRY, J.W., (1967) "Independence and conformity in subsistence-level societies". J. Personality and Social Psychology. 7, 415-418.

BERRY, J.W., (1970) "Marginality, stress and ethnic identification in an acculturated aboriginal community". J. Cross-Cultural Psychology, 1, 239-252.

BERRY, J.W., and R.C. ANNIS., (1974b) "Acculturative Stress : the role of ecology, culture and differentiation" J of Cross-Cultural Psychology, 5, 382-406.

BRODMAN, K., ERDMANN, A.J., LORGE, I., GERSHENSON, C.P., and H.G. WOLFF., (1952) "The Cornell Medical Index health questionnaire III., The evaluation of emotional disturbances" J of Clinical Psychology 8 : 119.

CAWTE, J., BIANCHI, G.N., and L.G. KILOH., (1968) "Personal discomfort in Australian Aborigines". Australian and New Zealand J. of Psychiatry, 2 : 69-79.

JOURARD, S.M., (1971) "The Transparent Self"., New York : Van Nostrand.

KOHS, S.C., (1923) "Manual for Kohs Block-Design Tests". Chicago : Stoelting.

MANN, J., (1958) "Group relations and the marginal man". Human Relations 11 : 77-92.

OLTMAN, P., (1968) "A portable Rod and Frame apparatus" Perceptual and Motor Skills 26 : 503-506.

PARK, R.E., (1928) "Human migration and the marginal man". American J. of Sociology. 33: 881-893.

RAVEN, J.C., (1963) "Guide to Using the Coloured Progressive Matrices". London : Lewis.

SOMMERLAD, E.A., and J.W.BERRY, (1970) "The role of ethnic identification in distinguishing between attitudes towards assimilation and integration of a minority racial group". Human Relations 23 : 23-29.

WITKIN, H.A., DYK, R.B., FATERSON, H.F., GOODENOUGH, D.R., and S.A. KARP, (1962) Psychological Differentiation. New York : Wiley.

APPENDIX II THE TWO TONES TESTS.+

Because these two tests were developed for the purposes of this study, a fuller description is provided here. The basic tests (Mawhinney, 1973) consist of 25 items each. In both, the task is to say whether one sound is contained in a more complex sound. In SITT, the first sound is a single note, and the complex is a chord; the respondent must say, after hearing the single note first, whether it is contained in a chord which is presented immediately after it. In SETT, the first sound is a short sequence of notes, and the complex is a larger sequence of notes; the respondent must indicate after hearing the first sequence, whether it is contained in the subsequent sequence. Details of both tests and their items are provided in Tables II-1 and II-2.

Tables here. II-1, II-2

The sounds were produced by a portable positive organ which provided a fairly pure wind sound. These were recorded on tape along with instructions and practice trials. The test was administered either individually or in groups, and the respondent recorded his answer (either a "yes" or a "no") independently on his record sheet. A random guessing strategy would produce a mean score of 12.5 for each test. A minimum of 0 and a maximum of 25 were possible.

+ In addition to those listed as assisting in the project, three other individuals helped in the construction, analysis and refinement of the Tones Tests : H.A.Witkin, R.C.Annis and J. van de Koppel. Further analyses and refinements of the test are being conducted by the latter two as part of a study of Pygmy and Bantu peoples in the Central African Republic, co-ordinated by H.A. Witkin and J.W.Berry.

TABLE II-1 SITT ITEM CHARACTERISTICS

(in 5 BLOCKS of 5 items each)

		RELATIVE POSITION OF TARGET IF PRESENT	No. OF NOTES INCLUDING TARGET	TARGET PRESENT
BLOCK 1	M Target / 1 : E	B	2	Y
		C	4	N
		T	2	N
		B	3	Y
		T	2	N
BLOCK 2	H Target / 2 : C	C	4	Y
		T	3	Y
		B	3	N
		C	4	N
		T	3	Y
BLOCK 3	L Target / 3 : G	C	4	Y
		B	2	N
		C	3	N
		T	4	Y
		B	2	N
BLOCK 4	M Target / 4 : E	B	2	Y
		T	4	N
		B	3	N
		B	2	Y
		T	3	Y
BLOCK 5	H Target / 5 : C	B	4	N
		T	2	Y
		T	3	Y
		B	2	N
		C	3	Y

Y=13 : N=12

Note

Range of notes used in both tests is from G below middle C to D plus one octave.

Letters H, L, M, denote high middle and low ranges of four notes each within the larger range

TABLE II-2 SETT ITEM CHARACTERISTICS

(in 5 BLOCKS of 5 items each)

			TARGET PRESENT
BLOCK 1	M target / 1:	GEFF	
	Trials 1.	DFFEFGEFF	N
	2.	GDGEFFGEGF	Y
	3.	EGEGDFEG	N
	4.	DFFGEFFGE	Y
	5.	FEEGEFFG	Y
BLOCK 2	H target / 2:	BAD	
	6.	DBCCBB	N
	7.	ABDCCD	N
	8.	DABADB	Y
	9.	DBDBADAC	Y
	10.	CDACDBAA	N
BLOCK 3	L target / 3:	CGAC	
	11.	ABGCCGACH	Y
	12.	GAABACGBG	N
	13.	BACGACCA	Y
	14.	CCGACBAC	Y
	15.	CACABGSC	N
BLOCK 4	M target / 4:	DEG	
	16.	DGGDEG	Y
	17.	DDGFGF	N
	18.	DFGEDDGF	N
	19.	EEGDEGDD	Y
	20.	EFEGDEGF	Y
BLOCK 5	L target / 5:	CBAC	
	21.	ABBCBCGG	N
	22.	CBCBCBAC	Y
	23.	ABGCACGC	N
	24.	BGCBACBG	Y
	25.	GCBCGGGG	N

Y=13 : N=12

The tests have proved to be moderately reliable, with only a few bad items in each. An item analysis has been performed among the Sioux Lookout Amerindian and Euro Canadian samples combined. This analysis is presented in Table II-3.

Table II-3 here

Finally, some studies have been conducted with both SITT and SETT in addition to the ones in this report. The original development of the test (in Mawhinney, 1973), all with Toronto school children, yielded the correlation matrix in Table II-4. The GEFT test referred to

Table II-4 here

is a Group Embedded Figures Test, which is a visual test of ability to locate a small picture in the context of a larger picture. As such SITT and SETT are auditory analogies of GEFT. A further study (with 29 Dutch university students) has employed both SITT and SETT, with the correlational results indicated in Table II-5. The "drums" tests referred to is an auditory test similar to SETT, but using drum beats rather than note frequencies. The "EFT" test, is an individual version of GEFT which is a visual test of picture disembedding (van de Koppel, 1974).

Table II-5 here

TABLE II-3. ITEM ANALYSIS FOR SITT and SETT
SIOUX LOOKOUT SAMPLES COMBINED (N=71)
ITEM - TOTAL CORRELATIONS

Item	SITT	SETT
1	.35	.29
2	.50	.28
3	.51	.30
4	.56	.31
5	.51	.13
6	.53	.34
7	.36	.34
8	.34	.36
9	.38	.11
10	.43	.25
11	.34	.19
12	.56	.25
13	.54	.31
14	.52	.49
15	.37	.33
16	.48	.28
17	.58	.05
18	.35	.32
19	.49	.31
20	.48	.46
21	.54	.37
22	.48	.36
23	.58	.41
24	.49	.24
25	.53	.30
Reliability (KR-20)	0.85	0.57

TABLE II-4 CORRELATION MATRIX: TORONTO SCHOOL SAMPLES (N = 114):

	SITT	SETT	GEFT	AGE	MUSICAL EXPERIENCE
SITT	-				
SETT	+.25	-			
GEFT	+.51	+.25	-		
AGE	+.39	+.15	+.59	-	
MUSICAL EXPERIENCE	+.42	+.18	+.28	+.16	-

TABLE II-5 CORRELATION MATRIX: TILBURG UNIVERSITY STUDENT SAMPLE (n = 29)

	SITT	SETT	DRUMS	EFT
SITT	-			
SETT	+.44	-		
DRUMS	+.22	+.25	-	
EFT	-.04	+.36	+.09	-

REFERENCES

MAWHINNEY, T., "Developmental Differentiation : Visual and Auditory Modalities". B.A.Honours Thesis, Queen's University, 1973.

VAN DE KOPPEL, J., Unpublished Report, 1974.

APPENDIX III : INTERVIEW AND TESTING SCHEDULE

(To be added from QUIST Files)