CULTURE CHANGE

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Let me begin with three anecdotes that illustrate various aspects of culture change. The first concerns a recording, made in 1939, of the Verdi Requiem Mass in which the tenor solos are performed by one of the most acclaimed singers of the twentieth century, Beniamino Gigli. The interesting thing about the performance is the lavish use Gigli makes of portamento, a musical ornamentation in which one note is carried to another by a slight scooping effect. Hearing the recording today, one is struck by how dated the performance seems and at first one is inclined to blame it on the outmoded recording equipment. Further observation, however, leads directly to Gigli's choice of style as the source of the impression. Not only is his rendition out of fashion, the quality of his performance has been rendered difficult to evaluate because of the subtle, fractal-wise change in standards between then and now.

The second anecdote concerns a recent event in Kodiak, Alaska reported in the Kadiak Times, June 13, 1985. United States Fish and Wildlife agents confiscated from local shops a variety of handicrafts fashioned out of sea otter by Marina Katelnikoff, an Alaska Native. The items were said to violate an exemption to the Marine Mammal Protection Act of 1972 which allows Alaska Natives to make and sell handicrafts from the hides of marine mammals. The federal agents questioned "if some of Katelnikoff's items fall in the category of 'traditional Native handicrafts'." A Fish and Wildlife spokesman stated: "Any items

determined traditional items of authentic Native handicraft or clothing will be returned to Marina or the shops they were seized from."

The third anecdote comes from the lower Kuskokwim River in South Western Alaska sometime during the mid-1970's. A young Eskimo boy had to be flown from his home village to the Public Health Service Hospital in Bethel for extensive repairs to his broken jaw. He had been kicked in the face during school recess by another boy who had seen television for the first time in that village the night before. One of the inaugural programs aired by this newly arrived technology was Kung Fu, a series remembered by some of us for its facinating mixture of mystic spirituality and vengeful violence.

One aspect of culture change these anecdotes bring to mind is that it is paradigmatically brought about by intentional action under the familier Descriptive Psychology formula: behavior is a function of personal characteristics and circumstances (Silva 1973). There is a paradox, however, that despite the logical necessity of intentional action as the basis of cultural change it never seems possible to trace particular changes to particular actors. Given the paradox it seems reasonable to point to larger sociological phenomena as the machinery of culture change, the two most popular candidates being culture contact, as in the case of Marina Katelnikoff, and sudden technological development, as with the ill-starred Eskimo boy just mentioned. But these areas of investigation, empirically important though they may be, must also have their concepts brought into the realm of psychological description in order to be complete.

The object of this presentation is to apply Descriptive Psychology concepts to the idea of culture change. Building as much as possible on formulations already developed in the Descriptive Psychology literature, the presentation begins with the application of the parameters of culture (Ossorio, 1983) to the description of culture change. This way of formulating culture change provides a straightforward answer to the question: what is it that is changing? This section will end with an analysis of why cultures change in which change is related to Basic Human Need satisfaction (Aylesworth and Ossorio 1983) under conditions of continuous and necessary fluctuations in the structure of personal characteristics, circumstances, and reality constraints.

The final two sections of the presentation are devoted to the question of how cultures change. Two empirical instances of culture change are explored, each of which is used to introduce a set of new parameters. The first version is where multicultural contact in schools provides the setting for culture change. What is at issue in culture contact is the production and resolution of conflict among incompatible versions of the same social practices or of conflict over the introduction of new and the replacement of old social practices.

The second version is a special case of culture contact in which the resulting change is associated directly with the cross-cultural transfer of technology. In this section, a paradigm case formulation of technology is offered from which the psychological basis for the cross-cultural transfer of technology can be derived. The paper ends with a parametric analysis of technology transfer presented in the context of a

comprehensive model for evaluating the impact of new technological developments on particular cultural settings.

The General Case of Culture Change

The very nature of Descriptive Psychology makes all of its contributions to the literature contributions about culture. Within that body of contributions, however, a large group are devoted directly to the idea of culture, and it is to that group this presentation about culture change is intended to have a strong conceptual connection. Specifically, the work of Ossorio (1983), Aylesworth and Ossorio (1983), Lasater (1983), Silva (1983), Torres (1983), and Orvik (1984), provide a variety of conceptualizations of culture and its related ideas from which to proceed.

To begin with, Ossorio's parametric analysis of culture provides a direct answer to the question: what is changing when a culture changes? Formula One lists the parameters of culture (Ossorio 1983).

Formula One:

⟨Cu⟩ = ⟨M, W, S, L, SP, CP⟩, where

Cu = Culture

M = Members

W = World

S = Statuses

L = Language

SP = Social Practices

CP = Choice Principles (p. 31)

Because this formula serves to differentiate one culture from another it can, with two modifications, serve to differentiate a single culture either at two points in time, the paradigm case of culture change, or from two points of view, an important derivative case in light of an upsurge of interest among social scientists (e.g., Glazer and Moynihan 1975) in the salience of ethnicity as the basis of social change in multicultural settings.

The first modification of Formula One needed to generate the parameters of culture change is to omit the Membership parameter. That is, the one feature that logically can't change is the culture's membership. Note that this logical requirement does not rule out empirical changes in a culture's membership, e.g., from one generation to the next. It is the same culture despite its inevitable turnover and attrition, otherwise there would be nothing we could point to as having undergone the change.[5]

The second modification to Formula One is the addition of a new parameter, Methodology. This parameter refers to the characteristic implements and procedures a culture uses in carrying out its social practices. In its most basic sense, Methodology corresponds to what Anthropologists call material culture. For the present conceptualization, Methodology encompasses a culture's technology, as well as its food, clothing, etc.. These two modifications are shown in Formula Two:

⟨CuC⟩ = ⟨W, S, L, SP, MT, CP⟩, where

CuC= Culture Change

W = World

S = Statuses

L = language

SP = Social Practices

MT = Methodologies

CP = Choice Principles

Another way to connect the idea of culture change to past work in Descriptive Psychology is to show how it compares with two related concepts about culture: (1) that of cultural displacement developed by Aylesworth and Ossorio (1983), and (1) the concept of social mobility, a derivative case of migration (Orvik 1984). ~~The relationships among these concepts are shown schematically in Figure 1.~~ Each of the three models shows conditions for persons having their Basic Human Needs satisfied or frustrated according to the restriction on behavior potential posed by a discrepancy between their personal characteristics and the social practices of their culture.

In the Cultural Displacement model the restriction on behavior potential stems from a person changing from one culture to another without having the right set of personal characteristics for social participation. In the Social Mobility model persons stay within the same culture but improve their behavior potential by participating in a new subset of available social practices consistent with the available personal characteristics they wish to acquire. Finally, in the Culture Change model potential restrictions on behavior potential stem from the culture

acquiring new social practices to the exclusion of old ones. To the extent the new social practices require new personal characteristics persons who fail to acquire those characteristics will experience Basic Human Need frustration.

The link between social participation in a culture and the satisfaction of Basic Human Needs was articulated by Ossorio (1983). What needs to be established here is that this same link connects Basic Human Need satisfaction to culture change. That is, the reasons why cultures change are fundamentally psychological reasons, the same ones that are invoked to explain behavior in general. The key relationship was stated earlier in the formula: behavior is a function of personal characteristics and circumstances (Silva 1983). Changes in circumstances provide reason enough to evaluate them for new opportunities for behaving. Thus, a complete account of why cultures change should include factors associated with changes in circumstances and their implications for the development of new social practices, methodologies, worlds, statuses, languages, and choice principles.

The following is a proposed list of factors to be observed in accounting for how cultures change (CC). They are organized in Formula Three as a parametric analysis.

Formula Three:

⟨CC⟩ = ⟨B, C, PC⟩ = ⟨Ef, Ra, Pr, Op, Tr, Ob, Re⟩ where

CC = Culture Change

B = Behavior

C = Circumstances

PC = Personal Characteristics

Ef = Efficiency

Ra = Rate

Pr = Pressure

Op = Optionality

Tr = Transformability

Ob = Obviousness

Re = Relevance

These parameters are:

1. Behavior, Circumstances, and Personal Characteristics. These parameters are used here in the same way as elsewhere in Descriptive Psychology. They apply to the concept of culture change as a reminder that culture change is essentially a psychological process operating within a set of reality constraints. The remainder of the list, in fact, is an attempt to comprehend the action of those reality constraints in controlling culture change in any given case.

2. Efficiency. If a culture is to change, i.e., take on new values in any of the parameters listed in Formula two, above, its members must acquire new personal characteristics. Efficiency refers to the reality constraints imposed by how many new personal characteristics are required for a given amount of change and how easy they are to acquire.

3. Rate. The rate parameter refers to how fast or slowly

circumstances are changing at a given point in time.

4. Pressure. Pressure refers to the existence of social practices that function to set, modify, and enforce cultural standards for how to behave in response to new circumstances and the personal characteristics they require.

5. Optionality. This parameter refers to how much flexibility exists in responding to new circumstances. Optionality corresponds to the Options parameter of the Basic Process Unit (Ossorio 1971/1978). It also is analogous to the Substitutability parameter of the Cultural Displacement model (Aylesworth and Ossorio 1983).

6. Transformability. Tranformability is the extent to which an existing version of a cultural parameter can be modified to meet new circumstances without being considered inauthentic by the culture's membership.

7. Obviousness. Obviousness refers to the intelligibility of a new value on a culture change parameter as a potential substitute for an existing value. It corresponds mainly to the Significance parameter of the general formula for behavior (B) (see Ossorio 1981, p. 96).

8. Relevance. This parameter refers to the Relevance a new cultural value has for meeting a Basic Human Need.

The general case of culture change can now be summarized clearly by setting the foregoing parametric analyses in a two-dimensional array

with the relevant parameters of culture listed in Formula Two, above. This arrangement of parametric analyses, Table 1, affords a simultaneous view of both the "what" and the "how" of culture change. The intersections of this array, together with the general explication of "why" cultures change, comprise a general formulation for describing the process.

It should be noted that, when analyzing particular versions of culture change the general formulas given above may be more comprehensive than is useful. From a practical standpoint, the foregoing general schemata should serve as a conceptual check-list for identifying what may be the most fruitful areas to develop in particular cases. Both of the versions chosen for presentation here exemplify this point rather well. That is, each one required specialized analysis of limited intersections of culture change parameters (Table 1) in order to be useful either to the clients who commissioned them or to the scientific community in general.

Culture Change and Culture Contact in a School Setting

We turn now to the first of two empirical versions of culture change: culture contact within a school setting. The second version, the cross-cultural transfer of technology will be presented as the final section of this paper.

In recent decades, contact among cultures within school settings has given rise to an abundance of social issues. Many of those issues arise

over the successful incorporation of multiple systems of social practices, world views, status management, etc.. Most of all, however, culture contact in the schools involves the larger multicultural communities within which the schools have been given the statutory role of common socializing agent for full-fledged adulthood.

Attempts to make schools a successful agency in this regard can often be redescribed as interventions in the problematical relationship between the cultural foundation of the school's social practices and the multiple cultural foundations represented among the children in attendence. Among the more notable attempts to solve these problems, we find large scale federal programs such as Titles I and VII, of the Elementary and Secondary Education Act (ESEA), devoted to compensatory and bilingual education programs, respectively. Alternative schools can also be characterized as a response to schooling problems in multicultural communities (Parrett, Orvik, and Stephens 1985).

The case of culture contact I wish to present here comes from an evaluation (Orvik and Towarak 1982) of the Nome (Alaska) School District's Art and Cultural Enrichment Program funded under Title IV-A of Public Law 92-318, the Indian Education Act. It became clear while developing the evaluation design that the focus of the evaluation had to include the larger community setting rather than just the limited objectives of the program. What was enacted as a program to improve the academic performance of Nome's Eskimo students, by the preservation and enhancement of their culture, paradoxically could only be successful if the elements of culture to be preserved and enhanced underwent changes within the school setting.

The resulting evaluation model responded directly to this state of affairs by cataloging the ways indigenous cultural elements were being transformed to fit the organizational structure (i.e., the cultural foundations) of the school. For the purposes of the present paper, the transformation process described in the Nome evaluation report reveals in detail many of the important features of culture change through culture contact. These features can be summarized by taking a closer look at the Transformability parameter presented earlier in the Culture Change formula, Formula Three.

There is enough known about the history of Nome to suggest that discontinuity between the culture of the school and the culture of the community was the main reason for the Native Arts and Cultural Enrichment program to exist (Orvik and Towarak 1982). We can even go so far as to say that the program's purpose was to make Native life and culture more important and sure of survival by bringing it into the life and culture of the school. It is equally important, however, to point out that any element of traditional culture brought into the Western school environment is subject to transformation if it is to survive. It was with regard to the Transformability of these elements that the following definitions and parametric analysis were constructed.

Definition One:

A Cultural Element is defined as an event, object, process, or state of affairs recognized as a constituent part of a culture's social practices.

Definition Two:

The Authenticity of a Cultural Element, as a constituent part, is established relative to standards used by persons with relevant cultural competence acquired through relevant experience and observation exercized in revelant contexts.

Definition Three:

The Transformation of a Cultural Element refers to adaptive changes in the element's content, form, or function by which its Authenticity is retained under new circumstances.

Insofar as most of the new circumstances an element must be adapted to are created by cross-cultural contact, each adaptation is subject to multiple standards of intelligibility and authenticity -- as many standards as there are cultures in contact. Furthermore, transformations in a Cultural Element may be extensions of transformations in the indigenous culture already underway in the wider community context. For example, the shift from using the Inupiaq language to English in the school is a transformation in the whole community and stems as much from economic necessity as from school reasons.

The parameters of cultural transformations

With the above definitions in mind there are five parameters by which

the transformation of a given Cultural Element can be described:

Formula Four:

$\langle Tr \rangle = \langle CE, P/W, S \rangle = \langle T, S, P, M, B \rangle$, where

P/W = Part/Whole relationship to other Cultural Elements

S = Symbolic relationship to superordinate culture units

CE = Cultural Element

T = Time

S = Space

P = Persons

M = Materials

B = Behavior

The first two parameters, Cultural Elements plus Part/Whole and Symbolic relationhips, are placed here as a general reminder that the importance of any given transformation is established in the context of the entire concept of culture. The intended distinction between these two parameters is that Part/Whole relationships refer to structural connections between a Cultural Element and other Cultural Elements. For example, building a Kayak once had a direct connection with food gathering but now the connection is indirect, limited to its cash value in the market place.. Symbolic relationships refer to the psychological functions a Cultural Element serves in meeting the Basic Human Needs of individual actors. For example, what one could be doing by building a Kayak is maintaining a state of <u>adequacy</u> and <u>competence</u> in one context but in another simply fulfilling a need for <u>disengagement</u> (see

Lasater 1983, p. 102). Even though culture change is fundamentally a psychological process, recalling a point made earlier, the reason for the present distinction is that neither parameter by itself encompasses enough of the possibilities for an adequate description of cultural transformations.

The remaining parameters of Formula Four comprise a series of reality constraints to be imposed on the description of cultural transformations. To explain briefly,

1. Time -- temporal transformations are based on how often, for how long, or at what time a Cultural Element is actualized

2. Space -- spatial transformations have to do with where a Cultural Element is actualized

3. Persons -- these are transformations in who is eligible to play a part in a Cultural Element

4. Materials -- material transformations have to do with changes in physical properties of a Cultural Element, i.e., what it is made <u>from</u> or made <u>with</u>, and

5. Behavioral -- behavioral transformations of a Cultural Element are those that take place in any general Behavior parameter (Ossorio 1981), e.g., in what could be wanted (W), needs to be known (K), significance (S), etc..

In the course of program evaluation we were able to exemplify each parameter without difficulty. For instance, all cultural enrichment activities are temporally regulated by clock and calendar according to the organizational requirements of the school. Participation in indigenous culture now begins and ends with the bell, not with enthusiasm, fatigue, or any internally defined sense of completion or spontaniety.

Traditional Native dancing now takes place in school spaces never previously used for that purpose. This example of a spatial transformation is interesting from an historical standpoint because it serves to remind us that the standards of transformability of cultural elements do not reside solely in the indigenous community but, rather, are subject to joint negotiation among all cultures in a given context. In the case of Native dancing, what was considered pagan in one community might be considered acceptable in another, depending on which church the local missionaries represented throughout the community's history of culture contact.

The Person parameter corresponds to the Eligibility parameter of the Basic Process Unit (Ossorio 1978). An example in the present context of a Person transformation of a Cultural Element is the removal of sex role inhibitions on handicraft production. Boys and girls are encouraged to work on products traditionally made by the opposite sex, and by doing so the program helps Nome meet a legal requirement of all school districts (cf. the Katelnikof case presented earlier).

Material transformations can involve changes in what things are made

from, such as using calf skin and mouton instead of seal skin and caribou. They can also involve changes in what things are made with, such as using power tools to carve ivory rather than using hand tools fashioned from indigenous materials.

As stated earlier, Behavior transformations encompass all of the parameters of the general Behavior formula (Ossorio 1981). One or two examples will suffice to show how the process works. First, it is doubtful that in traditional Eskimo culture anyone ever got a letter grade for carving a piece of bone. This is not to say that reinforcement and social appraisal were absent from day to day interaction, just that it wasn't meted out in quite that form. Second, the program uses public display cases to show the work of the students. In earlier times singling out individual performance would have been down played in favor of methods that accredit persons subtly while reminding them of their connection with the group.

Precaution: don't substitute policy for judgement... unless...

Two things should be pointed out before concluding this section. First, the willingness of members of an indigeneous group to allow its Cultural Elements to undergo radical transformation is, perhaps, the best measure of their desire to survive as a culture. However, and this is the second point, there are risks involved in any attempt to "manage" the transformations into existence. To paraphrase a Descriptive Psychology maxim: transformations go right, unless they go wrong in one of the ways they can wrong (cf. Ossorio 1980).

With regard to the Native Art and Cultural Enrichment Program in Nome there are several precautions worth mentioning. One is that a Cultural

Element can take only so much transforming before it exceeds Authenticity criteria. The expression: "it's not cricket", has its origin in just such a circumstance. Anyone who has seen the game knows that it has social requirements of form and observance that are nowhere to be found in the rule book. During the height of British colonial rule in India, the most studied attempts on the part of the Indians to play the game were met with the response: "Yes, but it's not exactly cricket you know". Once a Cultural Element exceeds its standards of Authenticity, it no longer has value in promoting cultural continuity. To the extent cultural continuity has value for persons in meeting their Basic Human Needs, the question of how much one can impose nonindigenous institutional requirements without a consequent reduction in the net behavior potential of indigenous persons becomes a serious one.

Another precaution is that there is a built-in bias for the host institution to select indigenous Cultural Elements that are the most easily identified and that threaten the host institutional structure the least. Unfortunately, these may be the Cultural Elements least in need of preservation. More seriousy, they may not be the ones most relevant to Basic Human Needs. An example of how this precaution has been met comes from another educational setting, the Kamehameha Early Education Project (KEEP), in Hawaii. In this program, developed to improve the educational achievement of Native Hawaiian children, ethnographic information about how Hawaiian children participate in certain cultural elements at home were used to help structure the learning environment of the school. By focussing on a less obvious but psychologically more relevant Cultural Element, the KEEP program was able simultaneously

to accredit the person without requiring assimilation, thus preserving a Symbolically important relationship (Formula Four) within the new setting.

Finally, there is the danger in what could be called the rejection paradox endemic to preservation by transformation. This paradox can take two forms, purism and seperatism. Purism is the imposition of bogus (usually external) standards of cultural authenticity based on arbitrary views of how the culture did things at some unspecified time in the past. As if a culture could exist without transformations, purism is a kind of cultural taxidermy that rejects modern forms and their producers as contaminated. The other form, seperatism, refers to the maintenance of organizational and conceptual distinctions between the "Native" parts of the system and the "real" system. Seperation carries an implicit message of rejection no matter what beneficial effects it may have. Art and cultural enrichment can survive but cannot thrive in an invironment that invites invidious comparisons.

Culture change and the transfer of technology

We come now to the final section of this presentation in which we analyze the case of culture change associated with the cross-cultural transfer of technology. The concepts presented here grew out of a need to comprehend the complex array of forces, mostly social forces it turns out, influencing the rapid deployment of high level telecommunications technology among the cultures of rural Alaska. These developments came about to solve a wide range of economic, educational, and social

problems endemic to that environment (Orvik 1978, Pittman and Orvik 1977, Hills 1981). How well these problems have been addressed stimulated the conceptualization of the models on which the present analysis is based.

That the rapid transfer of technology across cultural boundaries can lead to rapid culture change needs little documentation added to that already in existence. The literature on modernization alone (e.g. Kahl 1968, Smith and Inkeles 1966, Doob 1967, Dawson 1969) fills many volumes. Very little has been done, however, to develop a comprehensive conceptualization of why technology gets transferred, and yet such a package would go a long way toward helping us understand the difference between technology transfer going right and technology transfer going wrong.

What is described here is a model for identifying the key notions in technology transfer. It consists of a number of subsystems, each of which plays an important role in the overall process. The concept of technology itself, being directly linked to how persons meet their Basic Human Needs should be discussed before the various subsystems are outlined.

Time options

Dictionary definitions of technology are of little value because they are noncommittal as to the role technology plays in human life. For example, the Random House Dictionary of the English Language defines technology as "the branch of knowledge that deals with industrial arts, applied science, engineering, etc.", or as "the application of knowledge for practical ends, as in a particular field" such as educational

technology.

Oswalt, an Anthroplogist, defines technology as "all the ways in which people produce artifacts" (1976, p. 33). While this definition is at least more inclusive than Random House's, it makes no more conceptual headway inasmuch as it seems to exclude the artifacts themselves as the primary focus. In fairness to Oswalt, it should be pointed out that the focus of his work is on the artifacts themselves as a record of the technological complexity of the world's various cultural systems.

The problem is not so much with the definitions themselves as with the fact that the utility of definitions is inherently limited to what we already know that can be appealed to for recognition (Ossorio 1981). What is needed is an articulation of the concept that specifies the characteristics of an unambiguous, or paradigm case of technology. The formulation of the paradigm case can then be used as a standard for generating related cases on the basis of how they differ from the paradigm.

Definition Four:

For purposes of the Technology Transfer model, technology is defined as the production and use of an artifact for the improvement of a person's own circumstances.

The first characteristic, production, tells us that technology is not a natural but a human phenomenon. It has to be invented, adapted, conceived of, etc.. Production can also include distribution,

promotion, or authorization of a technology.

The second characteristic, use, suggests the purposeful nature of technology in the sense that a technology that isn't used is a defective case.

That technology consists of artifacts is to allow the distinction to be made between technology and nonphysical human inventions such as languages and social practices. The latter can share the same functions as technology per se.

Characteristic number four, improvement, opens up the possibility that technology can go wrong by failing to improve someone's circumstances.

With the fifth characteristic, a person's own circumstances, it is pointed out that in the paradigm case all five characteristics are actualized in the same person. (Cf T.S. Eliot) The fifth characteristic also allows us to generate cases where other persons and their circumstances are the reason a technology gets produced or used.

From Definition Four and its related discussion, we have the following Paradigm Case Formulation (PCF 1):

1. Paradigm Case: A person invents the wheel and uses it to get to town faster.
2. Transformations:

   T1. The person invents the wheel but doesn't use it.

   T2. The person uses the wheel but doesn't invent it.

T3. The person opens up a used wheel lot to make enough clams to buy new sandals because he always walks to town.

T4. The person uses the wheel to get someone else to town.

T5. The wheel keeps going flat.

T6. The wheel runs over the used wheel salesman on his way to the sandal shop.

T7. A person from another town sees the wheel and falls in love with the idea.

T8. The person from another town causes T2 through T7 all over again.

As will be made clear shortly, derivative cases encompassing the cross-cultural transfer of technology can be generated by reference mainly to the production and use patterns of a technology, i.e., T1 - T4, T7, T8 of PCF 1. For a complete understanding of the entire process, however, the remaining components of the Technology Transfer Model need to be described.

The Technology Transfer Model

The components of the model for evaluating the transfer of technology across cultures are organized into three interrelated systems: (1) the Consumer system, (2) the Influence system, and (3) the State of Affairs system. Each of these systems has a place in the evaluation of the role technology transfer plays in bringing about culture change. They are summarized in Formula Five:

The Consumer system. The Consumer system describes what kinds of consumers of technology are possible. In the paradigm case of

technology a person uses a particular version to improve his or her own circumstances in some specific way. The ways in which technology can improve someone's circumstances typically fall into three empirical categories:

(1) entertainment -- where technology is used (a) to initiate or maintain a positive mood, or (b) terminate a negative one, e.g., watching television

(2) profit -- where technology is used to acquire means of exchange (other than by selling the technology), e.g., using telecommunications for obtaining market information,

(3) convenience -- where technology is used to make a social practice a more efficient way of meeting a need, e.g., hunting with a bow and arrow instead of relying on jokes to bore the animal to death.

In the present model it is worth distinguishing among different kinds of consumption. Primary consumption is the use of a technology for one's own entertainment, profit, or convenience. Primary consumption is the paradigm case of technology use.

Secondary consumption is where technology is used for someone else's entertainment, profit, or convenience. This case of technology use is distinguished from the paradigm case by the logical necessity of another person or persons being involved. The relationship is built into the configuration of the technology itself. For example, if a teacher in a remote site takes an advanced course in cultural relations via satellite telecommunications, the students that will be taught better are conceptually part of the reason the technology exists. The teacher is a

secondary consumer in this case, even though there may be independent reasons, such as a pay increase, for the decision to participate.

The third kind of technology use is called tertiary consumption. Tertiary consumption refers to the effects on a person of someone else's use of technology. There are logically two types of tertiary consumers: those affected by someone's primary consumption, and those affected by someone's secondary consumption of technology. An example of the former would be the only child on the block without a television set. Such a child would be restricted from participation in whichever social practices involve acting upon what happened in prime time the night before. The incident involving the injured Eskimo boy I related at the beginning of this paper is an example of tertiary consumption stemming from primary consumption.

Tertiary consumption involving the secondary use of technology has already been illustrated in the education example above. A slightly different version of the concept is exemplified in virtually all the world's weapons of war. Ironically, the successful use of weapons technology is the only case I can think of where the tertiary consumer is intentionally less well off in the sense of paradigm characteristic number four, Improvement.

It isn't always possible to place the use of a technology cleanly into one class or the other. Some situations may have features of all of them. The important thing is that the use of technology can, and usually does, represent a complex configuration of social relationships, personal characteristics, and coordinated activities, not all of which

can be forseen, much less anticipated. The more that can be anticipated, however, the greater the chance that technology use of any kind will lead to increased behavior potential rather than unanticipated ill effects. The next section describes the system of influences that control the technology of a given place.

The influence system. Underlying the description of the Influence system is the reminder that the form a technology takes is under the control of persons engaging in deliberate action. Thus we can view technology as a psychological process, accomplished by choice within the entire social system that calls for it, rather than by accident or act of superhuman agency, outside the system of ordinary means by which persons meet their Basic Human Needs.

There are three components to the Influence system, each of which has two facets. The three components are: (1) the Motivation component, (2) the Authority component, and (3) the Competence component.

The Motivation component. The Motivation component of the influence system comprises all the reasons why someone wants to influence a particular technology. These reasons fall ~~generally~~ into two main classes of motivation: (1) Virtual -- reasons to influence a technology based on its virtues for improving the consumer's circumstances, and (2) Fiscal -- reasons to influence a technology based on the benefits that derive from some aspect of the production of the technology.

Examples of virtual motivation are easily generated. Any technology

that has ever been used for someone's entertainment, profit, or convenience, from the first arrow to the latest computer, could serve as an illustration.

Fiscal motivation, on the other hand, is exemplified in cases where the course of a technology is influenced for reasons other than what it was designed to do. The engineer in the land now known as "Silicon Valley", is fiscally motivated who, in response to a request for bids issued by the Alaska Office of Telecommunications, designs a piece of electronic equipment to translate satellite TV signals beamed to an earth station in a remote Alaskan village for the viewing pleasure of its citizens. The employee who wrote that request for bids was fiscally motivated to influence the technology of the remote village by an anticipated improvement in his annual performance rating. I am expressing my fiscal motivation to influence the village's technology, a technology I probably will never consume, by presenting the concept of fiscal motivation at this forum.

The purpose in making the distinction between virtual and fiscal motivation is so their relative influence over the social practices causing a culture's technology can be analyzed effectively. Two important questions arise in this regard. One is, how much of each kind of motivation is operating in a particular context? Another is, what conditions determine the degree to which one kind of motivation preempts the other, and what are the consequences? As will be seen in the next two sections, these kinds of questions recur in each part of the model.

Before moving on to the Authority component, however, it is worth

pointing out that the two kinds of motivation discussed here correspond to distinct roles played by those who assert power over technology. Virtual motivation logically applies to consumers, specifically to primary and secondary consumers. When virtual motivation is the basis for action, achievement is impossible any time prior to the actualization of the technology. Fiscal motivation applies to those occupying entrepreneurial roles, that is, in the design, production, or distribution of the technology. When fiscal motivation is the basis for action, achievement is possible at any time in the process of technological development. In other words when one is analyzing the relative influence of virtual and fiscal motivation one is also analyzing the relative operation of consumer and entrepreneurial interests in the matter. The timing of who gets paid when is central to the analysis. A related point is that what are normally accounted for as the costs of developing a technology can now be seen for what they are -- forms of fiscal motivation for anyone to respond to who has the requisite status and personal characteristics outlined in the next two sections.

The Authority component. The Authority component of the Influence system refers to positions in a social structure persons can occupy to influence technology. As with the Motivation component, there are two kinds of authority a person can have: (1) Statutory authority --the formal authority to influence technology associated with a particular social role, and (2) Social authority -- the authority to influence technology created through face-to-face interaction in a particular context.

Statutory authority is the more easily exemplified of the two kinds. Legislators who appropriate funds to extend entertainment television to rural Alaska, boards of directors who authorize stock purchases in computer firms, Supreme Court justices who rule on the patenting of recombined genes, are straightforward examples of statutory authority to influence technology.

Social authority, on the other hand, is easier to describe than to exemplify. An analogy will help outline its features. Gearing, et al (1979) made a useful observation to the effect that in any society the distribution of knowledge, skill, and talent is not random among its members. Rather, these powers are distributed throughout the social structure by the process of face-to-face interaction. Analogously, the implementation of a technology in any context is subject, at least in part, to how much utility and value is attributed to it through the same process -- face-to-face interaction. In other words, social authority exists to the extent that a technology's virtue is not entirely intrinsic but dependent also on socially negotiated judgements for its adoption and survival in a particular context of use.

If the concept of social authority seems elusive, the reason may be that it is elusive. Because the concept has not been articulated does not mean that its influence is weak, however. The dropping of America's commitment to enter the supersonic transport development race was a response to social authority, albeit exercised through statutory authority systems. Shows of public resistance to the development of our domestic nuclear power industry are further indicators of the social authority system.

In fact, one index of the magnitude of the amount of social authority over a technology is the amount of effort required to resist it. The advertising industry, for example, exists almost entirely in tribute to the social authority of the populace to hold thumbs up or down regarding even the most virtuous of technological developments.

The Competence component. The third component of the Influence system is the Competence component. As with the other parts of the Influence system, the competence to influence technology has two forms: (1) Technical competence -- what skills and knowledge are needed in order to actualize a technology in a particular context, and (2) Cultural competence -- knowledge of the social practices resident in a context where the technology is to be used.

The requirement of Technical competence is easy to understand; no technology can come into being without it. Technical competence refers to all aspects of a technology; not just to its design and production, but to its distribution and consumption as well. Because technical competence can range from high to low, so also can the quality of the technology, and by extension, its capacity to improve anyone's circumstances.

Cultural competence, understanding the social practices of a culture at risk to the transfer of a technology, is typically preempted or overlooked as a source of influence. Yet cultural competence is what is needed to anticipate (a) the extent to which a technology fits into the social practices of a culture in a particular case, and (b) the extent

to which it will improve its members' prospects for meeting their Basic Human Needs.

Anyone who watches television without being able to build a television set enacts the distinction between Technical and Cultural competence. The converse is true as well: anyone who's invention has been put to an unforseen use exemplifies the distinction. The inventor of chicken (now advertised as poultry mesh) probably didn't anticipate that villagers in Southwestern Alaska would see in it an ideal material from which to make a fish trap. Other examples of unforseen uses of inventions, from trivial to monumental, could be presented. The point is that the probability of such a use taking place is limited by the degree to which Technical and Cultural competence are simultaneously at work in the same locale. Moreover, to the extent Technical competence is segregated from and allowed to preempt Cultural competence, there is a liklihood that the technology transfered to a given context will be misdesigned in some important way. The same holds true for situations where Fiscal preempts Virtual motivation, and where Statutory preempts Social authority.

We can summarize the cross-cultural transfer of technology (CCT) in the following parameters of the Influence system:

Formula Five:

$\langle CCT \rangle = \langle P,D,C \rangle = \langle FM, VM, St, So, TC, CC \rangle$ where

P = the production of a technology

D = the distribution of the technology to a new cultural context

C = the primary, secondary, and tertiary consumption of the technology in the new setting

FM = the Fiscal motivation to transfer the technology

VM = the Virtual motivation to transfer the technology

St = the Statutory authority to influence the transfer

So = the Social authority through face-to-face interaction in the new cultural context to influence the consumption of the transferred technology

TC = the Technical competence to actualize the transferred technology

CC = the Cultural competence required to understand the social practices of the culture to which the technology is transferred.

The next part elaborates the concepts by which the parameters of the Influence system can be related to states of affairs their interactions produce.

The State of Affairs System

If the process of innovation were without problems, if transferred technology never went wrong, if new social practices always led to more behavior potential for everyone, there would be little need to monitor the states of affairs these cultural changes are intended to bring about. What is needed is a way of describing states of affairs that is sensitive to the difference between innovations that go right and those that go wrong. For discursive purposes, the States of Affairs system outlined here is based on the evaluation of technological innovation. There are direct applications, however, to evaluating any other aspect

of one culture's Methodology (Formula two) when transferred to another culture. What comes to mind is the delivery of such things as educational, medical, or social services; economic and legal procedures, etc.. For the current model, what holds true for technology developed in one cultural setting for use in another also holds true for anything developed in one cultural setting for use in another.

A great deal of attention is being paid, for example, to the use of Western models of psychotherapy and counselling in non-Western cultures (Draguns 1973, Torrey 1972, Marsella and Pedersen 1981, Silva 1983, Torres 1983, Marsella and White 1984). Indigenous subsistence systems are being replaced by Western corporate investment structures mandated under the 1971 Alaska Native Claims Settlement Act.

The evaluation of a technology in a new context can be accomplished by a slight variation on the theme of supply and demand. This abstraction works if a concept of demand is used that ties it to the idea of Basic Human Need, and a concept of supply is used that includes the use of technology to meet those needs.

The conceptual outline of the State of Affairs system is quite simple. It consists of only two intersecting dimensions representing the transfer of a technology in a new setting, on one axis, and the need for it in that setting, on the other. These elements are arranged in the four-fold matrix shown in ~~Figure~~ Table 2. The cells of this matrix represent four distinguishable states of affairs: Responsive, Wasteful, Deprived, and Stable.

Responsive states of affairs. Responsive states of affairs are those in which the demands for a technology in one cultural setting are met by its being transferred from another cultural setting. The "snowmobile revolution" in Arctic Scandinavia (Pelto 1973) is a good example of a Responsive state of affairs. In this instance, an old need was met by a new invention. Reindeer herding among the Sami predated the existence of snowmobiles by many generations, as did the need for continuously more convenient and profitable ways to do it. When snowmobiles got invented and became available for transfer, they became an innovation.

This is not to say, however, that a Responsive state of affairs is free of problems. For example, one effect of the use of snowmachine was to "de-domesticate" the herds:

> In effect, the animals have been allowed to return to a near-wild stage. Relinquishing control over the animals represents the continuation of a trend that was already evident before the comming of the snowmobile. The use of snowmobiles pushed the de-domestication process to its logical, and possibly irreversible limits. (pp. 98-99)

There are other examples in Pelto's analysis that serve as reminders of the systematic interactions among the parts of a context of technology use. In the present model culture changes occuring in Responsive stases of affairs are agreeable to the extent the Obviousness parameter (Formula Three) hasn't been illusory. Where problems arise, they arise in the area of Tertiary consumption associated with Primary consumption of the demanded technology.

Wasteful states of affairs. The next cell of the States of Affairs system is for situations where technology is transferred without it having been demanded. At first glance, this state of affairs may seem merely hypothetical, especially on a scale of any important size. We may all have purchased some gadget or other that now gathers dust in a closet, or have given a toy to a child only to have it appear at our garage sale advertised as "never used -- only thrown down once".

Ironically, it was the nagging underconsumption of telecommunications technology by rural Alaskans after it has been put in place at great cost that prompted the present conceptualization. How could that have happened? It is argued here that the magnitude of the waste is a joint function of (a) the amount of Fiscal motivation made available to (b) persons with Technical competence in excess of their Cultural competence by (c) persons with Statutory authority ignorant of the Social authority indigenous to the context of use.

Deprived states ofaAffairs. With appropriate modifications, the above argument holds for the next cell of the matrix, the Deprived state of affairs. In this state of affairs, there is a need that could be met by some existing technology but that technology is not supplied. Many of the differences between Third-world and Western nations could be thought of as Deprived states of affairs, When, for example, Western medical technology exists but, for all the reasons implied in the Influence system, do not get transferred to cultures that would benefit from them, those cultures are in a Deprived state of affairs.

There is, of course, an ex post facto character to Deprived states of affairs insofar as they can only occur after a technology gets invented; only then could a gap occur. All that is really being described, however, is a conceptual part of the uneven distribution of Basic Human Need satisfaction susceptible to to possible transfer of technology across culture boundaries. The significance of this condition is that a Deprived state of affairs logically includes reason enough to do something about it. What gets done about it is under control of the Influence parameters described earlier.

Stable states of affairs. The fourth state of affairs in the model exists when there is little demand for new technology and little external pressure to adopt it. This is termed the Stable state of affairs in the present conceptualization, implying a high level of Basic Human Need satisfaction within the context so that little reason exists to change the methodology of the place, introduce new social practices, or generally put a high value on innovation.

How stable any context ought to be can't be decided in advance. Postman (1976) has gone so far as to suggest that a culture can "OD on stability", by being too rigid to respond to changes in circumstances. Certainly the argument is more substantial than the simple straw man of flexibility vs. rigidity. The point of introducing the concept here is to remind us that stability is a possible state of affairs, possibly a desireable one, and one that could possibly go wrong relative to whatever standards we have for making that kind of observation.

These four possible states of affairs provide formal criteria for

evaluating how the concepts of the Consumer system relate to the concepts of the Influence system to bring about each one. By now, however, it should be clear that I have led you somewhat astray of the original purpose of this paper. How technology transfer causes culture change is no longer at issue. What is at issue is how to keep it from going wrong.

More generally, we can now redescribe the issue of culture change in these same terms; rather than: "how do we keep it from happening?", the question is: "how do we keep it from going wrong?". Returning to the three anecdotes I began with, beyond the general conclusion that one out of three ain"t bad, what have we learned? At the very least we can now suggest a formal and practical way of describing what happened that includes the relevant psychological principles. In practice, we can take seriously our role in the Influence system by recognizing those areas of public policy that need modification according to the model I've outlined here.