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A general system theory approach to understanding and changing the college classroom.

Herbert Philip Koplowitz
University of Massachusetts Amherst

A GENERAL SYSTEM THEORY APPROACH TO UNDERSTANDING AND CHANGING THE COLLEGE CLASSROOM

A Dissertation Presented

By

HERBERT PHILIP KOPLOWITZ

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Approved as to style and content by:

J. William Dorris, Chairperson of Committee

Harold Raush, Member

C. Dalton Jones, Member

Judith Evans, Outside Member

Bonnie R. Strickland, Chairperson
Department of Psychology

To my father

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A dissertation, like any other event, is not the unilateral product of one person's effort. At times while writing this paper I have felt like a vehicle for bringing others' ideas to formulations of greater equilibrium. The sources of those ideas and of the support for my efforts should be credited here.

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ABSTRACT

A General System Theory Approach to
Understanding and Changing the College Classroom

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Herbert P. Koplowitz, B.A., Cornell University
M.S., Ph.D., University of Massachusetts

Directed by: J. William Dorris

This dissertation critiques the conceptualization of the college classroom which predominates the literatures of educational psychology and higher education, and it develops an alternative model. The predominate mode of analysis, called "mechanistic", is characterized by treatment of the college classroom as though: 1) classroom roles were independent, so that, e.g., the teacher's role could be changed without changing the students' roles, 2) change and stability of the classroom were governed by laws of momentum, so that, e.g., the effect of a change attempt is always proportional to and in the same direction as the force applied, 3) classroom communications were simple and direct, so that, e.g., there is almost never more than one way to interpret what someone says, and 4) the classroom did not interact with other systems, so that, e.g., a classroom teacher need not consider students' activities and situations outside of the class. Examples from the literatures of higher education and educational psychology are used to show how those literatures are predominantly built on a mechanistic analysis, and the need for an alternative model is shown.

The alternative model developed is based on von Bertalanffy's General System Theory, an approach to science originally designed to

provide a more appropriate mode of analysis than the mechanistic for biology. Major concepts from General System Theory are illustrated by examples from their current application in family therapy by such therapists as Haley.

The General System Theory of the college classroom is presented and illustrated with examples from the literature and from the author's experiences as a teacher and a classroom consultant. This model is characterized by its treatment of the classroom as though: 1) classroom roles were interdependent, so that, e.g., a change in the teacher's role requires a change in the students' roles, 2) the classroom were stabilized by homeostatic tendencies and classroom change were affected by members' goals and positive feedback cycles, so that, e.g., a change effort might result in no effect, a great effect, or an effect in the direction opposite of the applied force, 3) classroom communication were complex, always open to interpretation, and always including a relationship component in addition to its content, and 4) the classroom were in constant interaction with other systems, including the department, the students' peer groups and families, and other classrooms.

Implications of this model are drawn for classroom consultants (people involved in faculty development and instructional development), classroom members who wish to make changes in classrooms, and researchers.

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CHAPTER I

INTRODUCTION

1.1 The Origins of this Paper[1]

In my five years as a college teacher I have found the college classroom to be puzzling and sometimes almost capricious. Although I have been able to control and predict the behavior of my classroom with some regularity, my plans and predictions have failed more frequently than I am comfortable with. I have entered semesters fully prepared to teach according to my students' goals and learning styles, and have been thwarted by students' demands that I set the agenda for the class. I have come to class feeling guilty and afraid because I was unprepared to talk about what I wanted my students to learn, and have been bailed out by students who themselves had expertise in the subject matter. I have made efforts to change the way my students and I communicate with each other only to have our style of communicating distort and weaken the attempt to change that very style. I have given a casual homework assignment which, according to some students, changed their entire approach to education and life. In short, in my experience, the classroom seems to have a life of its own. Results of my change attempts have not been proportional to the efforts I have put into those attempts; classrooms resist change in some cases and multiply it in others.

Over the past few years I have slowly acquired some insight

into my confusions about classrooms. These may be summarized as follows:

First, I have not been alone in my difficulties. Other college teachers I talk with also express consternation at the resistance classrooms show to change. It is fairly common to hear, for example, of a college teacher who tried to give his[2] students greater responsibility only to be overrun by his students or otherwise disappointed by them.

Second, my confusions stemmed not from a lack of data but from the way I conceptualized the classroom. I understand the classroom better now than I did five years ago; this is not because I know more about the classroom but because I think about it differently.

Third, I believe that the means of understanding the classroom which led to my confusions can be said to be the dominant means of analysis in use in the literature of higher education and related areas of educational psychology. I will call this mode of understanding and researching the classroom "mechanistic analysis". As is explained in subsection 1.24, the major purpose of this paper is to develop an alternative way of thinking. That is, I wish to develop here a model of the college classroom that is not based on mechanistic analysis, and which thus facilitates better understanding and planning for classrooms. First, the nature of mechanistic analysis and its influence on education and educational research should be discussed.

1.2 Mechanistic Analysis: Its Nature, Its Role in Education Related Theory and Practice, and the Need for an Alternative

1.21 Mechanistic analysis.

The mechanistic world view comes to psychology from nineteenth century classical physics. Von Bertalanffy (1968a, p. 45) gives the following description of that view:

> In the world view called mechanistic . . . the aimless play of atoms, governed by the inexorable laws of causality, produced all phenomena in the world, inanimate, living and mental. No room was left for any directiveness, order, or telos . . . The only goal of science appeared to be analytical, i.e., the splitting up of reality into ever smaller units and the isolation of individual causal chains. Thus, physical reality was split up into mass points or atoms . . . behavior into reflexes . . . etc. Correspondingly, causality was essentially one-way: one sun attracts one planet in Newtonian mechanics, one gene in the fertilized ovum produces such and such inherited character, . . . mental elements are lined up, like beads in a string of pearls, by the law of association.

The mechanistic view encourages research which characteristically does not consider the development and effects of goals and purposes, and which focuses on small units and individual causal chains. Although educators and educational psychologists do not seem consciously guided by this view of research, it does seem to have a great influence on the literatures of education and educational psychology, particularly in the attempts of these disciplines to become more "scientific". It is impossible, of course, to give a precise characterization of the literature of any discipline, and education and educational psychology in particular are fields without unifying philosophies to support research. It is possible, however, to show how elements of

the mechanistic view appear in the literature of these fields.

1.22 Mechanistic analysis in education and educational psychology.

The first characteristic of mechanistic analysis mentioned above is its avoidance of goals as an object of study. When goals are mentioned in the education and educational psychology literatures, they are usually goals that the teacher sets for the students rather than goals either teachers or students set for themselves.[3] The treatment of students' goals is particularly illustrative of the results of a mechanistic analysis of the classroom.

One aspect of students' goals is their relation to curriculum construction. Issues such as whether students have the right to influence the content of the courses they take and what the results are of students' so influencing their courses are rarely considered. When students' rights are discussed (Dennis & Kauffman, 1966; Katzenbach, 1966; Lipscomb, 1966) the rights considered are such rights as that to invite speakers to the campus or the right to peacefully protest campus or national policies; the right of the student to influence the content of his courses is rarely discussed.[4]

At times it appears as though the effects of students' influencing their course content are discussed. McKeachie (1969), for example, discusses differences between "teacher-centered" and "student-centered" courses. The "student-centered" courses were characterized as having greater student-student interaction, greater attempt to build student cohesiveness, and greater encouragement of

student discussion of their own experiences than the "teacher-centered" classes. But even in the "student-centered" classes, the teacher determined the course curriculum. Also, the dependent measures used were student attainment of teacher-set goals; student attainment of self-set goals was not measured.

Student goals are related to education and to educational psychology in still another way. Regardless of the teacher's goals in a course, a student's performance will be affected by his own goals, and he will learn more readily those parts of the course that interest him (Rogers, 1969). Even if a teacher wants to specify all of the desired outcomes for a course, he will be able to teach it better if he knows his students interests and their reasons for being in the course. Such knowledge will help the teacher design more interesting examples with which to illustrate his lectures and will also predict where students will need more help in learning material because they are less interested in it. But the role of student goals in student performance is largely ignored in the literature. For example, in a discussion of student motivation, McKeachie (1969) considers such factors as grades and the need to achieve, but not student desire to learn course related material. In general, the education and educational psychology literatures are not concerned with students' own goals.

The second aspect of mechanistic analysis mentioned was its focus on small units. Basic research in educational psychology tends

to focus on small units; one needs only to scan a recent issue of the Journal of Educational Psychology to verify this. Even observational studies of classrooms tend to assess the effects of individual teacher behavior, as Rosenshine (1971) notes in his review of classroom studies. An example of the kind of study reviewed (and encouraged) by Rosenshine is an investigation by Gage and colleagues (1971) of what constitutes good explaining on the part of the teacher.

Over fifty teachers and their twelfth grade classes served as subjects of the study. Each teacher was given materials on which to base lectures. The teacher was to use only the materials provided and to do no other research so that all of the teachers in the study could be assumed to have the same knowledge of the subject matter. Each teacher was to lecture only, to discourage student questions, and to lecture for exactly fifteen minutes. A number of methods were used to code and count the teachers' behaviors in delivering their lectures. All of the students were given the same multiple choice question tests, and mean class performance on the tests were used as measures of the teachers' effectiveness as lecturers. Mean class scores were then correlated with measures of teacher behavior in order to determine which behaviors were most effective in promoting student understanding.

As Rosenshine indicates, the drive to focus on small units is understandable in light of the failure of earlier, more global studies to produce significant results. But it seems that in

isolating "explaining", Gage and his colleagues have destroyed it. I know that my own ability to help my students understand new material depends on my researching areas particularly relevant to my students on a particular topic. Even more, my ability to clarify subject matter depends on my ability to elicit questions from my students and thus find out what it is that needs explaining. Rosenshine (in Gage et al., 1971) suggests that a teacher who appeared to be a poor explainer in the study might improve by adopting the behaviors exhibited by good explainers. But, depending on the skills and personality of the "poor explainer" in question, a better suggestion might be for him to abandon the experimental procedure. For example, for a teacher whose explanations fail because he does not know what it is that his students need explained, the best improvement might be for the teacher to encourage students to ask questions. By focusing on small units, educational investigators may be studying phenomena that have little relevance to the classroom, and the results of their studies may be without practical consequence.

The third aspect of mechanistic analysis noted was its focus on individual causal links. In the literatures of education and educational psychology, causation is usually pictured as going from teacher to student. For example, there are numerous studies of the effects of teacher behaviors on student performance, but few on the effects of student behaviors on teachers. The following are illustrative examples. Mager and Clark (1969) concluded from a

study of theirs that clearly and completely specifying the goals for a course will improve student learning. McKeachie (1969) gives college teachers the following advice about term papers: "Don't give students complete freedom in choice of topics. Most students have difficulty in selecting a topic and are happy to have suggestions." The picture of causality suggested by these studies is indicated in Figure I-1a. That is, student learning improves as a result of teachers' setting clear learning goals for the students.

The single causal link can put focus on a very limited aspect of the situation. In particular, it avoids two important questions: "Why do teachers have to set learning goals in order for students to learn well?" and "What effects are there, aside from improved learning, of student learning being regulated by someone other than the student himself?" Possible answers to these questions are diagrammed in Figure I-1b. It is plausible that when teachers set all of the goals for a course, ignoring student's goals, that the students will lose the ability to know and to articulate their own goals. Schmuck and Schmuck (1971), for example, discuss an authoritarian elementary school teacher whose students learned a great deal while in her class. Her students, however, had difficulty in the following year in taking initiative in their own projects in less structured classes.

If, at some point in the course, the teacher asks the students to base a project on their own interests, the students will be at a

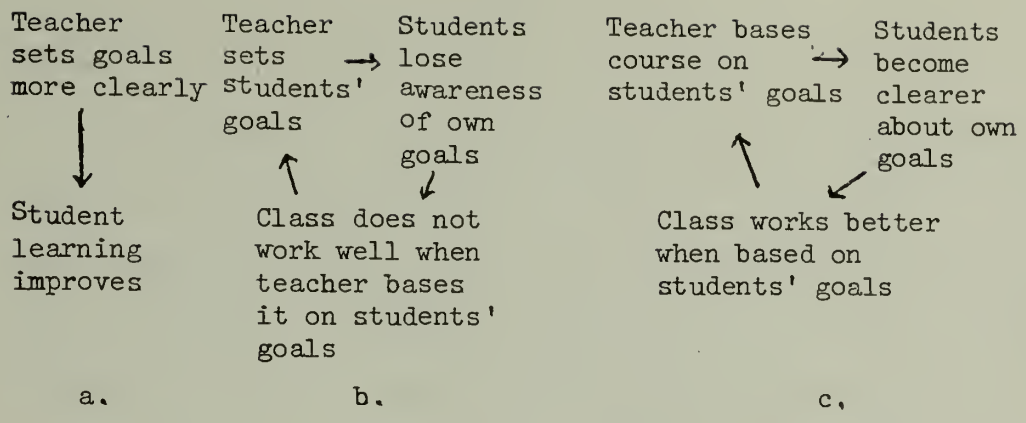

Figure I-1.

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loss about what to do their projects on. The teacher may learn from that experience that students do not know what they want to learn and may be less inclined in the future to have any student input into the course content.

This picture of causation suggests an alternative solution, diagrammed in Figure I-1c, to student's inabilities to set their own goals. If, throughout a course, students are making decisions about the course content, they may become more aware of how the course relates to their own interests.[5] As the course progresses, students may become increasingly clear about their goals within the course, and classes dependent on students' knowledge of their own goals would become increasingly successful. Students would then not need to have goals specified for them. A teacher who was tolerant of students' inability early in the course to specify their own goals might find this method successful and might be more inclined to use it in the

future.

The one-way picture of causality leads Mager, Clark, McKeachie, and others not to explore beyond Figure 1a. It may well be a fact that students learn better when goals are specified for them, but this fact takes on a different significance if its cause is that teachers do, in fact, specify learning goals for students.

In summary, educators and educational psychologists may not be consciously guided by the mechanistic view, but the elements of avoidance of goals as objects of study, focus on small units, and a one-way picture of cause dominate the education and educational psychology literatures.

1.23 Implication of mechanistic analysis for the classroom.

The mechanistic view suggests not only a style of research but also a model for conceptualizing the classroom. Such a model might include the following elements:

a. What happens in the classroom is determined by what the teacher does. A change in the classroom is thus brought about by changing the teacher. The teacher's change may bring about a change in what the students do, as when a teacher stops depending entirely on lecturing and has students do role plays in class. This would be conceived of as essentially a change in the teacher, however.

b. The teacher's abilities are thought of as the sum of a number of skills such as "explaining", "motivating", "testing", etc. Classroom improvement is therefore a matter of improving whichever

of those skills is weak.

c. Students are passive members of the classroom, and their classroom behaviors are not influenced by their own goals. Student characteristics (motivation for learning, need for direction from others, etc.) are not thought of as being changeable.

Again, it is doubtful that any teacher is consciously guided by this model. But my own behaviors as a teacher as described in 1.1 were consonant with this model, and I believe most other teachers' behaviors are too. In expecting that I could make my classroom student-centered simply through my acting like a student-centered teacher, I treated the classroom as though the teacher's behaviors determined everything that happens in the classroom. I thought I needed to improve my "getting the students involved" skills because I was playing too dominant a role in my class; in fact, student involvement improved when instead of my increasing my skills, I came to class unprepared, and students had to become involved or face total boredom. Again, by expecting to be able to create a student-centered classroom, I ignored the fact that my students had goals, and that their goals for the course might be different from mine. I was not doing it consciously, but I was following a mechanistic model of the classroom.

1.24 The need for an alternative to the mechanistic view.

If mechanistic analysis is the dominant form of analysis in

education and in educational psychology, it has not completely controlled the literature of either discipline. Cahn (1969) and Mann (Mann et al., 1970) portray students as having an effect on the classroom. Pilecki (1971) and Mann (Mann et al., 1970) have shown teachers' performance as being more than the sum of microskills. Rossman (1969a) and Perry (1968) portray students as being goal driven and changeable. Dorris (1974, 1975) has shown the need to incorporate student goals into university courses and ways of doing this without losing academic integrity and rigor.

While all of these may be exceptions to the mechanistic models, it is not clear what they are positive examples of. The rejection of mechanistic analysis raises a number of questions, and leaves no unified basis for answering them. If a classroom does not change in proportion to the teacher's efforts to change it, what is the relationship between the change effort and its effect? If the teacher does not unilaterally determine the nature of the classroom, how is it determined? What does it mean to say that a classroom has a life of its own?

What is needed is an alternative model to the mechanistic one, one which these exceptions would be positive instances of, and which would facilitate generalizations from them. Such a model should prove useful in providing descriptions of classroom events, in detecting and formulating classroom problems, and in devising solutions to these problems where these events and problems are related to the

classroon as a system. The purpose of this paper is to develop such a model.

I believe the basis for such a model can be found in General System Theory, developed by von Bertalanffy (1968a) to provide biology and other sciences with an alternative to the mechanistic view. A related source for the classroom model can be found in the literature of family therapy, especially in the works of family therapists who have been influenced by General System Theory. Before explaining further the kind of models to be developed in this paper, a brief description of General System Theory and of related family therapy literature will be given.

1.3 General System Theory

Von Bertalanffy gives the following description of General System Theory (G.S.T.) and the reasons for its development:

> Suppose we compare a dog . . . when alive and healthy, when sick, and when dead. What can you say about the differences from the viewpoint of traditional science? Extremely little, I am afraid. In such comparison, you will analyze the processes going on in the animal and in the corpse; . . . you will eventually come out with neat formulas of innumerable physical and chemical processes. Granted these processes and formulas will be different in the live and dead dog. But there is nothing to tell the difference which is obvious to the naive observer. The laws of physics and chemistry. . . do not care whether dogs are healthy, sick, or dead. . .
>
> But, of course, there is a tremendous difference between a live and a dead dog. . . The living being has a marvelous organization which is impaired in

> sickness and decays after death. In apparent contradiction to a well known law of physics, this organization--an utmost improbable state--is maintained in a stream of processes which should go to most probably equilibrium states; improbability even increases, in the dog's ontogenesis and evolution, by way of progressive differentiation. In its behavior the dog . . . appears to be goal-directed . . . But all these concepts and terms (. . . organization, differentiation-goal-directedness, and many similar ones) do not occur in the vocabulary of physics. . . Science, in the way it has developed since Galileo and Newton, was concerned with undirected events, isolable causal trains, one-way causality, relations between an independent and a dependent variable, rejection of any form of teleology, all these and other expressions being aspects of the same viewpoint. But what we are concerned with when envisaging living and dead organisms are questions of organized wholes, of directedness and order of events, or interactions among many variables, of goal-seeking and the like. . .
>
> In this situation we can take two different attitudes. First, we can decree that such problems do not exist and declare them to be anthropomorphic delusion and metaphysical nonsense. This is, in fact, what mechanistic science did. But then we run counter to everyday observation and to the actual practice of biology and medicine. . . The second alternative is to admit honestly that our present science. . . apparently does not tell us everything, in which case we must decide to do something about it. Since all problems mentioned are in some way aspects of wholes or systems, this probably will amount to the demand of a general systems theory. (In Gray, Duhl, and Rizzo, 1969, pp. 35-36).

Anatol Rapoport sees G.S.T. as having two sources of impetus:

> The first, the realization of the inadequacy of mechanism as a universal model in science; the second, a tendency to counteract the fragmentation of science into isolated specialities. (In Gray & Rizzo, 1969, p. 8).

Von Bertalanffy (1968a) defines G.S.T. as a discipline "whose subject matter is the formulation and derivation of those principles which are valid for systems in general", where a system is "a set of elements in interaction." (Gray & Rizzo, 1969). Examples of systems would be a person, an organism, or a government. (A person can be thought of as a set of organs in interaction, as can any organism. A government can be thought of as executive, legislative, and judicial branches in interaction.) The systems considered in this paper have three important properties: non-summativity, purpose, and openness, defined as follows:

Non-summativity: To say that a system is non-summative is to say that it is different from the sum of its parts.[6] To understand a person, for example, it is not sufficient to understand each of his organs; one must also understand how the organs interact. The organs themselves cannot be studied or understood in isolation because the functioning of each is affected by the functioning of the others. For example, a person's hearing often becomes more acute if the person is blinded.

Purpose: There is dispute over the best way to define "purpose". (See Rosenblueth, Bigelow, & Winer, 1968; Rosenblueth & Wiener, 1968; and Taylor, 1968a, 1968b.) For this paper, Taylor's (1968b) definition will suffice, that "to say of a given behavior that it is purposeful, is to say that the entity exhibiting that behavior desires some goal, and is behaving in a manner it believes appropriate to

the attainment of it." In general, evidence that a system has a given goal will be that it normally accomplishes that goal and that, given a change in the system or its environment which renders the standard behavior pattern useless for accomplishing its goal, it will change its behavior in such a way that it again accomplishes its goal. Thus, part of the evidence that a person has a goal of reading will be that he turns on a light and sits near it when it becomes too dark to read by natural light.

Openness: To say that a system is open is to say that it exchanges matter, energy, and/or information with its environment. All of the systems this paper is concerned with are open systems. A person, for example, depends on importing energy in the form of food. A system is treated as closed if interchanges with its environment are ignored, which is done at times to simplify analysis. Katz and Kahn (1969) in criticizing such simplified analyses of businesses comment on:

> The notion that irregularities in the functioning of a system due to environmental influences are error variances and should be treated accordingly. . . Open system theory . . . would maintain that environmental influences are not sources of error variance but are integrally related to the functioning of a social system, and that we cannot understand a system without a constant study of the forces that impinge on it . . . It is remarkable how weak many industrial companies are in their market research departments when they are so dependent on the market. (pp. 101-102).

General System Theory, then, is the study of the non-summativity,

goal-seeking, and openness of systems. It attempts to construct models to help conceptualize and account for these aspects of systems. It differs from mechanistic analysis not in what its objects of study are but in how it studies them. Mechanistic analysis precedes by breaking the object into parts and analyzing the parts separately, ignoring whatever non-summativity, purpose, and openness that object might exhibit. The open systems approach will study how the behavior of each of the parts affects and is affected by the bahaviors of other parts, the ways in which parts are organized and changed in pursuit of goals, and the dependence of the whole system on the environment. In so doing, the systems approach may ignore some particulars about the parts, for example whether they are people or parts of people, whether they are small or large, etc. Probably any object can be viewed as though it were an open system or as though it were a self contained mechanism. At points in this paper, a given entity may be referred to as being "a system" or "a mechanism"; this is to be understood as a simplified way of saying that I am making a G.S.T. or a mechanistic analysis of that entity, not that the entity itself is inherently a system or a mechanism. For different purposes a different approach may be more powerful. In particular, it is not improper to analyze the college classroom mechanistically. However, when student goals are particularly relevant and when student and teacher behaviors are particularly interdependent, General System Theory may provide a more powerful approach.

It should be noted that this paper does not give a complete coverage of G.S.T. but rather focuses on its interpretation and expansion by such family therapists as Haley (1963, 1972), Jackson (1969), and Watzlawick (Watzlawick et al., 1967, 1974). They have developed a model of the family as an open system, and this paper will use their work as a basis for developing a model of the college classroom as an open system. Thus, some aspects of G.S.T., such as queing theory, theory of automata, and decision theory which are not discussed in the family literature will not be considered here. On the other hand, aspects of cybernetics which are particularly useful in conceptualizing families will play a greater role in this paper than they do in G.S.T. in general.

1.4 Family Therapy

When family therapists began seeing clients in families, not just individually, they began to change the ways in which they conceptualized people, families and problems. Family therapy enabled and forced therapists to view the context in which an individual's problems develop and are maintained. For many therapists, a result has been to view problems as belonging not to individuals but to families.

> While the (beginning therapist) tends to see a particular individual as a container of psychopathology or a person with a low stress threshold, the more experienced therapist sees the

> family system as needing some individual to express the psychopathology of the system. For example, if a child is agitated and is quieted, the mother will become agitated, and if the mother and child are quieted then father or a sibling will become agitated because the system is of such a nature that this is necessary. (Haley, 1972, p. 263).

The agitation may have been seen as being "the child's problem", but because it is viewed in the family context it can now be seen as "the family's problem".[7]

Of the ways that have been devised to conceptualize families and their problems, some are concerned with particular processes and purposes peculiar to the family, such as raising children to maturity and independence. (See, for example, Anonymous, 1972). Models related to such issues will have limited relevance to the college classroom and will not be discussed here.

On the other hand, some conceptualizations of families and their problems are based only on the fact that families have purpose, that family members' roles are interdependent in a non-summative way, and that families are in constant interaction with their environments; that is, some of these models relate not to the family so much as to the family as open system whose elements are people. It is the latter type of model which is most likely to have useful application to the classroom and so will be discussed in this paper. (The similarities and differences among families, classrooms, and other open systems will be discussed more completely in section 3.12.) Thus, the

discussion of family therapy in this paper will be no more representative of the whole field than will be the discussion of G.S.T.

1.5 An Overview of the Paper

The purpose of this paper is to develop a conceptual model of the college classroom as an open system, and then to consider on the basis of that model the strategies one might use to change the classroom.

By "college classroom" I mean any collection of students with teacher or teachers that would be called a class or a course in higher education today. Probably what will be said will be most relevant to a small, highly interactive group, but the model should be quite useful for a class of thirty students and should even have application to a lecture course of a thousand students. (The relation of the models to various kinds of classes will be discussed further in section 3.122.)

By "model" I mean a way of conceptualizing an event or entity which brings some aspects of it into focus by stating relationships among them while ignoring other aspects. Such a relationship can be formulated mathematically or verbally. None of the models presented here will be given mathematical formulations. While a verbal model lacks the precision of a mathematical one, "a verbal model is better than no model at all, or a model which, because it can be formulated mathematically, is forcibly imposed upon and falsifies reality."

(von Bertalanffy, 1968a, p. 24).

The plan of the paper is as follows. Chapter two will explain some of the models developed by G.S.T. influenced family therapists. The chapter should familiarize the reader with some G.S.T. models and show how they have been applied to one area of psychology.

Chapter three will develop a model of the college classroom based on the model presented in chapter two.

Chapters four and five will apply to the college classroom change strategies used by family therapists. Chapter four will show how they can be used by a consultant to a classroom, and chapter five will show how they can be used by a student or a teacher to change his own classroom.

Chapter six will present implications of G.S.T. for research on the college classroom.

Notes - Chapter 1

1. Because the organization of this paper is fairly complex, a system of decimal numbering for chapters and sections has been adopted. Chapters are numbered 1, 2, 3, etc. Major sections of chapters are numbered 1.1, 1.2, 1.3, etc. Subsections are numbered 1.11, 1.12, 1.13, etc., and so on.

2. The pronouns "he", "his", etc. will be used in reference to persons of unspecified gender. This practice is adopted to avoid the clumsiness of such notations as "(s)he", "his/hers" etc. The choice of pronouns in this paper is not made to imply that the paper's content does not apply to female students or teachers.

3. Strictly speaking, there is reference in the literature to goals. There is, for example, much advice on how a teacher can write good behavioral objectives for his courses. The avoidance of goals mentioned here refers to the lack of reference to the broader purposes what is being learned; whether teachers want to teach what they are teaching; whether what happens in classrooms has meaning for the people involved, etc.

4. The lack of reference to whether students have a right to influence course content is particularly puzzling if one examines the economics of education. In simple terms, the student pays tuition in order for the teacher, who receives a salary, to help his learn something. In our economy, the person who pays specifies what service the one who is

paid should provide; education is a striking exception to this pattern. There may be reasons why education should, in part or in whole, be exceptional, but these reasons do not appear in the literature.

5. This can be done without compromising the teacher's role in deciding what is important in the subject to be covered. For example, Dorris (1975) describes a social psychology course in which the teacher decides which topics in social psychology will be covered (attraction, affiliation, etc.) and the students decide what areas these topics will be discussed in relation to (the classroom, sex roles, T.V., etc.).

6. Von Bertalanffy (1968a, p. 56) defines non-summativity more precisely as follows: "For illustration, we choose a system of simultaneous differential equations. Denoting some measure of elements, p_i (i=1, 2, . . . n), by Q_i, these, for a finite number of elements and in the simplest case will be of the form:

$\frac{dQ}{dt}1 = f_1(Q_1, Q_2, \ldots Q_n)$, $\frac{dQ}{dt}2 = f_2(Q_1, Q_2, \ldots Q_n)$, . . .

$\frac{dQ}{dt}n = f_n(Q_1, Q_2, \ldots Q_n)$. Change of any measure Q_i therefore is a function of all Q's, from Q_1 to Q_n; conversely, change of any Q_i entails change of all other measures and of the system as a whole.

7. I am not implying here that some problems are family problems and so should be treated by family therapy whereas others are individual problems which require individual therapy. As with G.S.T.

and mechanistic analysis, these two are different ways of conceptualizing situations which differ in which aspects of the situation are brought into focus and which aspects are ignored. To quote Haley on this:

> As he gains experience, the therapist begins to view family therapy not as a method but as a new orientation to the arena of human problems. . . (W)hen asked what are the indications and contra-indications for family therapy. . . the more experienced family therapist will appear puzzled since he finds himself defining any kind of therapy as a way of intervening into a family. . . (H)e views individual therapy as one way of intervening into a family. . . Even if drugs are given only to one person, the family therapist does not see it as a drug therapy in the usual sense; it is the introduction of a drug into a family system with consequent concern about who is being labelled as the patient or labelled as the one who is at fault by this act. (1972, p. 262)

One might add that family therapy can be viewed as a form of individual therapy as it leads to insight into and change of the feelings and behaviors of the family's individual members.

CHAPTER II

THE FAMILY AS AN OPEN SYSTEM AND GENERAL SYSTEM THEORY INFLUENCED FAMILY THERAPY

This chapter will present some of the models used by family therapists to conceptualize and change families. Again, this chapter is not intended to be representative of all of family therapy, but only of those notions which are used by G.S.T. influenced family therapists which are likely to be useful in understanding and changing the classroom. Five aspects of the family s stem will be explored: the interdependence of family roles, stability and change in the family, communication in the family, the openness of the family system, and family therapy.

These aspects of the family were chosen for exploration because of their relationship to the definition of a system. The interdependence of family roles relates to the nonsummativity of the family as a system; as the family is not a linear sum of the attributes of its members, an exploration is needed of the ways in which family members' roles interact with each other. The stability and change of the family is dependent on the goal seeking of family members and of the family as a whole. Special attention is paid to communication in the family because important insights about communication derive from viewing individual persons as systems. The openness of the family is clearly an aspect of the family system that needs to be explored. Finally, there is a need to show how the conception of the family as

an open system affects G.S.T. influenced family therapists.

The major purpose of this chapter is to introduce the reader to some of the major concepts in G.S.T. and to show how these concepts have been applied usefully to the family, which is one type of open system of people. In the next two chapters these same concepts will be expanded and applied to the college classroom, another type of open system of people.

One major example and several minor ones will be used to illustrate the concepts discussed. The case studies are introduced not in order to validate the concepts but rather to show how the concepts are applied to various situations. The major example used is rich enough to allow demonstration of most of the principles to be discussed. Some of the concepts, however, do not apply to that case, and additional examples will occasionally be used.

Before the major example is presented, an explanation should be given of what it means to view the family as a system.

2.01 Viewing the family as a system.

To view the family as a system means to see it as a non-additive, purposive, and open collection of elements (see section 1.3). Strictly speaking, the elements in the family are not the family members but the roles they play in the family.[1] When discussing the family, roles that members play in other systems (work, school, etc.) are not strictly relevant. These roles will only be of interest because the family is an open system and these other systems do

interact with the family; also by observing a person's behavior in other situations, one sees alternatives open to the person that he does not make use of within his family, and this gives an indication of how the family system limits the person's role within it. Although the family members themselves will be loosely referred to as the elements of the family system, it should be understood that it is only the roles played by those members in the family that actually are part of the family system.

As will be seen throughout this chapter, but especially in section 2.1, the family is not additive. In general, the family is different from the sum of its individual members. Any attribute of the family, for example, total income, is not the result of the sum of contributions from individual family members. If Junior gets a $20 per week job, for example, the family's income may increase by $20 per week. Junior's ambition may, however, stir his siblings to take on jobs, thus increasing the family's income all the more. Or, the parents may decide that with the extra $20 per week, they do not have to work as hard, and the family income might remain the same or even decrease. Thus, an increase in a given attribute of one family member does not necessarily lead to an identical increase for the family as a whole.

The notion of purpose becomes complicated when applied to a collection of individuals. Each member of the family has his own uses for the family: to provide food and shelter or emotional

support, to provide a context in which one has some control or in which one is in control, etc. In addition, the family serves purposes of other systems; schools and society in general depend on families to socialize children. Although Katz and Kahn (1969) warn the investigator not to confuse the purposes of a system with its purposes for its members, it will serve as an adequate approximation to consider the family's purposes to be what it does for its members and for interacting systems.

Finally, as will be discussed in more detail in section 2.5, the family is an open system. It depends on various economic systems to provide goods and situations in which to make money to pay for these goods. It is depended upon by school systems and by society in general to socialize children.

2.02 A case study.

The following case study will be drawn upon throughout this chapter to demonstrate aspects of the family system:

A young couple requested therapy because of troubles stemming from their relationship with the husband's parents. (Watzlawick et al., 1974, pp. 116-119). His parents' idea of being good parents entailed constant giving to their only child. The younger couple was therefore subjected to a constant shower of gifts. For example, the older couple chose a house for the younger couple, made a down payment on it, and furnished it.

> The parents . . . make four yearly visits of three weeks each. . . The parents completely take over the house, the young wife is banned from the kitchen, while the mother prepares all the meals and . . . starts washing everything washable in the house, while the father cleans and services their two cars. . . mows the lawn and weeds.
>
> (The young couple) tried very hard but unsuccessfully to establish a minimum of independence, but even the mildest attempt to protect themselves against the parents' dominance is interpreted as a sign of ingratitude which then provokes deep feelings of guilt in the husband and impotent rage in the wife. These attempts also lead to ludicrous scenes in public.

While shopping together, the mother was willing to create as much of a fuss over the right to pay for groceries as was her daughter-in-law; the daughter-in-law was left with the choice between allowing the mother to pay and creating an embarassing disturbance at the supermarket, and she always chose the former.

The more the younger couple did to achieve independence, the more it owed the older couple. The therapists' advice was simple: do less. The next time the parents visited, the younger couple did none of its previous preparation. Dishes and laundry were left dirty for the mother to take care of. The younger couple waited calmly for the parents to pay for groceries and theater tickets, and allowed them to do it without protest. The husband read or watched T.V. while his father worked on the cars.

The older couple cut the visit short. Before leaving, the father took his son aside and told him that there had been too much pampering going on, and that the son and his wife would have to learn to take care of themselves. Thereafter, the parents treated the

younger couple as independent adults.

2.1 Role Interdependence

The roles played by family members are each dependent on those played by other members; each member is dependent on the others to provide the context in which he can play his role. As family members cannot be studied in isolation and as members do not act or change independently of each other, some notion is needed of how members' roles interact with each other. This section explores some of those notions.

2.11 There is no unilateral cause in the family.

Nothing that happens in a family is the doing of any one member. No one plays any role in the family without other members' playing supporting roles. Blame for anything that goes wrong in a family cannot be completely located in one member.

In the example cited above, it seems as though the parents were causing the problem and that the children contributed nothing to it. The fact that the children could stop the problem by changing their own behavior shows this not to be so; the childrens' previous behavior provided the context needed by the parents to perform their "problem causing" behavior. The parents were only motivated to give to the younger couple if they prized the gifts and were worthy of them. The parents would only give gifts to grateful, hardworking children; by playing the grateful, hardworking role, the children

contributed to their own problem. Not only the parents, but also the children, are to blame for this parents' excess generosity.

In almost any difficulty within a family, a member can cease being bothered by another member's behavior simply by leaving the family; thus, there is usually something every member can do to alleviate any problem. But therapists indicate that there is usually a more reasonable and acceptable alternative; there is usually something each member can do about any problem that will make the family stronger rather than weaken it. (Watzlawick, et. al., 1974; Haley, 1972). And as long as there is something a given member can do to end the problem, he must share the blame for the problem while it exists.

2.12 Changing one family member's role necessarily changes other members' roles.

In the present case, it is not clear which role was the one that was to be changed; as noted in 2.11, there is not one role that can be said to be the cause of the problem. The younger couple wanted to change the parents' roles as givers. Clearly, the younger couple wanted to change its own role as receivers, too, and this change could only happen in connection with a change in the parents' role. Also, the children were able to change the parents' giving role by changing their own "well-behaved children" role. Because family members provide the context in which other members act, a change in one family member's role will bring about changes in other members' roles. In

the present example, the children wanted to change their roles; they wished to be more independent from the older couple. This change, however, would also result in a change in the parents' roles; they could not be the good parents they wanted to be if no one would play the role of children.

The principle that a change in one member's role will change other members' roles has several implications. First, it is not always sufficient to change just the "problem" role if other roles will react by inducing the first role to reappear; sometimes other roles will have to be changed also. It was not enough, for example, for the children to stop being receivers because the parents' giving roles reinduced the children's receiving roles; the parents' roles had to be changed too. Second, one does not always try to change the role that seems problematical. In this example, it may have been the children's receiving role or the parent's giving role that was problematical, but the intervention was made at the point of the children's role as good children, a role that seemed not to be giving anyone any trouble at all. Changing a role may result in or may only be accomplished by changing other roles.

2.13 A desired change in one member's behavior may bring about an undesirable change in another member's behavior and vice versa.

Each move by the children to be strong, independent adults had the effect of reducing the parents' status as parents who were stronger than their children. Each present the parents gave and each bill they paid made the children weaker than they had been before.

As will be seen in various parts of section 2.5, this see-saw effect in family change has implications for family therapy. It is not enough to change a person who has problems, because taking care of these problems will affect other members and may lead another member to exhibit problems. Watzlawick et al., (1967, p. 137) cite the example of a family in which the husband "finally received his graduate degree and obtained a job. His wife, who had previously been supporting him, collapsed with anxiety." Another implication for therapy is that if one wants to make a member healthier, this can be accomplished by making another weaker. Watzlawick et al., (1974, p. 142) present an example of a rebellious teenager who would do no work around the house and who would come home long after his parents wanted him to. The mother was instructed to do less housework than she was used to, and to do poorly what work she did (i.e., by "somehow" getting cracker crumbs into the teenager's bed while making it) and to act very apologetically about her behavior (e.g., saying "I don't know what's gotten into me lately — I just can't do anything right.") The teenager was forced to take care of his own environment or face living in one made intolerable by his parents. By becoming less responsible, the mother was able to help her child become more responsible.

2.14 Causation happens in cycles in the family.

As a change in one role changes the context of other roles, this contextual change produces changes in other roles, which necessarily

changes the context of the first role. This is illustrated in Figure II-1a.

The daughter-in-law tried to achieve some independence by paying for groceries. This action provided a context for the mother-in-law to see herself in debt to her daughter-in-law. From the mother-in-law's perspective, her only possible response is to put the younger woman in debt by snatching the money from the cashier's hand, returning it to her daughter-in-law's purse, and paying for the groceries herself. The daughter-in-law then has a context in which she is even more in debt than she was before entering the supermarket, and is tempted to right the situation by sending an expensive present to her husband's parents when they return to their home. Of course, if she does so, they will send back an even more expensive present. She will then not only be more in their debt, but will also have to live with an ugly sculpture or a gaudy wall-hanging in her living room. This is illustrated in Figure II-1b.

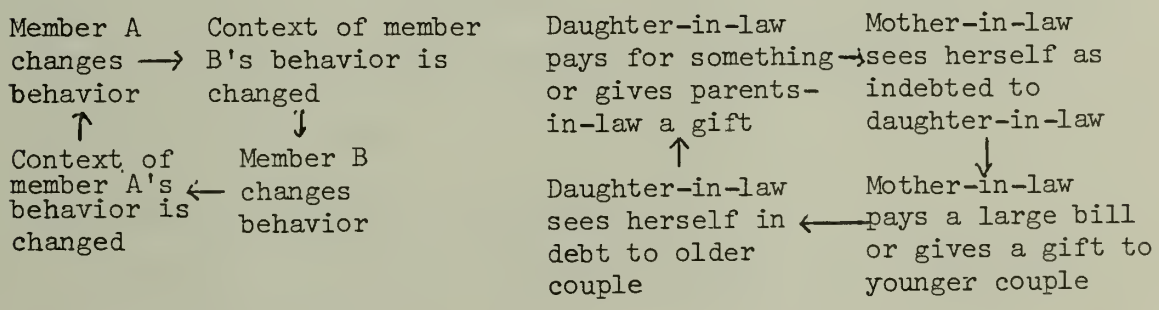


Figure II-1.

Watzlawick et al. (1967, p. 56) refer to a case in which a wife's nagging caused her husband to withdraw, and the husband's withdrawal would cause the wife to nag. The wife saw her nagging as being caused by the husband's withdrawal. The husband thought the wife's nagging caused his withdrawal. To an outside observer, however, it was clear that each person's behavior provided the necessary context for the other's behavior.

In summary, family roles are interdependent. Nothing that happens in the family is solely the doing of any one person. Changes in any role will create changes in others, and changes in one role may be facilitated by changing another. Because of the interdependence of family roles, causation often happens in cycles in families.

2.2 Stability and Change in the Family

The family's pursuit of its own goals, however they are to be conceptualized, provides the family with more than inertia and external forces to give it direction. This section will explore some of the models that have been developed to conceptualize stability and change in the family.

2.21 Negative feedback and homeostasis.

In pursuit of its goals, the family develops norms of behavior and interaction. There is a need for someone to bring in money, for someone to do the shopping, for someone to make decisions of various sorts, and norms develop as to which person or persons will

do these and other tasks and in what ways they will be done. The tendency for roles and relationships within the family to remain the same is called "homeostasis".

External forces or a member's desire to change his role will at times upset homeostasis. A parent may get fired and be no longer able to provide for the family or one of the females in the family may decide to take on a more liberated role. In such cases, the family system tends to act so as to return these members to their previous roles. The parent is still expected to provide for the family, or is repeatedly asked how the job search is going. When dinner is not on the table at the usual hour, everyone asks Mom why it is not (though she said the day before that someone else would have to take care of dinner tomorrow); when it is clear that she will not cook, she is asked the location of the cook book, the oregano, the frying pan, and four other items that whoever is cooking would be able to find under any other circumstances.

In simplest terms, homeostasis is maintained in the following way: when a member deviates from his role, another member acts so as to reduce the deviation between the first person's behavior and the behavior expected of him by his normal role. In the example immediately above, the mother had an expected role: to prepare dinner at meal time. When she deviated from that role, by not cooking, attempts were made by various family members to reduce that deviation by demanding or asking that she cook, or by attempting to bring her a

little more into the kitchen to at least say where the cookbook is. The mother is involved in a causal cycle here. Her kitchen-leaving-behavior is affected by its results; its probability is reduced by the complaints and pleas which it produces. Such a deviation reducing causal cycle is called a "negative feedback cycle".[2] (In this paper, the term "negative feedback" is always used in reference to such a deviation reducing cycle, and never in the colloquial sense of "negative reinforcement".)

Negative feedback need not be so direct. Lederer and Jackson (1968) describe the family in which Dad always wants to go for a Sunday drive, which Mom hates to do. Before the family has driven very far, the young son develops a stomach ache, and the family returns home to Mom's satisfaction. We can diagram these situations as in Figure II-2, where "+" indicates that an increase in the former event causes an increase in the latter, and "-" indicates an increase in the former event causing a decrease in the latter. A cycle of mutual causality will constitute negative feedback if the number of negative connections in it is odd.

In our two couples, negative feedback was at work maintaining the parents' superior position over the younger couple. "Even the mildest attempts to protect themselves against the parents' dominance is seen interpreted as a sign of ingratitude which then provokes deep feelings of guilt in the husband and impotent rage in the wife." (Watzlawick et al., 1974, p. 117). The young couple

also learned that any present it would send the older couple would be reciprocated by a more expensive present. (See figure II-3). Thus any attempt by the young couple to alleviate its problem would only restimulate the problem. The younger couple learned that attempts to assert independence would be met with strong reassertions of the parents' dominance, which usually made the young couple reluctant to try again to be independent, knowing what the consequences would be.

Figure II-2.

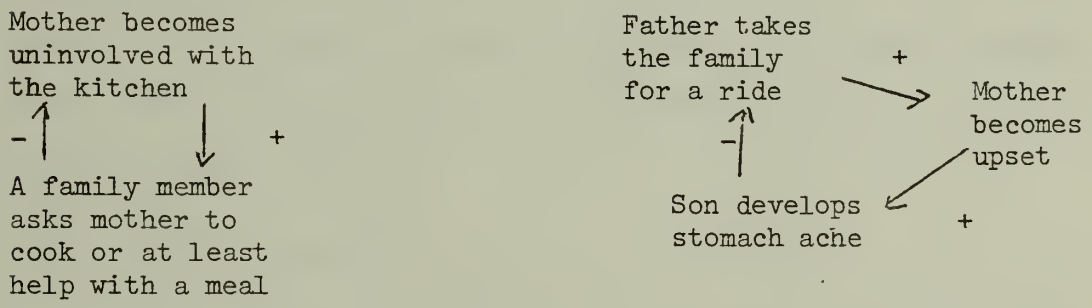
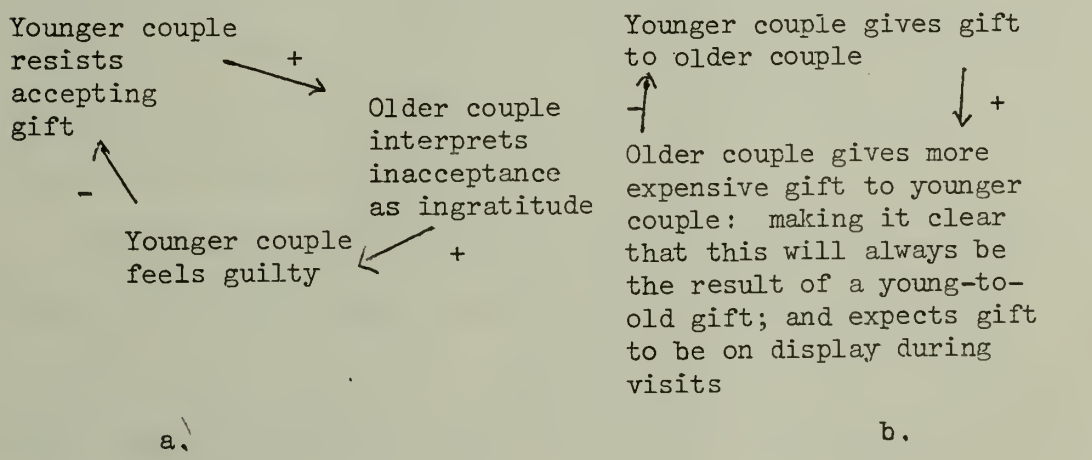


Figure II-3.



Note the relation of these feedback cycles to the ways in which the extended family served the older couple's purposes. The family provided the parents with a context in which they could be parents. When the family threatened to cease providing that context, the parents did not accommodate to the new situation but actively returned it to the way they wanted it. The inter-relatedness of family roles gave the older couple some control over the behavior of the younger couple. The constancy of purpose is what makes families homeostatic; families and family members will act to achieve their goals in the face of environmental changes which deviate them from pursuit of those goals. Because of the inter-relatedness of family roles, family members can make use of negative feedback cycles to maintain homeostasis.

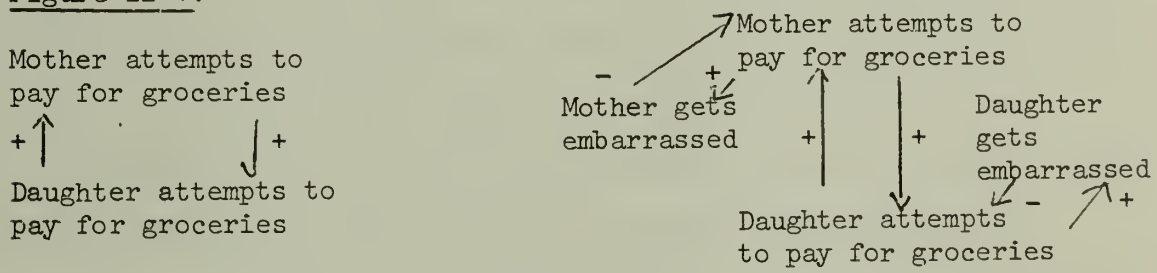
2.22 Positive feedback.

Cycles of mutual causation will sometimes increase rather than decrease deviations from the norm. This happens when there is an even number of negative links in the cycle, and such a cycle is called "positive feedback". Positive feedback occurs when the result of a deviation from a norm increases the probability that a similar deviation from the same norm will occur.

The young wife and her mother-in-law entered positive feedback cycles in the supermarket as the effort of each one to pay for groceries caused the other to increase her own efforts. Compare Figure II-4a with Figure II-3b. The actions of both parties are quite

similar. But in II-3b, the daughter-in-law is aware of the unwanted consequences of her efforts to be independent, so the mother-in-law's action has the effect of reducing the younger woman's independence efforts. In Figure II-4a, the older woman's actions only spur the younger woman on. The difference may be due to the first situation happening in the relative rationality of a livingroom discussion with the husband, while the second happens in the heat of interaction in the supermarket. In any case, the result in Figure II-4a is a blow-up, which is often the case in positive feedback. Obviously, such a phenomenon is self-limiting. In the present example, the mother-in-law's persistance wins out, and the cycle breaks down. A possible view of this is in Figure II-4b where the positive feedback loop is attached to two negative feedback loops. The daughter-in-law's loop is, in this case, a more important factor, perhaps because this is the supermarket in which she usually shops, and eventually she becomes too embarrassed to continue fighting. In other cases, a positive feedback loop may result in the development of a new norm.

Figure II-4.



It should be noted here that whether a given cycle is labelled "negative" or "positive" feedback depends on how the norm is conceptualized, and this is never entirely determined by "the facts". In the discussion above, the norm was considered to be calm, reasoned communication. Each person's deviation from this norm, by rushing to pay the bill or by grabbing money from a cashier's hand, induced the other person to deviate even further from the norm. Seen from the mother's point of view, however, the causal cycle is one of negative feedback. The norm is the mother's superior position relative to her daughter-in-law's, and the mother's increasingly drastic actions are intended to reduce the daughter-in-law's deviations from her inferior position. Thus, to refer to a situation as being a "negative feedback cycle" or a "positive feedback cycle" says something about the way that situation is being viewed in addition to saying something about the situation itself.

An implication of positive feedback is that a small change effort may have a great impact. In the present example, the existence of the grocery bill or the matter of fact attempt on the part of one person to pay the bill is really a minor event. It does not even matter who made the first attempt to pay for the bill. But the relationship is such the small event snowballed into a large one. In a system where a person's actions may increase the probability of increasing that action, one would be misled to pay too much attention to initial conditions or change efforts and too little attention to

relationships. (See Maruyama, 1968; and Wender, 1971, for a deeper discussion of positive feedback and its relation to behavior.)

2.23 Symmetrical and complementary relationships.

As was discussed throughout section 2.1, each family member is dependent on the others' roles to provide the context for his own role. In some instances, a family member may want to play a role which involves being different from another member, perhaps by being superior in some way. This, of course, will entail the other member's being inferior to the first. A relationship characterized by a necessary difference between roles is called "complementarity". In our example, the mother-in-law wanted to be a mother which entailed the young husband and his wife playing the complementary role of child. Complementary relationships are relatively easy to maintain through negative feedback if both members want the relationship to be maintained. A father who wants to play the role of a father can bring his son back into line by, for example, reminding him to cut the lawn. The son can bring the father back in line by asking for guidance or support or by misbehaving so much that he will have to be punished.

There are difficulties when, as with our example, one member wants to have a complementary relationship with another who does not want such a relationship. The use of negative feedback from the desiring member may be strong enough and skillful enough to bring the relationship off. This happened in our example, at least up to

the point of therapy. Another possibility is for one or more members to change the way he views the relationship or the possible change in it in such a way that both members are comfortable with the relationship. After the younger couple's visits with the therapist, the parents felt they had spoiled their children. As a result, they became parents in a way that their children could accept. Other possible results of the situation would be for the one who wants the complementary relationship continuously try to bring it off but fail, or give up, or for the other to give up and accept his own role complementary to that taken by the other.

A relationship based on roles which are in some way similar is a "symmetrical relationship". In our example, the younger couple tried to establish a symmetrical relationship with the older couple, a relationship based on equality among adults. There were difficulties here because the parents wanted the relationship to remain complementary. But even when all parties want a relationship to be symmetrical, problems may occur. The members will, of necessity, differ to some extent in the way in which they wish to be the same. If for example, members of a couple wish to consider themselves to be equals intellectually, one of them will have made the last witty comment. A correction attempt is likely to be imperfect and is likely to reverse the imbalance. The "one-down" member will refute or top the witty remark made by the other. A possible result is for the members to be constantly bickering over relative position,

caught in a positive feedback cycle, each member's victory causing an attempt in the other member to top it. (See Albee, 1962, especially as treated by Watzlawick et al., 1967). Another way out of this difficulty is for each member to accept some range of tolerance of being "one-down". It would then not be so urgent for each member to immediately right the situation when he is in a slightly inferior position.

2.24 Family myths and homeostasis.

Family members may not always want to admit or face their needs to play certain roles. The older couple in our example would probably not want to admit its need to be parents; related to this, the couple was probably not aware of that need. A myth is sometimes created by the members which gives a more acceptable cover story for their behaviors. As a family, the older has a myth that it gives presents to the younger couple out of devotion wanting to "do what is best" for the youngsters. (Ferreira, 1963), describes family myths as:

> a series of fairly well integrated beliefs shared by all family members, concerning each other and their mutual position in the family life, beliefs that go unchallenged by everyone involved in spite of the reality distortions which they may conspicuously imply.
>
> What is noteworthy in this formulation is that 1) the issue of literal belief is not central; and 2) the function of the deception is relational.

In our example, the parents apparently did literally believe their myth. The myth does solve problems of relationship, however. It allows the parents to have the relationship they want with their son and his wife without considering what that relationship really is or whether the younger couple wants it too. It also provides a way for the parents as individuals to deny they have any interest at all in the situation. ("Your father-in-law would just be furious with me if he knew I let you pay for the groceries," or, "Son, it would just break your mother's heart if you didn't accept this dining room set she and I spent two weeks shopping for, not to mention $8,000.") One wonders whether there is not an obverse to this situation. The children may have been perpetuating a myth of their own, namely, that they did not enjoy being pampered and were in no way contributing to the older couple's constant gift giving.

Another example comes from a colleague of mine whose parents cannot accept his living with a woman to whom he is not married. Recently his parents confessed to him that they talk about the young couple, both with themselves and with friends, as being married. They have begun referring to the woman as their daughter-in-law in her presence. For the older couple, this myth is preferable to consciousness of the son living in sin. To the younger couple, conditions under the myth are far preferable to the stormy relationship before it. No one in this situation literally believes the myth, but it still maintains relationships in a desirable state.

Like negative feedback, family myths maintain homeostasis; a myth usually implies that what is being done is what should be done, and so provides impetus for things to remain the same in face of forces for change. The parents can choose and buy a house for the young couple over its protests because they are "only doing what is best." The parents of my colleague can talk with pride about their son to friends who might disapprove of his living in sin.

Usually, one accepts a perception of an event if it is shared by all of the participants in it. (See Kelley, 1974). When all of the participants have reason to distort their perceptions in the same way, however, such faith may be misplaced.

2.25 Equifinality and multifinality.

In a mechanistic system, as a rule, changing the initial conditions of a situation will change the final conditions. If billiard balls are arranged differently on two billiard tables, a cue ball shot identically on the two tables will result in different final arrangements of the balls.

In a family, there may be no end effect of a change in initial conditions. Whether the wife tried a little, a lot, or not at all, she would not pay for the groceries. The husband could tell his father once or a hundred times not to work on his car, but the father would work on it anyway. Negative feedback reduced the impact of differences in initial condition. The tendency for families to achieve the same end state regardless of changes in the beginning

state is called "equifinality".

Positive feedback has the opposite effect; it can create large differences out of small differences of initial conditions. For example, the introduction of a bill for 65¢, say, to have a key made, could have created an intense confrontation between the young wife and her mother-in-law. Though no word appears in the literature for the tendency of families to amplify differences in initial conditions, "multifinality" will do. The term indicates that two situations with almost identical initial conditions may result in very different final conditions.

One implication of the notions of equifinality and multifinality is that it may be more important to look at the structure of a system than at initial conditions. As is seen in the case of the son trying to stop his father from washing the car or in the case of the mother and the daughter-in-law battling over a grocery bill, there may be little explanatory value in investigating who did what when. The structure of the family may be what ultimately determines interactions. The structure may be such that a random event may get blown up into a destructive family argument, or it may be such that nothing that a given family member can do will bring about a desired change. It would be a mistake, however, to look for the cause of an argument over a grocery bill in who it was who first attempted to pay the bill.

2.26 Section Summary

In summary, the existence of purpose and the interrelatedness of

roles in the family make change and stability in the family a rather intricate matter. Causal cycles are common, and these may act to amplify or to dampen deviations from normal conditions. The nature of the cycles may be influenced by complementary or symmetrical relationships. Homeostasis may be maintained through negative feedback or by family myths. Such factors as negative and positive feedback, equifinality and multifinality, and family muths may make it difficult to know what is happening in a family, to infer what happened earlier or to predict what will happen later. These factors also call for different techniques to understand the family than to understand a mechanism.

2.3 Communication in the Family[3]

Watzlawick et al., (1967, pp. 48-49) equate "communication" with "influence". That is, to communicate with someone is to influence that person's behavior, thoughts, or feelings. They therefore see all behavior as being communication:

> If it is accepted that all behavior in an interactional situation has message value, i.e., is communication, it follows that no matter how one may try, one cannot <u>not</u> communicate. Activity or inactivity, words or silence all have message value: they influence others and these others in turn cannot <u>not</u> respond.

In previous sections there has been discussion of reasons family members have for wanting to influence each others' roles and behaviors,

and directions in which members might want to change each other. This section will consider the dynamics of those change attempts.

2.31 Communication and assimilation.

It is equally factual or valid to refer to a situation as a father spoiling his son, a father smothering his son, a father being generous to his son, a son accepting money from his father, or a son being made to feel grateful. In any situation within a family, each member will assimilate the event in his own way. Part of what determines how a person will assimilate a given situation is the homeostasis of that member as a system himself. Consider the father in our example. He needs to see his gift giving as generosity, concern for his son, something his wife wants him to do, and something that will make his son freer. He also needs not to see the gift giving as part of his need to be a father. Because a person is a system (Piaget, 1971), none of these needs can be changed without simultaneously changing much else in the father's needs and beliefs. The father is likely to interpret events within the family in ways consonant with the ways in which he needs to see the family. He will, of course, see his own actions as being good actions. He will hear his son's refusal of a present as an insult to himself or to his wife. He will receive a present from his son as an indebtedness to his son which must be repaid. In general, because the members of families are themselves systems, communication attempts need not be interpreted as they were intended, nor are their perceptions of a

situation necessarily the same.[4]

2.32 Content and relationship aspects of communication.

Students of human communication have found it useful to distinguish within it two aspects: content and relationship. (See Watzlawick et al., 1967) The content aspect of a message is that which is communicated through the meanings of the words in the message The relationship aspect, given by the way in which the words are said and the context in which the message is given, is what the message say about the relationship between the speaker and the listener. The message, "Son, happy anniversary. As a surprise, your mother and I have bought you a new set of furniture for the dining room which will be dilivered at 7:30 tomorrow morning," has a content about comings and goings of furniture. The message also implies that the father-son relationship is such that the father can pick furniture for the son without consulting him, can have the son inconvenienced without second thoughts, etc. It is easy to miss the relationship aspect of a message because the content of it is usually more clearly defined; the content is explicit and the relationship is implicit.

The same message may carry contradicting meanings in its content and relationship aspects, producing a paradoxical communication. A father may tell his son to treat him as an equal, in a message that implies the relationship is such that the father is superior because he can tell the son how to behave. Such a message might produce

tension and confusion if, for example, the father assimilates the content aspect of his own message and the son assimilates its relationship aspect.

2.33 Metacommunication and its role in stability and change.

Another aspect of human communication is that persons can metacommunicate, that is, talk about the way in which they talk. Metacommunication can provide a homeostatic mechanism as when two people decide they have not been communicating the way they would like to. Metacommunication can also provide a positive feedback mechanism as when two people begin to talk about their family in terms of general system theory. The more they use that language, the better they are able to use it, the more applications they find for it, and the more they will continue to use it. Eventually, the increased use of that form of analysis will reach diminishing returns, and the use will level off.

In summary, communications within the family are not received directly but are assimilated to the receiver's network of needs, beliefs, and concepts. Messages also have both content and relationship aspects. And a family's way of talking can themselves be the object of conversation which can contribute either to the family's stability or to its change.

2.4 The Openness of the Family

As family members cannot be studied apart from each other, the family cannot be studied apart from systems with which it interacts.

If an Arab oil embargo prevented the parents from visiting as often, the problem might change. If the parents' savings were wiped out by the failure of a business organization, things might be different. Consider also that the younger couple itself constitutes a family; clearly, this family cannot be studied apart from the older couple, which is another system with which it interacts. could be extended indefinitely. There are two important points here. First, what is troubling a family may come, in a sense, from outside the family. The younger couple seemed to do alright with each other; its problems had to do with the relationship with the parents. Second, a family's problems may sometimes be aided by making changes in another system. Again, this family's problems ended by changing the behavior of the parents. (For a more complete treatment of interactions between the family and other systems, see Bell and Vogel, 1960.)

2.5 Family Therapy

The preceding four sections have given a means of conceptualizing the family and its problems. Family roles are seen as interdependent, the family has change and stabilizing mechanisms which distort change efforts, communication in the family is humanly rich and complicated, and the family is seen in the context of systems with which it interacts. This section will sketch some ways of conceptualizing change attempts based on the previous descriptive models.

The section is divided into subsections on data collection, problem definition, and intervention, although, as might be expected, these areas cannot be cleanly separated from each other.

2.51 Data collection.

The therapist gathering information about a family is not in the same position as the physical scientist who in a detached and straight-foward manner investigates an area of interest to him. This subsection will explore some of the complications of data collection in the family.[5]

2.511 The effects of family myths on data collection. As was noted in 2.24, family myths can be misleading because there is a tendency to see consensus as an indication of truth. If the older couple in our example had for its own reasons seen a therapist, he might at first assume that they were generous and thoughtful and that the younger couple was truly grateful to have such loving parents. This mistaken impression might have had implications for therapy.

Ferreira (1963) indicates there are two major kinds of myths. In one, the myth is that everyone is happy, and the family is seeking therapy in hopes that the therapist, without disturbing the way the family does or perceives things, will restore the myth. In the other kind, the myth is that only one member is unhappy, and therapy is sought to promote change in the unhappy member (while leaving the supposedly untroubled members unchanged.) Again, each type of myth will be deceiving in its own way relative to what is

happening in the family. Also, the myth may, once discovered, give important cues as to what underlies the problem. If the older couple in our example sought therapy, it might prove useful to the therapist to discover the parents' need to be parents.

On the other hand, it may be easy to see a myth as the cause of a problem which might imply a need to explode the myth. The younger couple's therapists might have been tempted to confront the parents with the reality of their behaviors, that they were oppressing the younger couple and that they stemmed from a need to be parents and not from generosity. The problem was resolved, however, without touching the myth. The same is true of the example, discussed in subsection 2.24, of the woman who was referred to as "daughter-in-law" by the parents of the man she was living with but not married to. It might seem pathological for the parents to refer to her as their "daughter-in-law" when they know she is not, or for the younger couple to accept this labelling when they know it is not applicable. These distortions of reality, however, bring the family system into equilibrium with itself and with important interacting systems, and so are preferable to any alternative available. The myth is not a pressing problem.

2.512 The "family + therapist" system. Haley (1972) notes that the therapist is not a detached observer of the family, but that the therapist is a member of the larger system of the "family + therapist". The therapist has his own needs and his own effects on that system

and is effected by it. Haley sats that the beginning family therapist:

> will say that the family members are hostile to each other; the more experienced therapist will say the family members are showing me how hostile they are to each other. This is not a minor distinction. As a consequence, the more experienced person does not think of the family as separate from the context of treatment, and he includes himself in that context. He will consider, for example, whether the particular difficulty he sees between a husband and wife is created by the way he is dealing with the couple. (p. 266)

There are at least two ways in which this larger system can distort information. First, as Haley notes, the therapist adds his interventions, and even his data collection have an effect on the family. It would be a mistake to ignore the therapist as a factor in the family's behavior. Second, the family has an effect on the therapist. It is difficult for anyone to be actively present with a family heatedly working out its difficulties without becoming embroiled in them himself. Family therapists talk of alternately being pulled into and pulling themselves out of the family system, and the difficulty has led to what Haley (1969, p. 107) refers to as "The Chuck it and Run School" of family therapy, in which the family discusses its problems alone while the therapist listens and watches from an adjoining room, entering only occasionally to prod or redirect the family.

One means of coping with the above problems is to discuss the case with another therapist who is not embroiled in it. Another

solution used is for therapists to work in teams so that each has some perspective on what the other is doing.

2.513 Collecting data about "non-problematical" parts of the system. In a mechanistic approach, there is a tendency to collect information only about what seems problematical. In families, it may be necessary to collect information about others in the system, to find out others' perceptions, or to obtain information about or from people outside the system. In our example, the therapist could not deal with the young couple's problem of husband-wife blaming and tension without information about the parents. Because individual family members perceive and represent family events in ways that maintain their own homeostasis, any one member's perceptions cannot necessarily be accepted as true or complete.

2.52 Problem definition.

Like other situations, problem situations are not self-defined. The data themselves do not dictate whether the problem is that the parents want to dominate or that the children do not accommodate to the parents' wishes. There is some consensus among family therapists as to how problems should be defined, which has implications for what intervention should be made and how data should be collected and interpreted.

2.521 Defining the problem as in the system and not in the individual. It is easy to focus on family members who appear most deviant and to consider them to be the cause of problems; such a

focus would lead a therapist to collect data on the personalities of the "sickest" members, to look at those members as the source of the family's problem, and to intervene at the point of those members. In our example, this would have meant that the parents would be focussed on because of their excessive need to be parents; the children would not be focussed on because their needs for independence are, in this culture, considered normal. A therapist might then want to know more about the parents' needs and their origins, might want to see in what ways their needs cause problems, and might try to bring the parents into analysis in order to relieve them of their need. As it was, the therapist saw the problem as having at least three aspects: the parents' needs to be parents, the children's provision of a context in which the parents could be parents, and the children's needs to be independent. The focus fell on the second aspect, and this was examined to determine how the children could stop providing that context. Thus, the intervention was a change in the children's behavior rather than in the "abnormal" behavior of the parents. In general, a family therapist will see a problem not as being part of an individual but as part of the family system and as indicative of the way the behaviors and needs of all family members are interacting.

2.522 Defining the problem as being currently caused and solvable. Haley (1972) relates a story about a young therapist whose client family had a problem that seemed unsolvable. She asked a more experienced therapist what he would do in that case, and he replied,

"I would never let that be the problem." Given that the problem must be defined by the therapist he might as well define it as something he can do something about. This is not like searching under the streetlamp for car keys lost at the dark corner, however; judging by their writings, therapists seem confident that there is always something that can be done to lessen a problem, and there is rarely a need for a therapist to try to solve a problem that seems insolvable.

If a problem is to be solvable, it must be currently caused as the present is the only time in which interventions can be made. Family therapists therefore tend to define problems as being currently caused. Again, this is not turning the back on "real problems." Regardless of what events in the past brought about a family's or a person's problems, family therapists find ongoing situations and the ways in which family members interpret them to be crucial to understanding the present situation. Again, nothing is gained by trying to change something in the past; family therapists tend to focus on the present, investigating the past mainly to help understand the present.

In our example, the therapist did not define the problem as being the parents' needs to be parents. He might have so defined it were a restructuring of the parents' needs an easy task. As it is not, especially given that the parents themselves would probably not want to know they had that need and also that they did not see the family as having problems, the therapist defined the problem as

lying in how the children acted when with the parents. The focus here was not in how the children came to act the way they did, but rather on how the children might change their behavior to their own benefit. Their current behavior was something the children could do something about, especially given that the children saw difficulties in the current situation.

2.523 Malfunctioning. Up to now, a problem has been defined as a solvable, currently caused malfunctioning in the family system. Nothing has been said about what a "malfunctioning" is, and little is written explicitly about this in the family literature. The definition of the problem to be worked on seems to be a combination of the clients' complaints and notions of what the problem is, the therapist's reading of the family situation, and the therapist's notions of what a healthy person and a healthy family are. Little is said about how these factors are integrated, and Watzlawick, et al., (1974) say that even people who are very successful in bringing about change do not know how they do it. It might be said that a problem occurs when a family does not fulfill its purposes; this is helpful to know only when it is clear what the family's purposes are; whether to change the family's functioning or the family's purposes, and how to bring about the desired change.

In our example, the clients, after discussing their problem with the therapist, defined their goal to be the father's saying, of his own accord, "You are now grown up, the two of you will have to take

care of yourselves." (Watzlawick, et al., 1974, p. 119). The therapist saw this as an attainable goal which, when attained, would make the family members happier with the family. In some situations (see Ferreira, 1963) the therapist will consider the problem to be something the clients do not believe is problematical. In such a situation, the clients may break off therapy because they feel the therapist's interventions are not directed at what they consider to be the problem. The therapist, however, may be satisfied with his work if the problem, as he defines it, is solved.[6]

2.524 The interrelatedness of diagnosis and intervention. Haley (1972) quotes an experienced family therapist as saying that "evaluation of a family is how the family responds to your therapeutic interventions." In our example, the younger couple's attempts to achieve independence by trying to pay for bills and by sending the parents presents could be seen not only as change attempts which failed but also as successful data collection; the younger couple had a picture of the parents as being people who would listen to reason, and the change attempt showed this picture to be wrong. There are several reasons why data collection cannot be separated from intervention in family therapy.

First, the sheer complicatedness of families makes it likely that the therapist's impressions of the family will be in some ways mistaken. The only way to correct such mistakes is to act on the impressions the therapist has. If an intervention attempt does not work, that is an indication of how the family differs from what the

therapist thought it was.

Second, there may be a need to see what behaviors members have available to them which they do not exhibit in the family system. It is easy to mistake a member's role for the member himself. By changing some aspects of the family dynamics, "new behaviors" of family members can be seen. Watzlawick et al. (1974, p. 120) discuss a husband who, according to his wife was always argumentative. The couple's frequent arguments seemed always to be started by the husband, and it would be easy to see him as having a need to fight. When the wife was instructed not to react to his provocations, however, it was seen that he was quite capable of living in harmony with her.

The third reason why problem definition cannot be separated from intervention is more theoretical. The therapist is usually not trying to obtain an objectively accurate and complete picture of the family and its dynamics. Rather, he collects data in order to help him improve the family's functioning. In a sense, the therapist assimilates the family and its problems to the interventions available to him. What he wants to know is what intervention will be the most effective. The results of intervention attempts therefore provide just the data the therapist is looking for.

2.53 Intervention: how, where, when, and by whom.

2.531 Where intervention is made. According to a mechanistic view, intervention is made at the point of the sickest member of the family. The family therapist, however, sees the behaviors and

perceptions of all family members as contributing to every problem. He therefore intervenes where he has the most leverage, that is, where he can bring out the greatest benefit through the least effort and strain. Some factors contributing to leverage are the following:

a. Who has the most motivation to change. In our example, the younger couple would put much more effort into a change effort than would the older couple because the former felt a greater need for change than did the latter.

b. Intervention should be made where positive feedback will increase the effects of the change effort and not where negative feedback will decrease its effects. The early attempts of the younger couple to become independent through opposing the attempts of the older couple to pay for things failed because negative feedback negated the attempt. A possible effect of the intervention actually made would be a positive feedback cycle between all four members' enjoying the younger couple's independence and all four working to make the independence work better.

c. Intervention should be made at a point where the therapist can construct a way to change things for the better. One reason why it did not make sense for the therapist to try to reduce the parents' need to be parents was that he just did not know any easy ways of bringing that about.

d. Intervention should be made in areas whose character is more determined by current than by past events. Again, the younger

couple's behavior was determined more by its current needs and current assessment of the situation than by habit and past events; the parents' personalities, on the other hand, had been shaped over a long time.

2.532 When intervention is made. It has already been emphasized that family members' reports of family events cannot be taken as statements of objective truth, and that the family is so complicated that data collection cannot be separated from intervention. In addition, part of a family's problem may stem from the family's inability to notice or to talk about factors contributing to the problem. It therefore becomes necessary at times for intervention to be made during a family's interaction rather than intervening by discussing past events or by planning a way to handle a future event differently. (In our example, the situation seemed clear enough and the younger couple's perceptions seemed clear enough that the intervention could be planned before the event and evaluated afterwards.)

2.533 By whom intervention is made. Interventions can be made by family members or by a therapist. Both the therapist and the younger couple devised and enacted change plans for the family. In some instances the same intervention will have different effects depending on whether it is made by the therapist or by a family member. Very briefly, some of the ways in which the personality of the intervener may be significant follow:

a. Some requests and statements become nonsensical when made

by certain people. The therapist may tell a child to be more independent of its parents, and the child can either comply with the command or disobey it. But if the parents ask the child to be independent of them, he can only become independent by complying with their request, i.e., by showing dependence on them. And if the child remains dependent on his parents, his doing so is a disobedience to their order, that is, an act of independence from them.

b. An intervention is usually more effective when made by someone trusted and respected. Sometimes this will be a family member and sometimes a therapist.

c. Intervention is better made by someone with distance on the situation,i.e., the therapist.

d. An intervention might take certain skills, which only some people in the situation might have.

e. Preexisting patterns of communication among family members will in some instances facilitate and in other instances interfere with a given intervention.

2.534 How to intervene. Among the kinds of change strategies employed by family therapists are the following:

a. First and second order change. First order change is an increase or an improvement in what some member is already doing. If what the person is already doing is part of a negative feedback cycle, a first order change may bring about its own ineffectiveness

by energizing a counter-change effort. When the young couple increased its at first mild demands for the right to pay its own bills, it also stimulated the older couple to increase its efforts to pay those bills. By doing more of what it was already doing, the younger couple also energized the older couple's counter-change efforts, and the first-order change attempt failed.

Second order change attempts to alter the feedback cycle rather than to work within it. Often this is done by attempting to do less of that was done before. In our example, the younger couple achieved independence by being more dependent. Looking at the entire cycle, it is clear that the parents' "problem causing behavior" was in fact stimulated by the children's "problem solving behavior". By removing the opposition to the parents' behavior, the children allowed the parents to see the situation as one they themselves were not comfortable with, and the parents themselves were able to break out of the old pattern.

b. Changing behaviors or changing perceptions. It is easy to focus on behaviors as problem causers and to ignore the contributions of how behaviors are interpreted. Most change efforts will eventually result in changes both in how family members behave and in members' perceptions of what is happening in the family, but the intervention can be directed initially to one of these. "Reframing" is a change in how a member perceives a given event; often behavior change is most easily effected through reframing, which is itself a second-order

change. In our example, the younger couple at first tried to change the parents' behavior directly, for example, taking care of the bill the parent was about to pay for. By becoming obviously dependent on the parents, a reframing was achieved. The parents saw their behavior in a different light. Instead of seeing it as generosity, they saw it as spoiling, and they therefore stopped it.

It might have been necessary to change the way the family members talk about how they discuss their affects on one another. That is, a change in metacommunication might be necessary. This might happen where a family always gets into fights about who was to blame whenever it discusses arguments it has had. In such cases it might be beneficial to restructure such discussions so that the focus is no longer on "who is to blame" but rather on how family problems can be solved.

c. The double-bind. Just as there are requests which cannot be complied with (see 2.533a or Watzlawick et al., 1967, Ch. 6), the therapist may make use of communications which must be complied with but which embody contradictory yet imperative messages for the receiver. Such communications are referred to as "therapeutic double binds". A common application of double-binds is situations in which part of the patient's problem is resistance to therapy. If a therapist suspects that the client has a need to differ with him, he may suggest that the patient's problem is so great that there is little hope for its resolution. The client's need to show the therapist he

is wrong binds him to falsify the therapist's prediction. That is, in order to prove the therapist wrong he must improve. The client is doubly bound because there is nothing he can say or do that can alter the situation. He cannot leave therapy without confirming the therapist's analysis. He cannot disagree with the therapist except by saying "I am curable".

e. Use of feedback. Another form of intervention that is useful is to introduce a feedback cycle which will either multiply a change effort or dampen an existing problem. An example of the former was given in 2.53 1b. The achievement of independence by the children might bring about positive changes in family relations (the children might be able to look forward to the parents' visits and they might become more enjoyable) which might lead everyone to work towards making the independence work even better.

An example of the latter is given by Watzlawick et al. (1967, 248-249). A college student found herself unable to get out of bed before ten o'clock, and was therefore missing her eight o'clock classes. She was instructed to set her alarm clock for seven. If she was not out of bed by seven fifteen, she was to reset the clock for eleven and not get out of bed until the alarm went off. Also, if she failed to get up by seven, she was that night to set the alarm for eleven and not get up the next morning until it went off. At that point she would be allowed again to set her clock for seven, and restart the cycle. The student did not make it out of bed on

time the first morning, and thus had to spend that morning and the next in bed until eleven, doing nothing (she was not allowed to read or listen to the radio), though she was wide awake both mornings at seven. The prospect of being totally bored for four hours got her up the third morning and every morning thereafter at seven o'clock. The problem, her tendency to stay in bed too long, was made to bring about a situation, her having to stay in bed bored for four hours, which reduced the likelihood of her problem being enacted.

2.6 Chapter Summary

Five aspects of the family as open system have been explored. First, the family roles are seen as being interdependent. As a consequence, no role can be investigated in isolation, and nothing in the family can be seen as being totally caused by one member. Second, causation within the family is seen as being in cycles. There are negative and positive feedback cycles, sustained by family myths and by symmetrical and complementary relationships, and resulting in equa- and multifinality in the family system. Third, communications within the family take on the complications of human communication in general. Homeostasis on the part of individuals distorts communication, messages are seen as having content and relationship aspects, and communication about communication takes on a special role. Fourth, the family is seen as affecting and being affected by other systems. Fifth, some aspects of family therapy were explored. Data collection was seen as being complicated by the family's own complicatedness,

and therefore not cleanly separable from intervention. Problems were seen as being defined (as opposed to discovered), and they are to be defined as in the family (as opposed to being in an individual) and as solvable. Finally, a number of kinds of intervention were discussed.

Notes-Chapter 2

1. I use the word "role" to refer either to a consistent behavior pattern a person exhibits in a system or to a way in which a person consistently contributes to the system's purposes. When I write of someone "playing" a role or "making a move" I do not imply that people play at their roles or do not take them seriously. The implied similarity between games and life is that both entail patterns of behavior that are in some sense governed by rules.

2. For a more complete discussion of feedback cycles, see Maruyama, 1968.

3. For a more complete discussion of communication in the family, see Watzlawick et al., 1967.

4. Piaget is related to G.S.T. both conceptually and developmentally. Piaget and von Bertalanffy cite each others' work as having supported their own. On the conceptual level, two aspects of Piaget's work stand out as being consonant with G.S.T. First, Piaget sees aspects of a person's knowledge as being interdependent. The child's concept of volume is seen as being related to his concepts of equality, length, and multiplication, and changes in one concept are seen as liable to produce or to depend on changes in another concept. Second, Piaget sees cognitive growth as being maintained by a drive for equilibrium among the person's cognitive structures and between those structures and the person's environment. The equilibrium aspect of Piaget's theory is consonant with a view of organisms as

being goal-seeking, although Piaget does not make this connection explicit. In both these regards, Piaget's theory contrasts sharply with Skinner's mechanistic behaviorism which views cognitive growth as the accumulation of independent responses, and which specifically prohibits introduction of teleology in scientific exploration. For a more detailed exploration of these questions see Piaget, 1970, 1971, and Koplowitz, 1976.

5. Heisenberg (1956) disputes the notion of detachedness for even the physical scientist.

6. The willingness of some family therapists to decide that an area is problematical which the client says is not problematical is perhaps related to the G.S.T. notion of communication as not being straightfoward, and of the family's being so complicated that an outside expert is needed to see it clearly. If, for example, a client states that a given area of his family is not the problem, he may be using that statement to draw attention to that area of his family because, at some level, he does see it as problematical. Also, because of family myths (as well as other complications discussed in this chapter) a family member may not have a clear picture of what is causing problems in his family. Nevertheless, the therapists' willingness to define clients' problems for them raises serious ethical questions. Does not the client as consumer have the right to determine what services he is paying for? If the therapist,

as expert, can claim authority to determine right and wrong, cannot the politician claim the same authority? The G.S.T. influenced therapists make it clear why they would be uncomfortable with the client's playing the sole problem defining role, but they do not indicate how resulting ethical difficulties could be resolved.

CHAPTER III

THE COLLEGE CLASSROOM AS AN OPEN SYSTEM

The previous chapter explained what it means to look at something as an open system and introduced some conceptual and change models used by G.S.T. influenced family therapists. This chapter will demonstrate how to look at the college classroom as an open system and will apply to the classroom some of the conceptual models developed by family therapists. Section 3.1 will discuss the applicability of G.S.T. notions to the college classroom. This section draws general guidelines for when it does and does not make sense to look at the classroom as a system. The remainder of the chapter will for the most part follow the outline of the first four sections of chapter two, discussing the role interdependence, stability and change, communications patterns, and openness of the college classroom. Some notions discussed in Chapter II will be expanded and discussed in greater depth in this chapter. This chapter should not only explain how to apply these concepts to the classroom but should also show that G.S.T. notions are generally applicable to the classroom. Thus a wide range of examples will be given from my experiences as a teacher and as a student. Because the notions are applicable to teachers with values different from mine, examples will also be taken from classrooms I have become familiar with as a teaching improvement specialist[1], through talking with other teaching improvement specialists, and from the literature. Also, an attempt

will be made to indicate common classroom situations in which the notions can be usefully applied.

3.1 Viewing the Classroom as an Open System

The position has been taken here that the systems view is not more correct or true than the mechanistic view, only more powerful under certain conditions. This section will delineate some conditions under which one approach or the other is likely to be more powerful. Unfortunately, there are no general guidelines to follow in making such a delineation. Kuhn (1962), for example, writes of the fit between situations and scientific paradigms, but he does not specify how the fit is to be measured. The apprcach here begins with a consideration of situations in which classrooms do not clearly demonstrate nonsummativity, purpose, and openness as these notions have been expanded in chapter two. Then, some general guidelines will be drawn about when it is and is not useful to view the class as an open system.

3.11 Role interdependence, goal seeking, and openness in the college classroom.

3.111 Role interdependence in the college classroom. Von Bertalanffy offers two models in opposition to nonsummativity and the resulting role interdependence in systems. "Independence" is the state of a group in which no one's behavior affects or is affected by anyone else's behavior. "Centralization" is the state of a group

in which one key figure determines everything that happens in the group, while other members' behaviors do not affect anyone's behavior.[2] Total independence is unlikely in a college classroom because the teacher so typically has and uses power to influence student behaviors. In the very rare instance the teacher may not care what the students do, or the students may not care about the sanctions the teacher can bring to his attempts to influence students. Usually, however, the teacher has influence over students, and if a class seems not to demonstrate nonsummativity it is because it is centralized and the students do not influence the teacher or each other. Students may not influence the teacher if the teacher refuses to be influenced by them, as may happen with a teacher who does not care about his teaching or who believes that students should have no say in the running of the class. Student influence will also not happen if students do not try to influence the teacher; this may happen in a large class because the individual student feels powerless to change the class, because the students do not feel they have the right to change the class, or because the teacher has structured the class, perhaps in a lecture, to minimize the ways in which students can influence what happens in the class.

In contrast, a highly interactive class will be more clearly nonsummative. Different areas of interactivity can be distinguished. On the level of content, a discussion class will be more clearly nonsummative than will a lecture. In a discussion, what the teacher

says will be highly dependent on what students say and vice versa. Another level of interaction is discernable in a class in which both students and teacher play a role in deciding how the class will be run. Although it is very rare for an undergraduate course to begin by the class members deciding collectively what the course will be like, some teachers do solicit feedback from students at several points during a semester, thus giving the student some influence over the course of the class.

Two comments should be made here to put the discussion of nonsummativity in perspective. First, independence and centralization should be seen as limiting cases of interdependence and nonsummativity. Every teacher is influenced to some extent by his students, though sometimes that influence is slight enough that one can afford to ignore it. Second, even if students' behaviors do not appear to produce significant changes in a teacher's behavior, the teacher is still dependent on the students. Even the teacher who reads the same lecture notes year after year ignoring student complaints would most likely not read his notes if no students appeared in class. This is a highly unlikely event, but the point here is not to confuse a constant effect with no effect.[3] Theoretically, all roles in the classroom are interdependent in all classes. This interdependence can be ignored, however, if there is little variation in the students' roles and if it is difficult to bring about any variation in the students' roles.

3.112 Goal seeking in the college classroom. The second property of classes as open systems is the purposiveness of classes, which shows in the tendency of class members to redirect the class when it is not fulfilling its purposes. Only in the extreme case will a teacher not be concerned about a course and not take action when students are not learning the material. Students, on the other hand, are likely not to try to change a course, especially in situations like required courses where the student is not interested in learning the course material and so will not take action when the course is not helping him learn that material. (Such students might, however, take action if the course threatened not to fulfill the students' goal of a passing grade in the required course.) Every class is fulfilling purposes for all of its members, else they would not be in the class. The purpose might be to collect a paycheck, to remain in college so as to continue receiving GI benefits or family support, to obtain a passing grade in a required course, or to be with peers, rather than such "high minded" purposes as to participate in a sharing of knowledge which are given broader coverage in the educational psychology literature. However, as was the case in interdependence of roles, purposes may not surface because their fulfillment is all but guaranteed. That a person is interested in a given course because it is required can be ignored until the person is in danger of failing; he will then take action to change the effect the class has on him. When purposes are sure to be fulfilled it may do an analysis no harm to ignore those purposes, but again, a guaranteed goal should not be

confused with no goal at all.

3.113 Openness in the college classroom. The third property of classes as open systems is their openness. Section 3.5 will outline the ways in which various types of courses interact with other systems. It should be clear, however, that every course is affected by events in the department in which it is taught, other courses the students are taking and have taken, as well as by factors external to the educational institution such as the economy, and so on. Again, when these influences are unchanging and unchangeable, they may not be noticed. One is not aware of the interactions between classes and furniture companies until a strike leaves the class without chairs to sit on. Similarly, if all departments had the same regulations one might accept to the point of not noticing it a department's "publish or perish" policy with its damaging effects on teaching. An analysis may not suffer by ignoring unchanging and unchangeable effects of other systems on the classroom, but this is not to say that those effects do not exist.

3.12 When it does and does not make sense to apply the G.S.T. paradigm to classes.

Section 3.11 made it clear that it is always strictly correct to speak of a class as a system, that all classrooms do have nonsummativity, goals, and openness. It also indicated conditions under which it is not crucial to view a classroom as an open system, and these have to do with effects which, because they are unchanging or

unchangeable, can be overlooked. For example, in large classes or where the teacher does the great majority of the talking and the decision making, one can often ignore the dependence of the teacher on the students. In required courses, where students may not be particularly interested in learning the course material, and in any class where members' goals are almost sure to be met, one can ignore purpose and self-correction of courses. And in any course affected only in constant ways by other systems, one can ignore the other systems and consider the effects to be simply properties of the class. (For example, as long as the supply of furniture is assured, one might say "People in this course sit on chairs" without apparent reference to systems external to the classroom. It is only in situations such as strikes when it is necessary to keep in mind that "Furniture for this class is made at the Fliet Furniture Factory".) In summary, to the extent that classroom members routinely provide each other with the necessary contexts for their roles, role interdependence can be ignored; to the extent that members' goals are routinely met, goal seeking can be ignored; to the extent that external influences are constant, the classroom can be considered to be closed. To the extent that all of these system properties are constant and unchangeable, the classroom can be considered to be a mechanism, although, strictly speaking, the G.S.T. paradigm is still applicable. In addition to these guidelines, there are two other considerations affecting a decision to apply the G.S.T. paradigm to classrooms.

The first consideration is one of language. The acceptance of a norm or of a convention may lead one to talk as though some classroom members had no effect on the class or no purposes. For example, a student with substandard reading and writing skills may have difficulties in a course. If the college expects all of its freshmen to have these skills above some standard, it might make sense to speak of cause in a unilateral sense. One might want to say that the student's failure in the course is not the teacher's fault but the fault of the student (or of his high school). To say that the teacher is not to blame for the student's failing grade is not to say that in reality the teacher played no causal role in the student's failure, for there is always something the teacher could do to prevent the student's failure. The teacher could have made it clearer to his students to begin with that certain skills would be needed in the class, the teacher could have provided tutoring for the student, the teacher could have lowered his grading standards for the students with below standard skills, and so on. To say that the student's failure is in no way the teacher's fault is to report a decision about what a college is for and what activities a teacher is and is not expected to engage in. It is to say that the college bulletin's statement that all entering students should have twelfth grade level skills is sufficient and that the teacher should not have to make an extra announcement, that the teacher is not expected to provide tutoring for students without the desired skills, that the

teacher should not lower his standards, and so on. In a case such as this, it may make sense to talk as though roles were not interdependent, but this is not to say that are not interdependent. And even here, there may be reason to say that a problem is a student's, but it might still make sense to intervene at the level of the teacher or elsewhere.

Similarly, there may be reason to ignore students' goals in a course. A teacher might have a philosophy by which course content and structure is for the teacher to decide, or the teacher might be interested in offering a particular course regardless of students' goals. The fact remains that the students' goals affect their behavior and therefore the teacher's teaching goals. The teacher may feel it is his right or his duty to make sure his students know facts X, Y, and Z before he gives them a passing grade in General Systems Theory 101, whether or not the students are interested in X, Y, or Z. But it still might be to the teacher's advantage to find out what the students are interested in as that might help him structure the course to better insure that the students will learn X, Y, and Z. In cases like this, it might make sense to ignore student goals when setting goals for the course, but that does not mean that students have no goals, nor does it mean that student goals should be ignored when structuring the course. And in general, there are times when it makes sense to talk of a class as though it were not a system, but that does not mean it is not a system.

Another consideration in the applicability of the G.S.T. paradigm is its use as an ideal. Some classes may not appear to be systems because there is little interaction between teacher and students or because students do not care about the class. Improvement strategies for such courses might entail making them more like systems. For example, a chemistry teacher consulted with me because his students were not becoming involved in duscussion sections of his course. He thought students were interested only in doing what was required of them in the course to pass the course as it fulfilled a science requirement. The course was behaving like a mechanism because the students made no effort to affect the behaviors of the teacher or of other students, and the mechanistic nature of the course was the problem. The solution was to make the course more systemic by tying it in more to the students' goals and by increasing student interaction in the class. I suggested to the teacher that he involve the students in the planning of discussions (not as to what principles of chemistry will be discussed but to what social areas these principles will be applied) and that he find out in the beginning of the semester what the students' goals were so that he could better demonstrate the connection between those goals and his own for the course. I also suggested that he break his class of 55 students into groups of four or five students to discuss issues or to work on problems; this will increase the interaction among students over what it would be if all 55 were to participate in one discussion,

and it is a way of overcoming the tendency of large classes to be mechanistic. In cases such as this one, a class which appears to be mechanistic (for reasons discussed in section 3.1) may be improved by making it more like a system.

In summary, there are three considerations in applying the G.S.T. paradigm to classrooms. First, there are situations in which classes may be considered to act as though they were mechanisms. Interdependence can be ignored if one role is constant, purpose can be ignored if it is always fulfilled, and openness can be ignored if the effects of other systems are constant. If these factors cannot be influenced, the systemic nature of a classroom can be ignored when one is trying to change a classroom. Second, the acceptance of certain norms or standards might lead one to talk of a classroom as though it were not a system (e.g., to talk of cause in the classroom as though it were unilateral or to talk of students as though they had no goals), although for the sake of classroom improvement the class might still be treated as a system. Third, the G.S.T. paradigm may be used as an ideal which a mechanistic classroom may be changed to be closer to if the mechanistic nature of the class is itself a problem.

3.2 The Interdependence of Classroom Roles

The roles played by classroom members are each dependent on those played by other members; each member is dependent on the others to provide the context in which he can play his role.

Again, role interdependence is linked as a concept to nonsummativity. Classroom roles cannot be studied in isolation because each role must be studied in a context which involves all the other classroom roles. The classroom cannot be analyzed into a "teacher factor" and a "student factor" because a teacher can take on a given role only with the cooperation and support of students and vice versa; one cannot experimentally manipulate one role without varying other roles accordingly. This section will examine role interdependence and its implications.

3.21 There is no unilateral cause in the classroom.

Nothing that happens in a classroom is the doing of any one member. No one plays a role in the classroom without other members' playing supporting roles. Blame for anything that goes wrong cannot be completely located in one classroom member.

These principles will be illustrated first in an example from my own teaching, and then in an example taken from the literature. Finally, some applications of the principles will be discussed.

When I first started teaching college, I wanted to have a humanistic class.[4] I wanted the course to center on my students' goals and learning styles. I thought I could bring this about by showing concern and interest in my students as persons. I discovered that my students were not inclined to tell me what their needs and interests were, and in many cases seemed not to know themselves what they wanted to learn in my course or in college. Not knowing what

my students wanted to learn, I began teaching what I wanted to teach. I could not make the classroom a humanistic one, and I could not play the role of the humanistic teacher without my students playing a supporting role.

I have learned since then something about how to help students articulate their needs and interests to me. I have learned to spend time at the beginning of each semester talking with students about why they are taking my course and how it can be designed to be of most benefit for them. I have learned to pursue the topic whenever a student mentions anything about his interests relative to the course. By being more patient, by talking with students about why I need to know their interests, and by facilitating students' talking about their interests, I now find out enough about my students' to have a fairly student-centered classroom. But the class is not humanistic only because I am a humanistic teacher, but also because, in the present situation, the students are willing and able to articulate and follow their own goals, i.e., to be humanistic students.

Not just the "humanistic teacher" role, but any teacher role requires supporting student behavior. Consider Mann's (Mann et al., 1970) observational study of the college classroom. Mann identified seven factors underlying college teachers' classroom behavior, which he called reaction, role satisfaction, colleague, punitive, apprehension, display, and warmth. While these are considered to be factors

underlying teacher behavior, investigation shows them all to be dependent on student support.

"Apprehension," for example, is characterized by the teacher's withdrawing, expressing anxiety, and denying he is anxious. Apprehension usually occurs when

> there is some subsurface friction which may or may not break into open confrontation at any moment. . . When and why do some potential confrontations cause such anxiety and avoidance? One of the most common situations occurs when there have been ambiguous indications of student apathy or discontent. The teacher may want to ask the students precisely what they dislike or want changed, but he is afraid that their criticism might be unanimously harsh. . . . Another potentially explosive issue in psychology classes arises in dealing with sexual or other emotion arousing material. It seems that too personal or explicit a discussion arouses fear of the class's becoming hopelessly bogged down, frightened, or entangled. (pp. 60-61)

Although it is the teacher who is labelled "apprehensive", he becomes so only when there are indications that the students might act in a certain way. The same teacher may present the same material to two different classes and become apprehensive in one class but not in another. He may be apprehensive about discussing low test scores with one group of students, but not with another group which is unconcerned about grades. He may be apprehensive about discussing sexual issues with one group of students but not with another, more mature group.

A teacher's becoming apprehensive is, therefore, not just caused

by the teacher's personality, but is also influenced by who his students are and how they behave. The same can be said of the other six factors listed by Mann et al. A teacher can hardly be warm with students who reject his warmth, nor punitive with students who reject the teacher's authority to punish or who do not take the punishment seriously, and so on.

At times there may be good reason to use a unilateral concept of cause. If, for example, students are required to take a particular course and if the teacher of that course simply lectures and is not at all interested in students' opinions or students' rights, there may be little an individual or even a group of students can do. I such an instance, it might not be much of a distortion to say that the teacher determines what happens in that class. But in many instances, an analysis may be distorted by arbitrarily locating cause in one segment of the classroom. Two examples of how this might happen are the following:

If a number of students do poorly on an examination in a course, the teacher might blame the students for their low scores. It is true that each student's motivation, intelligence, knowledge, study habits, etc. are factors in his score. However, the teacher taught the material, told the student what to study, determined the content and structure of the test, scored the test, and determined what score would be considered "low", all while knowing the nature of the students in his class. Thus, the teacher made some necessary

contributions to the students' low scores. There might be a reason to set standards for teacher performance so that someone's teaching could be considered "adequate". In such a case, the students' failure in a course taught by an adequate teacher could be considered the students' fault entirely. But only if such criteria are established for teachers can the blame for student failure be located entirely in the students.

The second example relates to teachers who deliver unclear lectures. Many teachers do not explain points that need explanation, and their explanations are not clear to their students. There is a tendency to blame the teacher for such a situation as he decides what he will explain and how he will explain it. The students, however, contribute to the situation by not asking more questions, not asking for further clarification, and by allowing the teacher to proceed after he gives an enadequate explanation. Even in large lectures or in situations where the student fears retribution from the teacher, a note, possibly anonymous, could be sent to the teacher explaining how he could better meet the students' needs. Most teachers have at least some interest in being good teachers, and it can only improve a teacher's lecturing to know that his students want clearer lectures and to get the information needed to make his lectures clearer. Lecture clarity, then, is not a property of a teacher but of an entire class.

3.22 Changing one member's role necessarily changes other members' roles.

In order to bring about change in one member's role it may be necessary to actively change another member's role. A desired change in one person's role can sometimes be achieved by changing another person's role.

Because classroom roles are interdependent, a change in, say, the student's role will change the context of the teacher's role and therefore the teacher's role itself. If the teacher resists making that change in his role, there may be a need to actively help the teacher change his role in order to bring about the change in the student's role. It may be possible to bring about a desired change in the students' roles by actively changing the teacher' role only.

Several years ago I was intrigued by the notion of the student as an oppressed person.[5] I offered a five-week workshop, "The Student as Underdog", for sixteen students in an undergraduate educational psychology course. I wanted to show the students that they were oppressed but that they had more freedom than they were using, and I wanted to show them how they could take responsibility for their own education. In particular, I wanted the processes of my workshop to reflect the ideals I was espousing. That is, I wanted the students in my workship to be in control of the workshop.

As it turned out, the students were not interested in controlling the workship and resisted taking a controlling role.[6] When I asked

for suggestions as to what we should do in particular situations I would get none. When I asked participants to make observations on their courses, they were unable to find the time during class to do anything but take notes on class content.

As the students in my workshop persisted in the passive roles they were comfortable in, I persisted in the directive role I was comfortable with as a teacher. What I did not realize at the time was that as long as I persisted in directing the workshop, the students would not take over its direction. In order for me to change their behaviors, I had to change mine also. When I realized what was happening, I left the next session of the workshop at the beginning of the session telling the participants that I could not justify giving them academic credit for a workshop in which they had put no effort and from which they had learned nothing. I said that if the students thought they deserved credit for the workshop they should organize their reasons and call me back into the room. The students did organize their reasons and call me back in, and in doing so took more control over the workshop than they had previously done. The consensus of the students was that they learned more in that session in which I absented myself than they did in the other four sessions combined.

Although it was the students' role I was focused on, a change in it would have to produce a change in my role; the students' playing a more directive role in the workshop would have to result in my playing a less directive role. The change in the students' role

could only be accomplished with the help of some direct intervention in my role; as long as I continued filling in the leadership gap in the workshop the students would not develop leadership among themselves. In the end, the change in the students' role was accomplished primarily through a change in my role; my instructions to the students and the other attempts I made to change their behaviors did not have nearly the effect on their role as did my changing my role by pulling out of the classroom.

These same aspects of role interdependence are evident in the example of my attempt to be a humanistic teacher, just presented in section 3.21. Although it was my role that I wanted to change, that change necessitated a change in my students' role; if I was to become a humanistic teacher and respond to my students' needs, my students would have to become humanistic students and articulate their needs to themselves and to me. The desired change in my role could only happen with the help of an intervention in the students' role; only after I introduced into by courses classroom practices which helped my students and me know what the students wanted was I able to take the role I wanted to play of responding to their needs. I suspect that a change in students alone could result in a teacher's becoming more humanistic; were someone to help a group of students articulate their needs to their teacher, it is quite likely that the teacher would become more responsive to their needs.[7]

Although authors often focus in their writing on the one role, usually the teacher's, which they are interested in changing, there

are occasional references to the interdependence of role changes. Michael Rossman (1969b), for example, wrote about his experiences in the Free University of Berkeley which, in the late 1960's, encouraged informal classes taught by anyone who wanted to teach any subject:

> Those who have experimented with a model in which there is not fixed authority—as we did in the experimental programs at the University of California at Berkeley and at San Francisco State College—are amazed to discover what happens to cardboard C students when they cannot find someone to play the game of "stay in your C-student role". After they get over their initial confusion they often abandon the role and become significantly more independent and creative. (p. 28)

In this example, some students were faced with a change in teacher role not through a change of behavior within one teacher but from being exposed to a teacher who took a role entirely new to the student. Rossman implies here that the teachers in the experimental colleges did not necessarily prod their students into greater creativity and independence; the teachers just did not act as though they expected their students to be dull and dependent. As a result, the students' own behaviors changed.

Meyer Cahn (1972) wrote of a course in which he was dissatisfied with the students' role. Students were not doing the assigned readings and, though the class was for the most part a discussion class, few students partook of discussions. Cahn wanted a classroom where those who were truly interested in the subject matter could become deeply involved in it and those who were less interested would

not have a negative effect on the class atmosphere. Instead of trying to involve all 25 students in discussion, he made five students responsible for extra preparation in each subject. After these five volunteers would begin a discussion of the material, other class members were free to join in. While Cahn was primarily interested in the effects of this arrangement on the students, he did describe its results for his role:

> We developed new roles not only for the students but also for the teacher. . . The teacher was not expected to present the learning materials to the students. . . The teacher could and did elaborate upon the materials as the need for it grew out of the context of the discussions. . . The role of the teacher was, perhaps principally, that of organizer. He was responsible for seeing that at any given moment there was some significant learning experience for all . . . students . . . He was the manager of the experience. . . I used various methods to disengage myself from the conversation. To encourage the speaker to direct his comments to his own group I would not look at him. After an opening question, I tried to remain silent long enough to get the discussion well launched before I made any comments. (pp. 45-46)

Cahn's article focuses on a new role he has created for students which solves a common classroom problem, student passivity. With five students given primary responsibility for a discussion, those who were interested in the topic could become deeply involved in it and those who did not want active involvement with the material would not interfere with the activity of those who wanted to be more active. But the change in the students' roles could not happen

without a change in the teacher's role. A teacher who enjoyed lecturing or who felt like he was not doing his job if he was not lecturing might not want to take the role necessary to support the students' new roles. A teacher who had limited group dynamics skills or who was unable to react quickly to the flow of a discussion might be unable to take a role supporting the students' new roles (though he might be able to prepare exciting and informative lectures).

As a general principle, the interdependence of role changes is obviously and trivially true. Even if a teacher's role change consists of changing to a new style of lecturing, students will have to alter their behaviors somewhat to better observe the new lectures. And a teacher changes his own role in the very telling to students what their new role should be. It is difficult at times to write of changing one role because the consequent change in other roles is so apparent.

Yet it is easy to focus on the changing of one role without considering whether other classroom members are willing or able to make the necessary changes in their roles, and that is one general area where this principle has useful application. Consider, for example, the dimensions of control and activity. If, for example, a teacher wants to take less control of the class, he must consider whether students would have the necessary skills and maturity and desires to increase their responsibility for the proceedings in the

class. If the teacher wants to increase his control of the class he must judge whether students will put up with having less control themselves. If the students' role is to be changed to one of more activity, the teacher must be able to play a supporting rather than a leading role and must get his rewards not from a well delivered lecture but from a classroom discussion which he allowed rather than caused. If students are to be less active, the teacher may have more preparatory work to do. Similar dynamics must be taken into account if one wishes to vary the level of emotional input or work related to personal as opposed to discipline related matters or group work or any other dimension of the students' or the teacher's role. In changing one role, it is necessary to look at the consequent changes in other roles. If the other members are unable or unwilling to take on the necessary supporting roles one must decide if it is possible and practical to do what is needed to help them tame the new roles.

In addition to seeing whether supporting role changes can occur when one is focused on a particular role change, there is one other aspect of interdependence of role change which may have practical importance for the classroom. This is the point already mentioned, that there may be times when the easiest way to achieve a desired role change is through changing another member's role. This point will be discussed more fully in Chapters four and five.

3.23 A consequence of role change interdependence is that a beneficial change in one role may result in a detrimental change in another.

There are two general ways in which a desired change in one member's role can bring about an undesired change in another member's role. The first is related to classroom homeostasis: if a classroom has a need, the more one member tends to satisfy that need the less other members will do to satisfy it. For example, there is a tendency for students to take less responsibility for a course as teachers take more responsibility for it. Bette Erikson (Clinic to Improve University Teaching, 1974) recognized this in her recommendations about teachers' answering students' questions:

> Repeating a student's question before responding insures that all students have heard the question. However, this response should be used with caution. Continually repeating questions which have been heard and understood the first time can become an irritating mannerism. Moreover, this strategy sometimes has the effect of discouring students from listening to one another. (p. 2)

If a student's question cannot be heard by other class members, a teacher's answer to it will not benefit other members either. There is therefore good reason for someone to do something about a question that cannot be heard. But if a teacher attends to all the details in his classroom, if he tries to solve all problems before they arise, if he himself repeats a question before any student realizes he has not heard it or could himself ask that it be repeated, the students in

the class become disengaged from the class. A teacher who attends to all of the details in his class leaves his students as uninvolved in the class as they would be with a television program. Carl Rogers (1969) reminds us that "learning is facilitated when the student participates responsibly in the learning process" (p. 162). In a lecture hall with 500 students it might be assumed that every question had to be repeated by someone in front of a microphone, and in such a situation it might make sense for a teacher to make a policy of repeating students' questions before answering them. In a smaller class, however, a teacher might do better to encourage students themselves to ask a questioner to repeat his question. This could have the effect of making students more aware of what they can and cannot hear, and of what they can and cannot understand, and of helping students to articulate their needs in the classroom.

As another example of how improvement of one role can lead to a detrimental change in another, consider a classroom in which students come to class unprepared for the activities the teacher had in mind for the day's session. A common response for teachers is to do in class the work assigned for the students to do the night before. The teacher does this so that he can continue with the lesson he had in mind for that day. Another consequence of his doing the homework assignment in class, however, is that it reduces student motivation to do the next homework assignment; seeing that the first assignment was done in class, the student comes to expect that future assignments will be similarly done in class and that the student

himself does not need to do the assignment at home. The beneficial change in the teacher's behavior, to now also cover in class material he assigned students to do themselves, leads to a detrimental change in students' roles, to not do homework assignments.

There are many areas where the meeting of a classroom need by one member may reduce other members' action on that need. There is a growing body of literature helping teachers define their goals for courses more explicitly, sometimes to the point of saying what behaviors students should exhibit when leaving the class. Might it not be that the better the teacher defines goals for the course the less students will? A teacher concerned about students' setting their own goals might do well not to set his own very firmly. Similarly, a teacher concerned about students' developing leadership might do well to act less the leader in his classes.

There is a second general way in which improvement in one role can lead to detrimental change in another in addition to the tendency for a classroom need to be met by only one member. Some people are too embarrassed to attempt a task in the presence of someone who can perform the task much better. Thus, if a chemistry teacher prepares for a class so well that he demonstrates problem-solving flawlessly, students may be reluctant to volunteer to try solving problems in class knowing they are certain to make some mistakes along the way. One statistics teacher has told me that he deliberately comes to class marginally prepared on occasion so that he can demonstrate to

students that he too struggles through problems.

Mechanistic analysis would imply that an improvement in any given role will be a positive contribution to the classroom. It would imply that if the goals of a classroom are not clear the class will improve if the teacher specifies classroom goals, that if questions are not heard the class will improve if the teacher repeats all questions, and that a class will improve if a teacher stops making mistakes while demonstrating examples. Clearly it may be undesirable for a classroom to be without goals or to have communications unclear or to have a constantly bumbling teacher. But because classroom members will not act to meet a classroom need that is already met by another member, and because some people tend to be intimidated by others' abilities, an improvement in one role can bring about undesired changed in other roles. One must therefore ask about a given role change not only what it does to the performance of the member whose role changed but also what its wider effects are on the rest of the class. It may be very important to not who will fulfill a classroom need, and a classroom may be better off if a given member performs his function less well than he usually does.

3.24 Causality often happens in cycles in the classroom.

Because classroom roles are interdependent, causation often happens in cycles in the classroom. The general form of this cyclical causality is given in Figure III-1 below. Although certain aspects of cyclical causality will be explored in greater detail in sections

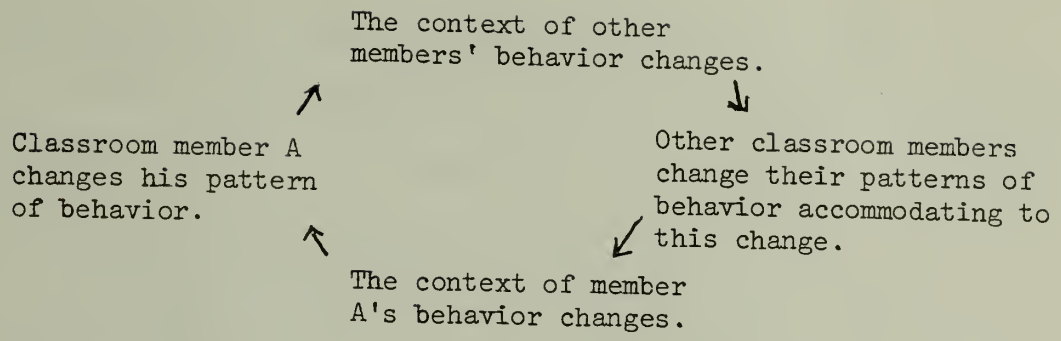


Figure III-1.

3.31 and 3.32, a few examples should be given here.

Cyclical causality was evident in the workship on students as oppressed persons, discussed in subsection 3.22. I wanted the students to become involved in the running of the workshop. They were reluctant to become involved, and so I gave them assignments which I hoped would increase their involvement; I would try to have a discussion based on their observations of their classes or I would break the class up into smaller discussion groups. Because I used class time implementing my own plans for increasing participant involvement, I did not find out from the participants why they were displeased by the workshop, nor how to use class time in a way more fitting with their needs. The classroom designs therefore drove participants further from involvement in the workshop, which induced me to try even harder to do something to bring them back in, and so on. While I complained to my friends about the participants' passivity, I was contributing to my own problem. Cycles of cause are often perpetuated by persons' focusing on how their contexts

affect them while ignoring how they affect their contexts.

Ronald Lippitt and Martin Gold (1959) identified a collection of causal cycles centering around the "problem child" in a classroom:

> When we try to close in on the locus of pathology which maintains and aggravates the unhealthy situation of certain children in the classroom group, it is apparent that the difficulties are created and maintained by a circular social process contributed to by the individual child, his classmates and by his teacher.
>
> If we focus on the individual child who is in difficulty we see that he contributes to the unhealthy situation by 1) his negative self evaluation and response to this; 2) his hostility toward others; 3) his unskilled and unrealistic behavior output of assertive aggressiveness or withdrawing noncontribution; 4) his insensitive and defensive reception of feedback from others which might potentially give him more guidance for his own behavior.
>
> If we look at the rest of the group as a source of difficulty for the individual child we see that there is 1) a very rapid evaluative labelling of a child and a strong tendency to maintain this evaluative consensus in spite of further information . . . 2) very inadequate skills of the groups in providing the member with feedback which communicates sympathetic guidance rather than rejection of ignoration; and 3) a lack of . . . acceptance and support of deviancy.
>
> If we look at the role of a teacher and her contribution we note 1) a lack of teaching effort focused on developing . . . good human relations; 2) a lack of . . . procedures guided by mental health goals; 3) a lack of (modeling) constructive behavior patterns toward low status children.

Here, the behaviors of the problem child, his teacher, and other class members all affect each other. The child may not be aware how his behaviors contribute to others' taunting him, and they may not

realize how their taunting contributes to his problems.

Causal cycles demonstrate clearly the other aspects of role interdependence. The concept of unilateral cause cannot be applied because problem child, other child, and teacher all contribute to the problem. Several roles may have to be changed simultaneously for the situation to improve; if the problem child alone is treated, other classroom members may strongly restimulate the problem (note here that Lippitt and Gold set their research task to be defining when which people should be worked with). Improvement of a classroom member may not bring about improvement in the class; a problem child may be negatively affected either by an increase in other members' skills which widens the gap between him and them or by an increase in his own skill which goes unnoticed by others.

3.3 Change and Stability in the College Classroom

In a mechanism, change and stability are regulated by Newton's laws of momentum. If one pushes on a rock toward the right, the rock will move to the right. If the rock does not move, increasing the force applied will usually succeed in moving the rock. The laws of momentum imply also that a small force will have a small effect and that a large force will have a large effect, and that, in either case the effect will be in the same direction as the force.

The laws of momentum do not hold in a system such as the classroom. An attempt to make students work harder may not succeed.

If the attempt is strengthened, it may, in fact have the result of causing students to work less hard or to give up entirely. As was shown in subsection 3.22, a teacher's attempt to give more power to students may in fact result in the teacher's taking more power for himself. Thus, a force applied in one direction may have an effect in the opposite direction. Also, the size of the force applied to a classroom does not correlate with the size of its effect. A teacher may struggle to get a discussion started in a class, but if the students are not interested, his efforts may not be fruitful. In a similar situation, however, a single comment offered by one student might open a floodgate of response from other students. Thus, a large effort, such as the teacher's, may have a small effect, and a small effort, such as the student's, might have a large effect. In short, the effect of a change attempt in the classroom might not be in the direction nor of the same size as the force applied. Models other than the laws of momentum are needed to account for change and stability in the classroom.

3.31 Homeostasis.

Two kinds of norms can be identified in the classroom. First, there are norms of purpose; classroom activities are centered around certain classroom goals including students' learning goals and various professional goals for the teacher. Second, there are norms of structure; classroom members tend to behave in the same way from one class to the next even if other behaviors might be more productive

in terms of the goals of the classroom. Pressures arise which would tend to change these norms; students might show dissatisfaction with the structure or content of a course, or a new topic might call for a restructuring of the class. Even in the face of these pressures, classrooms tend to maintain old norms; the tendency to resist change and to maintain norms is called "homeostasis".

Two examples will illustrate classroom homeostasis. The first relates to a continuing education introductory psychology course I taught. To illustrate some principles of person perception I designed a role play in which one person would interview a second for a job. The role play involved only these two roles, with the rest of the class instructed to observe the interaction in specified ways. One woman, who was actually soon to be interviewing for a job as a waitress, volunteered to play the role of the interviewee. It would have made sense for me to ask for a volunteer for the interviewer's role. As I had no business experience, it was probably that one of continuing education students would have been able to play the role better than I could; in fact, I later found out that one of the students had been a personnel manager and another had run his own restaurant. Also, had I not been in the play I would have been able to observe it better. However, I chose to play the part of the interviewer because that was the most directive role to play in the classroom and I was accustomed to playing the most directive role in that class. And because I played the interviewer's role, the

learning value of the role play suffered; my observations of the play were limited, and, my more experienced students informed me that my performance as an interviewer was not realistic. In this example, a norm of structure was maintained at the expense of the purpose of the class.

The second example comes from The College Classroom (Mann et al., 1970). A classroom is discussed (Chapter 5) in which the teacher attempted to alter the structure of the class. Originally, the teacher placed a "heavy emphasis on his expert and authority functions" (p. 241). In response to student complaint, the teacher stopped lecturing and restructured the class so that students were responsible for leading discussions. The teacher, referred to as "Mr. B.", had no trouble soliciting volunteers to lead discussions, but other students would not participate in the student-led discussions. After a number of weeks trying out the new structure, Mr. B. felt it:

> would not bring about the sort of interaction that he hoped would be possible in this class. . . . Furthermore, he was faced with the recognition that he lacked the skill needed to make use of the kinds of interactions that take place when there is low structure. Finally, he was hearing competent people ask for his help and dominance which strengthened his earlier notions about the necessity for a teacher to be in control. (p. 235)

Mr. B had two choices: to develop the skills needed to make the low structure design more productive, or to return to a design more dominated by the instructor. No indication is given that he

considered the first alternative, and the second was taken. A norm of class structure was thus maintained. In this class, the norm of structure supported one class purpose (learning of course content) and work against another class purpose (facilitating discussion among students).

The resistance of classrooms to change cannot be explained by "homeostasis" any more than the effectiveness of a sleeping pill can be accounted for by its somniferous powers. As a concept, "homeostasis" has heuristic value as a reminder that classrooms do not passively accept change attempts but rather actively resist them. However, other concepts must be invoked in order to account for the resistance.

3.311 Homeostasis of the classroom and homeostasis of the classroom member. One means of accounting for classroom homeostasis is to push the problem to another level, that of the classroom member. A change in the structure or the function of the classroom will affect the goal achievement or the role of some classroom members. In the example cited above concerning my continuing education course, a change could have been considered in the course structure; I could have stepped out of the role of the most directive person in the class and let someone else play the role of the interviewer. This would, of course, have produced a change in my own behaviors, as well as a change in the self-esteem I derived from being the most directive person. In the example taken from The College Classroom, the change in class structure from teacher-centered to student-centered design resulted in changes for the teacher as an individual; the change resulted in a reduced focus on Mr. B as an expert and an authority, and these were

important attributes to him.

Clearly, a change in the classroom entails changes in individual classroom members. As individuals, people resist change; in resisting change for themselves, people prevent change of the classroom. Piaget (1971), among others, has offered a homeostatic psychology of the individual, but no theory is needed to understand that people resist change. People have goals, their goals tend to be fairly stable over time, and people pursue their goals in the face of forces interfering with goal attainment. A teacher may assign extra work to students, but that work is unlikely to be accomplished if it prevents the students from doing other things they want to do. A teacher may try to initiate a discussion in class, but he is unlikely to succeed if the students are uninterested in the subject or if they feel participation would reduce their popularity with their peers.

All of this ought to be obvious, yet the literature on higher education is remarkably deficient in attention to students' goals. Books and articles describing alternative styles of teaching (McKeachie, 1966, 1969; Grasha, 1974), tend to focus on making the teaching style appropriate to the subject matter, and occasionally making the style appropriate to the teacher's personality. The question of how students will receive the structure and of whether they will be inclined to accept it and facilitate its implementation is rarely addressed. The impression is given that a teacher need only decide how he wants to structure the class, and that structure will come to pass. But anyone who has tried to initiate a discussion or a role play among resistant students should realize that student goals cannot be ignored and that

the goals of individual students have a homeostatic force on the class as a whole. The tendency for teachers and students as individuals to seek their own goals and to remain in roles with which they are comfortable serves to maintain the norms of structure and function of the classroom as a whole.

3.312 Negative feedback. Not all of the classroom's stability derives directly from members' goals. A very general homeostatic mechanism, the negative feedback cycle, may maintain a norm of form or function whether or not that norm is desired by a classroom member.

A negative feedback cycle is a circle of causes and effects in which a deviation from a norm energizes opposition to that deviation. That is,the deviation from the norm causes an event which in turn reduces the probability of a similar deviation from the same norm.

An example of such a cycle was discussed in subsection 1.22 above. The norm in question was the tendency of college teachers not to involve students in decision making processes regarding what or how students will learn in their courses. I have no evidence that this norm is a goal of teachers or of students. While most college teachers, especially those in the sciences, have some notion of basic areas they want to cover in their courses, teachers and students are not opposed on principle to students' suggesting areas to emphasize, optional areas to add or drop, or helpful ways of structuring the class.

Although lack of student input into decision making is not a common goal, it is definitely a common norm in classrooms. Teachers' guides (McKeachie, 1969) suggest that teachers should prepare curricula for their courses in detail to present to the students on the first day

of class; there is little emphasis on incorporating student interests into the curricula. Recently there has been an explosion of interest in Keller plan and so-called Personalized System of Instruction courses in which the teacher plans to the last detail everything to be learned in the course and how it should be learned. In discussions with fellow teachers I rarely hear of teachers who systematically incorporate students' goals into undergraduate courses.

How is this norm maintained if it is not in the direct interest of anyone concerned? One must begin by examining what happens when a class begins to deviate from the norm of teacher constructed curriculum. When I first tried to make my classes more student-centered, I asked the class as a whole what the class members wanted to learn in the class. I rarely received a helpful response to this request. Students would be silent, or they would ask what I wanted them to learn in the class. Discussions with other teachers lead me to believe that this result is quite common. Having received no help from my students, I would proceed to design the course myself, and would be reluctant in future semesters to try again to design my course around my students' interests. Another result of my decision to design the course myself is that students in the course come no closer to being able to articulate their interests in future semesters. Most theories of learning imply that people tend to learn what they practice and that people are not likely to learn what they do not practice. By not giving my students practice in goal setting, I took from them the opportunity to learn goal setting. Of course, all their lives these students had been denied such an opportunity, which explains why they

were unable in my class to set their own goals. This negative feedback cycle is illustrated in Figure III-2. Following the causal arrows around, one sees that a deviation from the norm of students' not contributing to the content of the course leads to a disappointment which decreases the probability that the teacher will again deviate from this norm.

As was stated above, not all negative feedback cycles entail norms that are directly related to members' individual goals. However, all homeostatic mechanisms involving individual members' goals can be understood as negative feedback cycles. The general form of these cycles is given in Figure III-3. As a particular example, consider Mr. B. The class began to falter in serving one of Mr. B's goals, to facilitate student learning of the course content, when the class became student-centered. As a result, he restructured the class so that he could see that students were actually learning the course content. A class member need not be overt in his actions to restore homeostasis of the classroom and satisfaction of his own goals. Mann et al. (1970, p. 83) notes how a student, by being unresponsive, can resist involvement in an area he finds boring or threatening:

> Unresponsiveness may involve a process as simple as avoiding replying to a question when one does not know the answer, or as complex as passive resistance to important elements of the classroom situation. One of the advantages of unresponsiveness for the student who does not feel like going along with the teacher's plans is that it calls much less attention to his personal resistance than does a contentious response. The students may undercut the thrust of the teacher's actions while appearing fairly innocent.

3.313 Complementary relationships. One common form of negative

feedback cycle centers on complementary relationships in the classroom. Complementary relationships are ones based on a difference between members; typically, this difference is such that one member maintains a position one-up (more powerful, more highly valued) relative to the other position. Within the classroom, the teacher typically is in the one up position because of his greater expertise, his power to grade, or his skills as a teacher. Examples of complementary relationships in the classroom would include that between a directive teacher and a dependent student, or between a teacher as expert and a student seeking a mentor.

Complementary relationships contribute to classroom homeostasis in the following ways. A teacher may need to play a given role in the classroom, say the role of the expert. In order for the teacher to be the class expert, he must appear to know more about the course content than anyone else in the class, and others in the class must feel dependent on the teacher's knowledge. The teacher might therefore interrupt a discussion among students if the discussion showed the students as being independent of the teacher's expertise. The teacher

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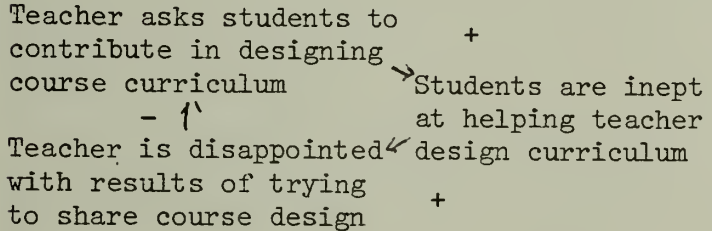

Figure III-2.

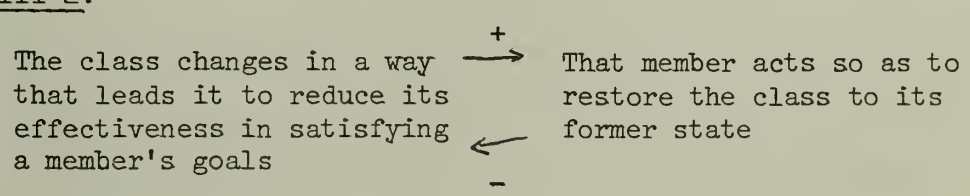

Figure III-3.

might not be opposed to the students talking among themselves per se; but if the students' discussion threatens the teacher's role as expert, the teacher will interfere with the discussion. Thus, classroom members resist not only change that directly threatens their goals but also changes which indirectly threaten their goals by changing another member's role.

3.314 Classroom myths. A classroom myth is an erroneous belief about the classroom shared by almost all of the students and by the teacher. This definition lacks precision. What is an erroneous belief to one person is a justified belief to the one who holds it. It may be of necessity arrogant to call a given shared belief a myth. The heuristic value of the myth concept, however, is that it allows explanation of an otherwise anomalous belief about a classroom shared by its members but not by the outside observer. Classroom myths serve as homeostatic mechanisms. They prevent change by keeping problem areas from being clearly perceived by classroom members.

Like family myths, classroom myths usually support the notion that the ongoing situation is satisfying. By denying there is a problem, the myth excuses classroom members for not taking responsibility to work on the problem.

As an example, consider a classroom a colleague of mine worked with as a teaching improvement consultant. The purpose of the course was to help the students learn to read and write French. Every day, the teacher read from the text, translated, made a few comments to the ten students in the class, and then read again from the text, translated, and so on. The format never changed, and my colleague complained of

the difficulty of staying awake while observing the class. Yet a questionnaire of all classroom members revealed that no classroom member felt the teacher had a need to improve his skills at varying his teaching method. The shared belief that the class did not need more variety was puzzling to the consultant and was in fact later belied by the general satisfaction of class members with variations in the teaching style encouraged by the consultant. If the belief that the class had no need for greater variety was erroneous, it had homeostatic power. It prevented the teacher from putting more work into the class and prevented the students from taking risks by admitting their boredom. By preventing classroom members from making change attempts, the myth maintains norms of structure or of purpose.

3.315 Equifinality. An assumption of the mechanistic view is that a difference in initial conditions will result in a difference in final conditions. The mechanistic view would imply, for example, that if a teacher tried to center the class more on discussion among students then there would be more discussion among students in the class. As was shown in subsection 3.31, such an effort may in fact bring about no changes. The mechanistic view would also imply that if a change attempt does not succeed, one need only increase his efforts in order to succeed in bringing about change; if students do not answer questions, ask the questions more forcefully, and if they still remain silent, stare at them.

As has been seen throughout subsection 3.31, these mechanistic assumptions do not hold in the classroom. Change attempts may energize forces in the opposite direction. If, for example, a teacher presses

an unresponsive class for an answer to a question, class members may stifle any desire to have a discussion in the class. If the teacher stares at the students, the students may look away. Thus, the teacher's efforts may bring about no change. The tendency for classrooms to remain unaffected by change attempts is called equifinality, indicating that the final condition may be the same even if initial conditions are different. It is the nature of the classroom organization, not the nature of the initial conditions which is determinant.

3.32 Classroom change.

Subsection 3.31 presented some of the ways in which classrooms resist change. Subsection 3.32 will explore some of the ways classrooms do change.

3.321 First and second order change. It proves useful at times to distinguish two kinds of change. "First order change" consists of doing more of what one has done before or doing it better; it is change which leaves the structure of the classroom the same. If a teacher gives disorganized lectures, a first order change might consist of writing on outline of the lecture on the board at the beginning of class. "Second order change" is change in the structure of the class; it consists of doing something different from what was done before rather than doing the same thing better or doing more of it. For a disorganized lecturer, second order change might consist of holding a discussion instead of lecturing.

Although the terms "first order" and "second order" will be used as absolute descriptions, they can in fact be applied to a situation only relative to a given frame of reference. That is, whether the

structure of a classroom has been changed depends in part on what is to be called "the structure" of the classroom, and that is never given entirely in the classroom itself. In the example being considered, the initial structure of the classroom, when the teacher was lecturing, could be considered to be "the teacher stands in front of the class and talks to the students"; then the teacher's writing on the blackboard would constitute a change of class structure and would be a second order change, as would the initiation of a class discussion. On the other hand, the structure of the class could be described as "the teacher decides what the class will learn and how the students will learn it"; in this case, the initiation of a discussion by the teacher would constitute first order change, as would the outlining of the lecture on the blackboard.

The heuristic value of the concepts "first order" and "second order" change is to indicate that a change attempt may not be succeeding because it is attempted at the wrong level. Literature on improving teaching in higher education (McKeachie, 1969) often suggests how to improve lecturing, how to improve discussions, how to write better syllabi, etc., without considering the issue of whether a lecture, a discussion, a syllabus, etc. is what is needed.[8] But the subject matter or the teacher's skills might suggest that a change in structure is more appropriate than an improvement within the current structure. If a teacher has difficulty lecturing on humanistic psychology, an improved lecture may not do as much as a change to a more experiential format. If a good lecturer is having difficulty running discussion groups, he might be better off returning to lecturing rather than developing the skills needed to facilitate discussion.

The notions of "first order" and "second order" change also have implications for instances where change attempts are opposed by negative feedback cycles. In such cycles, a change attempt energizes an opposing force; improving the initial change attempt will only increase the strength of frequency of occurrence of the opposing forces. What is needed to break those cycles is second order change, a change in the structure of interaction among class members. For example, a teacher might try to initiate a discussion by actively inducing students to participate. He may ask a question to start the discussion; if he gets no reply he may repeat the question; if there is still no reply he may ask a different question; if there is still no reply he may stare at a student; if the student does not return eye contact, the teacher may probe in another way. It may seem as though students are simply doing nothing throughout the teacher's attempt to initiate discussion, but this "doing nothing" must be seen as a response to the teacher's change attempt. In American culture, it is normal for people to answer questions asked of them and to return eye contact. In breaking these norms, the students should be seen as active resistance to the change attempts. Each attempt by the teacher to deviate from the norm of the teacher's doing all of the talking may lead to a counter move by students to resist involvement in discussion. What is needed in such instances may not be more or better probing, but for the teacher to cease probing entirely. A second order change, the teacher's ceasing to talk, may lead to such an uncomfortable silence in the class that finally some student will be driven to break it by offering a comment, and the discussion may flow from there.

3.322 Positive feedback. A positive feedback cycle is a cycle of cause and effect which multiplies an original deviation from a norm; it is a cycle which is so structured that an original deviation from the norm makes similar deviation from the same norm more probable. Positive feedback cycles can be seen in a number of areas in the classroom:

a. A classroom consultant described a teacher whose classroom performance had spiralled downward. Initially her teaching skills were not highly developed. Her students reacted with intolerance and hostility to her somewhat inept teaching. The students' reactions led the teacher to separate herself from the students. She ceased any attempt to hold discussion, when she lectured she would not have eye contact with the students, and eventually she spent as much time as she could looking at the blackboard. Each worsening of her teaching increased her students' hostility which in turn led her to put more distance between her and her students. Each deviation from an original norm of the class being mediocre led to a further deviation until a new norm was established of the class being unbearable for students and teacher.

The consultant's work was to improve the unbearable classroom. It might seem as though it would require a tremendous effort to bring about improvement in a class where the teacher was almost to the point of mumbling at the blackboard because if she turned toward the class she would be faced with its hostility. However, the interventions of the consultant started another positive feedback cycle, this time toward improvement and away from the new norm of the unbearable

classroom. The consultant directed the teacher to speak clearly and to directly face the class while talking. The students recognized the teacher's efforts, appreciated the new clarity in the teacher's communication, and began to act more favorably to the teacher. The students' reaction in turn encouraged the teacher to work harder on her teaching skills and eager to hear new suggestions from the consultant. The consultant's opinion was that the teacher should be given a small change to make at first which would be easy to implement and which would be almost assured of success. The initial success set the tone for the following change attempts. The teacher, encouraged by the students' reaction while herself encouraging that reaction, was able to spiral upwards from her failure as a teacher.[9]

b. A common example of positive feedback in the classroom occurs at the beginning of class discussions. Teachers who introduce a topic and then open the class up for discussion often experience a tension waiting for the first student to offer a comment. Often, there must be a break from the norm of the teacher's doing all of the talking and the students' only listening. That norm may be encouraged not only by the teacher, who may indicate in a number of ways that he wants to be the focus of the class, but also by the students, who may likewise indicate that they feel it is not the student's role to offer contributions to the class. When a teacher indicates he would like a change from the norm of his doing all of the talking, there is still a question among the students as to whether they too wish to break from the norm. Generally, if one student volunteers an opinion, that will trigger a comment from another student which will elicit a reaction

from a third, and a discussion will ensue. If, however, no student offers that first comment, or if the teacher can elicit student opinions only by directly addressing individual students, the norm will not be broken. Thus, a minor event, (the first comment volunteered by a student) can lead to a series of events, (other students making comments) which can break an original norm (of the teacher's doing all of the talking).

3.323 Symmetrical relationships in the classroom. A symmetrical relationship is one based on a similarity between the two people involved. Symmetrical relationships can lead to positive feedback cycles in the following way. Suppose student A and student B each wants to be the outstanding student in the class. If student A makes a significant contribution in a class discussion, student B must make a more significant contribution or belittle A's contribution. Student A must then reassert his superiority, and a contest between A and B may develop. The original norm was of a full class discussion in which neither student A nor B was particularly significant; any deviation from that norm would be multiplied and the original norm was broken. A curved grading system might lead to a similar spiral of many students' attempting to work harder than other students.

Symmetrical relationships between teacher and student are not obvious in the classroom. Usually, it is the complementary aspects of the student-teacher relationship that are most apparent.

3.324 Multifinality. In a mechanistic analysis, one assumes that if two situations are nearly identical to begin with, they will be nearly identical at a later point in time. Positive feedback cycles,

however, amplify differences in initial conditions. The concept of "multifinality" indicates that different endings can result from nearly the same beginnings and makes more understandable how great changes can result from small initial inputs. For example, consider the first classroom discussed in 3.222. In that classroom, the teacher felt so incompetent and the students were so hostile that the teacher did not face the class while lecturing and did not speak clearly. A minor change was suggested by a consultant. The teacher was to face the class when she spoke. The class responded positively to her efforts to improve her teaching which increased those efforts. The original small change led to a marked improvement of her teaching. Had that original small change not been made, however, her teaching would have continued to be incompetent or might even have deteriorated further. Thus, very different endings can come from almost identical original conditions.

3.33 Section summary.

At the beginning of this section it was noted that mechanistic analysis leads to several assumptions about change and stability. Most important of these assumptions are that 1) a classroom would passively accept and be affected by a change attempt, 2) the effect of a change attempt will be proportional to the effort put into the attempt, and 3) similar initial conditions will result in similar final conditions and different initial conditions will result in different final conditions. A systems approach to classroom stability and change leads to a different set of assumptions: 1) classrooms may demonstrate homeostasis and resist change, 2) the effect of a change attempt may

be reduced by negative feedback or amplified by positive feedback, and 3) a classroom may demonstrate equifinality (differences in initial conditions may not result in differences in final conditions) or multifinality (similar initial conditions may result in very different final conditions).

3.4 Communication in the Classroom

As indicated in section 2.3, the term "communication" includes not only verbal communication but also all other ways that people's behavior affects other people. This section will explore some concepts from G.S.T. useful in describing classroom communication.

3.41 Communication and assimilation.

Literature on higher education often contains advice to teachers on how to make their lectures more clear. A teacher is instructed to put an outline of his lecture on the blackboard, to summarize important points, and to use real-life examples to illustrate points. (Center for Instructional Resources and Improvement, 1976). The impression given by such suggestions is that clarity of communication is largely a property of the words and actions of the communicatory, that if one organizes his points well and illustrates them well any student who speaks English and who pays attention should understand the lecture.

However, as Piaget has demonstrated, the effect a person has on another depends not only on the behaviors of the affector, but also on the concepts to which the affected person assimilates those behaviors. (See Koplowitz, 1976) As a trivial example, consider a

chemistry teacher I consulted with once. In the course of our discussion, the teacher referred to difficulties she had in getting students to ask questions in class. As an example, she referred to a series of lectures she had given on attractive and repulsive forces in chemistry. After two separate hours of her lecturing on this topic, during which time she defined all of the terms necessary, outlined important points, and gave numerous examples, a student said in class, "I don't get what you mean by attractive forces". The teacher was not clear about this, but I believe that every time the teacher used the word "attractive", the student understood it to mean "pleasing to look at". All of the teacher's organization and her attempts to give clear definitions of such words as "attractive" did no good because the student assimilated the teacher's words to inappropriate concepts.

There is some recognition in some of the literature on higher education of the possibility of misunderstanding even in the best organized lecture. One often finds a suggestion that even in a lecture the teacher attempts to establish two-way communications with students (Bolton & Boyer, 1971). Talking with students about the subject matter can be an effective way of discovering whether a lecture has been understood as it was intended.

However, literature which suggests two-way communication as a means of finding how accurately communication was understood often gives the impression that miscommunication can be easily corrected by the teacher's restating this message in terms the student can understand. As the following two examples illustrate, however, the

student may simply not have the concepts necessary to understand the teacher's message, and there may be no way the teacher can help the student develop those concepts inside of a class period.

The first example comes from William Perry's (1968) study of Harvard undergraduates:

> Let us suppose that a lecturer announces that today he will consider three theories of _____ (whatever his topic may be). Student A has always taken it for granted that knowledge consists of correct answers, that there is one right answer per problem, and that teachers explain these answers for students to learn. He therefore listens for the lecturer to state which theory he is to learn.
>
> Student B makes the same general assumption but with an elaboration to the effect that teachers sometimes present problems and procedures, rather than answers, "so that we can learn to find the right answer on our own". He therefore perceives the lecture as a kind of guessing game in which he is to "figure out" which theory is correct, a game that is fair enough if the lecturer does not carry it so far as to hide things too obscurely.
>
> Student C assumes that an answer can be called "right" only in the light of a context, and that contexts or "frames of reference" differ. He assumes that several interpretations of a poem, explanations of an historical development, or even theories of a class of events in physics may be ligitimate "depending on how you look at it". Though he feels a little uneasy in such a kaleidoscopic world, he nonetheless supposes that the lecturer may be about to present three legitimate theories which can be examined for their internal coherence, their scope, their fit with various data, their predictive power, etc.
>
> Whatever the lecturer then proceeds to do (in terms of his own assumptions and intent) these three students will make meaning of the experience in different ways which will involve different assessments of their own choices and responsibilities.

No matter how clearly the professor organizes his lecture on the three theories, students A and B will misunderstand it. If the teacher engages his students in a dialogue about the theories, he may see that

students A and B misunderstood the lecture, but it might take one or two years for these students to develop the concepts necessary to understand three theories as being equally legitimate.

As a second example, consider an announcement I have often made in the beginning of the semester in introductory psychology courses I have taught:

> I will be assigning short papers for you to write every week or two. I would rather, however, that you do not do an assignment in an area that is not of interest to you or an assignment that you feel you will not learn from. If you feel that way about any assignment, please come talk with me and I believe we can work out an alternative that better meets your needs and interests.

This announcement has never had the effect it was intended to have. Few students come to attempt a change in assignments, although the frequency with which this happens does increase over a semester. It has, however, been clear that students do not like the assignments as they receive more criticism than any other aspect of the course when I have asked students to comment on the course. I was surprised at how few students would attempt to negotiate a change of assignment until I began to consider how students might assimilate the message.

One way to explore this assimilation would be to consider how various types of students would understand the message. Mann et al. (1970) identify eight major "styles and adaptations" of students in the classroom. Consider how some of these would affect the way in which students might assimilate the beginning-of-semester message. "Compliant" students "easily and naturally conform to the standards of an authority figure" (p. 147). Some of these students come from families

where disagreement with authority is expressly forbidden. Others come from families which lead them to feel guilty or disrespectful for disagreeing with authority. These students would not be able to make sense of my announcement. They would be quite reluctant to try to change an assignment I had made. My request that they do so might strike them as nonsense or as indicating that I was not a competent teacher; if I were competent, I would know which assignment is best.

"Anxious-dependent" students are "very dependent on the teacher for knowledge and support, and very anxious about being evaluated" (p. 153). Most of these students would be reluctant to take changes matters relating to assignments and would probably fear I would be annoyed if they attempted to change an assignment.

Considering "the discouraged workers", Mann et al. say "When things go wrong for these people, they tend to blame themselves." (p. 163) If these students were displeased with an assignment, they would tend to see that as their fault and would try to accommodate to the assignment.

The "snipers" have a general pessimism about the possibility of fruitful relationships with authority figures. (p. 186) They might be skeptical about the possibility of their really being able to change as assignment. Their low investment in the class and their tendency to rebellion would also lead them to prefer criticizing the assignment to attempting to improve it.

Of the eight types discussed by Mann et al., only two groups would be likely to understand the message as it was intended: "the independents" who are older than other students and who "seem quite

confident of themselves and are not often threatened by the teacher, the work, or the other students" (p. 166) and "the heroes" who "see themselves as exceptional people" and who are "contemptuous of people whom they see as weak, conforming, and afraid to be independent." (p. 174)

It should be understood that it would take much time and effort to change my students' orientations toward school, authority, and life in general. Even knowing that my message is being misheard, it is difficult for me to correct the communication.

In sum, Piaget's notion of "assimilation" bears the following implications for classroom communication. First, clarity of communication is dependent not only on the organization of the message but also on the concepts to which the listener assimilates it. Thus, the lecture described by Perry and my instructions to my students might both be well organized by still misunderstood because of the differences between the speakers' concepts and their students' concepts. Second, one can generally discover what miscommunications exist by establishing two-way communication. Perry's lecturer could discover whether his students understood his lecture as he intended it by discussing its context with the students, and I might see how my students understood my instructions by asking their opinion of them or asking what use they might make of options I offered. Finally, some miscommunications cannot be quickly resolved because clear communication depends on concepts the listener has not developed. It would have been impossible for Perry's lecturer or me to have helped many students

develop the concepts necessary to understand our messages in the space of one class (or perhaps even in the space of a semester).

3.42 Content and relationship aspects of classroom communication.

Two aspects can be distinguished in any human communication. The content aspect of a communication is the information the message contains about the world. The relationship aspect is what the communication implies about the relationship between the one who gives and the one who receives the communication; it is concerned with such issues as power, evaluation, and intimacy. If a teacher says to a student "Your last paper was very good", the content aspect of the message is an evaluation of the paper. The relationship aspect of the communication includes the grading power the teacher has over the student which adds an import to the teacher's comment; it includes the implication that the teacher's respect for the student was enhanced by the student's last paper; it also includes the fact that the teacher feels comfortable giving the student an opinion about his papers, although the student may not feel comfortable giving the teacher an opinion on the teacher's latest article. Given that students do not grade teachers' writing, the very act of the teacher's grading the students' papers affirms a difference in status between the teacher and the students, and therefore has relationship implications.

As another example of relationship in classroom communication, consider the following advice from McKeachie (1969, p. 178):

> Occasionally you will meet a student who aggressively calls you by your first name. This probably won't annoy you unless you're already

> worried about your position, but even if it does, it seems to do little good to reprimand the student. He will simply express his resentment of authority in some other way.

The content of the following message is the same: "Hey, Wilburt, could you repeat the last point", and "Dr. McKeachie, could you repeat that last point." The content of both messages is a request for a point to be repeated. What McKeachie finds objectionable in the first is the relationship aspect of it, the implication that the teacher and student are more intimate or more equal in power than the teacher feels they are.

The content aspect of communication is usually explicitly given in the meanings of words. The relationship aspect, although just as important, is often not noticed by the communicatory because it is given in tone of voice, body movements, in non-semantic aspects of words (such as the difference between "Hey, Wilburt" and "Dr. McKeachie") and the contexts in which these occur. Perhaps the best way to explore the relationship aspect of classroom communication would be to cite some classroom communications and describe their relationship aspects:

a. There is a relationship communication in teacher's distributing a detailed syllabus for a class in the beginning of a semester. This action tells the students that the teacher will be determining what the students will study in the class and that the teacher is not particularly interested in what the students want to learn.

b. When students resist participating in a classroom discussion about a topic of no interest to them that the teacher is trying hard to generate, they tell the teacher that he cannot compel them to feign

interest in that topic.

c. When a student raises his hand to contribute to a discussion, he acknowledges the teacher's right to determine who will speak in the class.

d. When a student asks the teacher for clarification about the subject matter he implies that such clarification is the duty of the teacher and not of other students who might be competent to clarify the point in question.

In all of these examples it is not the speaker's words but the context in which they are spoken or the classroom member's nonverbal behaviors that bear implications about relationships among classroom members.

3.43 Metacommunication in the classroom.

One of the most effective means for changing the way people affect each other in a classroom is to metacommunicate, that is, to talk about the ways in which classroom members affect each other. This process is often overlooked in literature on classroom change. McKeachie (1969), for example, lists the following sources of information a teacher has about his teaching:

1. student evaluation of the teacher's teaching,
2. the classroom examination,
3. the behavior of students in class,
4. individual conferences outside of class with students about their problems,
5. advice of colleagues.

One possibility missing from this list is that of asking individual students, groups of students, or an entire class, "Is this course going well? Are any changes needed?" If a teacher asks the question long enough, gives students whatever support they need to answer it, and responds to student suggestions, talking with students about a course can be a most valuable source of information about the course.

But there is some recognition of value in talking with students about a course. One example is given by Cahn (1972) in his discussion of a classroom structure he had experimented with. A few students would be panelists, discussing an issue in front of the class; other students would at some point in class join in on the discussion; the rest of the students, the observers, said nothing but watched. Although various students would volunteer for the panelists' roles, one fairly consistent group of students would always be silent observers. Cahn writes:

> After about ten sessions, ... I felt I had to know more about the observers. Were they unhappy? Did they feel ashamed? Was this a debilitating experience for them? I wanted to check their morale, and to find out why they chose the role of the observer.... The ten observers comprised 40 percent of the class, too high a proportion of the entire group to be taken lightly. I decided to find out what I could by talking directly to them as a group. The observers seemed relieved to be alone with me, and I too was pleased.... After a halting, difficult opening, they tried to give me their reasons (for being observers): they would rather listen than speak because they did not feel comfortable with the materials; some were frightened of the brighter students in the class beside whom they felt inadequate; some were afraid to speak at all.... I was impressed with the general friendliness

> of the group. When we had finished discussing the role, I felt that they were relieved to have clarified their position. (p. 47)

By discussing whether the course was a debilitating experience for the students and how the class frightened some students and made some uncomfortable, the teacher communicated with the students about how he as a classroom member affected them. This metacommunication provided the teacher with the information he needed to have an effect on the students more in accord with the class goals.

A second example of classroom metacommunication is given in a discussion of the issue of how quickly to cover material in a course, Erikson (Clinic to Improve University Teaching, 1974) suggests:

> An often informative and useful strategy is to ask students directly about pacing: "Am I moving too fast?"; "Are you with me so far?"; "Shall I give another example?"; "Should we work another problem?"

Here the classroom members are communicating about the effect his lectures have on the students. By finding whether the lectures help students understand the material and whether the lectures leave the students behind in the materials, the teacher can make his lectures more facilitative of student learning.

Finally, Mann et al. (1970) (p. 235) describe a class in which the teacher "took the opportunity to find out how the class felt about his strength and about his role in the class by asking the students what they thought" about the present structure of the class. In the ensuing discussion, the teacher got definite information about the amount of control individual students wanted him to assert over the class.

In each of the above examples a teacher was able to redesign classroom procedures so as to better achieve class goals by discussing with the students how the current procedures were affecting them. The examples indicate the usefulness of metacommunication in redirecting a class toward its goals.

3.44 Paradoxical communication.

Some classroom requests are paradoxical, that is, they cannot be complied with. Greenbaum (1968) describes:

> An example not infrequently observed in enlightened classrooms...the teacher's command which says, in effect, "disagree with me." Translated into relationship terms, this is saying, "I command that you perceive our relationship as symmetrical." The student who acquiesces is, of course, obeying the teacher's injunction and in adopting a symmetrical relationship is confirming the complementary one. This is not unlike the wife who tells her husband, "I want you to dominate me." Both the student and the husband are placed in untenable positions of denying the injunction by acceding to it, or obeying the injunction by disobeying it. In general, the giving of instructions defines a relationship as complementary; if the instructions require a symmetrical relationship, or an inverse one-up, one-down relationship, they become paradoxical and cannot be obeyed. (p. 8)

Another example is given by Gadlin (1976). Teachers, when they are nearing the end of a lecture which has gone on longer than they had planned, often ask students, "Should I go on and finish this up or would you like to stop the lecture and discuss some of it now?" Gadlin points out that this question is often a request for the students to a) tell the teacher to continue lecturing and b) do so because they find the lecture valuable. Once this is made explicit,

it becomes clear that the request cannot be complied with because one cannot find a lecture valuable on request. Students will therefore usually not reply to the teacher's question or may politely ask the teacher to finish the lecture without considering whether it is valuable to do so; in either case, the teacher will continue on with his lecture. The request, although it appeared to be grammatically correct, was paradoxical.

3.45 Section summary.

Four aspects of classroom communication have been explored. First, the role of assimilation in communication was discussed. It was shown that clear communication is not just a property of the organization of the message, but also a matter of the concepts to which the message is assimilated. Also, although dialogue can indicate where there are communications problems, miscommunication is sometimes caused by the listener's not having certain concepts which are difficult to develop; as a result, no all miscommunication can be easily corrected.

Second, a distinction was drawn between the content and relationship aspect of communication. It was pointed out that the relationship aspect, though important, is often overlooked as it is usually implicit, not explicit in the communication.

Third, a distinction was drawn between communication and metacommunication. Metacommunication was shown to have value in keeping the classroom directed towards its goals.

Finally, it was indicated that some classroom requests which appear to be reasonable cannot be complied with because they are in fact, paradoxical.

3.5 The Openness of the Classroom System

The classroom does not operate in a vacuum but is in interaction with many other systems. Some examples of interactions with other systems are the following. The academic department may to some extent dictate the course syllabus and, especially for untenured faculty, may limit the amount of time the teacher spends preparing for class (as this interferes with time spent on research) and may affect the way the class is taught (if some teaching styles are looked upon more favorably than others by the personnel committee). The students' previous courses affect student behavior and may make it difficult for a teacher to structure his class differently from the way his students' previous classes were structured. The students' freshman orientation affects student behavior in the classroom in that it is the first interaction the student has with the institution and so has a large affect on the role the student assumes within the institution; if the student is given a passive role in his orientation, he may well assume a passive role in his first classes and in classes thereafter. The students' peers may affect how hard they study and the degree to which they feel they can be interested in various aspects of their classes.

To explore the openness of the college classroom in any depth or breadth would in itself be a major task. Instead, one such system will be explored and its affects on the classroom demonstrated. This system is the "teaching culture", described by Mann et al. (1970).

The teaching culture is the group of teachers and the social

structure linking them together which most affects a given teacher's ideas, values, and behaviors as a teacher. The teachers involved may be officemates, the staff of a large course, members of a department, or some other group of teachers who influence each other. The effects of the teaching culture are described as follows:

> To put it bluntly, our conviction is that much of the ineffective and unsatisfying teaching in American colleges today can be traced to the disorganized and often destructive qualities of the many teaching cultures. When teachers almost never talk to each other about their teaching, or when the only references to students are derogatory, the teaching culture is to blame if each teacher walks into class unmotivated to do well. When teaching fellows feel that if they were any good they would have research fellowships and not have to teach, the teaching culture is not likely to support and stimulate creative teaching. (p. 334)

Mann et al. identify six roles teachers must play in the classroom: expert, formal authority, socializing agent (as a member of his academic field), facilitator, ego ideal, and person. The teaching culture affects the teacher's performance in each of these roles.

For example, a seminar for the staff teaching a large course could improve the performance of the teachers involved as experts in the field. The problem of lack of expertise in certain areas in a broad introductory course can also be side-stepped by teachers' who are not well versed in some areas they are to teach inviting to their classes other teachers who are more expert in those areas. It is also noted that

> paradoxically, the first step toward increasing the expertise of a set of teachers may necessitate breaking an unspoken rule against admitting ignorance. Only when one can admit without disgrace that one cannot remember (or has never read) a particular source will the capacity of a collectivity

come into play. (p. 335)

How teachers act in the classroom as formal authorities (assigners of work, givers of grades, etc.) is affected by how they are treated by authorities over them, the course coordinator, department chairman, etc. In addition, the opinions of a teacher's peers may prevent him from finding a style appropriate to him "sometimes impelling the teacher to be more inflexible than he wants to be and sometimes to be more 'democratic' than he wants to be." (p. 336)

Mann et al. proceed to show how the teaching culture affects the other four roles as well as other aspects of teaching, and recommend that teachers develop their own organizations of peers to facilitate their own teaching.

> Very few teaching units have even begun to test out ways of building a cohesive culture. Almost any structure created and owned by the members, the teachers themselves, would seem to be an improvement over the atomized, low energy arrangements so prevalent in college teaching today. (pp. 345-46)

3.6 Chapter Summary

The chapter is perhaps most usefully summarized by a chart comparing the open systems view of the classroom with the mechanistic view. It should again be understood that the coherence in the chart of the mechanistic view is not intended to imply that anyone consciously holds that view. However, some people do consciously hold some parts of it, and, I suspect at times most of us fall into the kind

of simplified reasoning it represents even when that approach is not appropriate. The chart is, however, intended to provide a coherence to the various parts of the G.S.T. view which are separately espoused by a variety of people.

Summary Chart of Chapter Three

Classroom Aspect	Mechanistic View	Systems View
Relationship among classroom roles	Roles are independent:	Roles are interdependent:
	Cause and blame locatable in one person, usually the teacher	No unilateral cause
	One classroom member can be changed	Changing one member entails changing all. The only change possible is a change of the system
	Beneficial change in one role benefits the classroom	Beneficial change in one role may cause detrimental, beneficial, or neutral changes in others and may lead to corresponding effects on the classroom
	Cause is linear; the environment determines the individual	Cause is cyclical; the environment and the individual effect each other
Change and stability	Determined by laws of momentum:	Affected by positive and negative feedback cycles:
	Change attempt brings change in the same direction and same order	Result of change attempt may be in opposite direction of force applied and

Classroom Aspect	Mechanistic View	Systems View
(change and stability cont.)	of magnitude as the attempt	may be greater or smaller than applied force
	Small initial differences lead to small final differences; large initial differences lead to large final differences	Negative feedback can dampen initial differences. Positive feedback can magnify initial differences
	No distinctions made about kinds of change	First order change (improvement within the structure of the class) distinguished from second order change (change of structure)
Communication	The message sent is normally the message received. Stimuli are self defined	Messages are assimilated to the receiver's concepts and are thereby changed
	The message consists of meanings conveyed by words	In addition to content, there is a relationship aspect of a message conveyed by implicit cues and social context
	No differentiation of levels of communication	Communication differentiated from meta-communication. Meta-communication seen as having homeostatic value
	All grammatical communication seen as sensible	Some communication seen as paradixical e.g. "Disagree with me"
Openness	Classroom seen as closed self-contained. All classroom problems seen as caused in and to be treated in the classroom	Classroom seen as interacting with families, other classes, departments, peer groups, and society as a whole. Classroom problems sometimes caused by other systems

Notes - Chapter 3

1. "Teaching Improvement Specialist" is the title used by the Clinic to Improve University Teaching at the University of Massachusetts to refer to classroom consultants using the Clinic's teaching improvement process. Chapter IV describes and examines that process.

2. Von Bertalanffy (1968, Chapter 3) gives the following formulation in mathematical terms for "independence" and "centralization". First, he expands the equation given in note 6, page 23, into a Taylor series:

$$\frac{dQ_1}{dt} = a_{11}Q_1 + a_{12}Q_2 + \ldots a_{1n}Q_n + a_{111}Q^2_1 + \ldots$$

Here, change in Q_1 is a function of the quantities of all elements Q_1 to Q_n. If however, the coefficients of the variables Q_j $(j \neq i)$ become zero, the equation becomes:

$$\frac{dQ_i}{dt} = a_{1s}Q_s + a_{ill}Q^2_i + \ldots$$

That is, a change in each element depends only on that element, and independence exists. On the other hand, if the coefficients for one element, p_s, are larger in all equations than all the other coefficients, we may say the system is centered around p_s. In the degenerate case, where all coefficients go to zero for $i \neq s$, we obtain:

$$\frac{dQ_1}{dt} = a_{1s}Q_s + a_{11s}Q^2_s + \ldots$$

That is, change in Q_1 is a function only of Q_s.

3. The confusion between a constant effect and no effect has an

interesting parallel in the equations above. A given variable may have a constant effect on another variable. (For example, we may assume that there will always be enough students present at a lecture to allow a teacher not to feel foolish lecturing to an empty hall.) The derivative of a constant function, however, is zero. Thus, in such a case, the first variable will not contribute to changes in the second variable. (Again, student attendance, being constant, does not cause changes in lecturer performance.) It would be a mistake, however, to infer no relationship between two variables because of a zero derivative of one with respect to the other.

4. By a "humanistic class" I mean a class designed in accordance with a humanistic approach to educational psychology. (See Rogers, 1969) Primarily, this means making use of the students' own learning goals as the major motivating force in the classroom. (In his emphasis on the goal seeking aspect of human nature Rogers can be considered to be in accord with the G.S.T. paradigm. Von Bertalanffy (1968a) lists Rogers as one of the psychologists who considers man to be an active organizing personality system rather than a reactive mechanism.)

5. The student role is similar to that of Blacks and women as oppressed persons in a number of ways. For example, students are low power people. Much of their activity is determined by others in positions of higher power. Students are also like Blacks in that they are socially segregated from higher power groups. Perhaps the most thorough comparison between students and Blacks is given in the Student as Nigger (Farber, 1967).

6. It is still not clear to my why the students were not interested in controlling the workshop. In part, I was never sure of their interest in the topic of the workshop to begin with; they chose to participate in it as part of a required course, not a course that they freely chose to take. In addition to the ambivalent feelings they probably had about the workshop topic, my inept handling of difficulties in it probably drove the students further from caring for or taking responsibility for the workshop.

7. Support for this hypothesis comes from a study done by Duncan Grant (1973) on improvement strategies for fifth grade classrooms. Grant found training students to be more effective than training teachers in increasing how often teachers praise students as opposed to criticizing them. (Training teacher and students as a whole class was found to be the most effective treatment).

8. An exception to this pattern is Grasha's (1974) article which describes for the teacher a way of selecting the best classroom design given a set of instructional objectives, instructor skills, and student skills in the classroom.

9. This example comes from Bette Erikson's experience as a classroom consultant.

CHAPTER IV

THE CLASSROOM CONSULTANT

In recent years, there has been an increased interest on the part of colleges and universities in improving the quality of their classroom through on-campus centers providing classroom consultants. Typically, these consultants are referred to by such titles as "faculty development officers" or "instructional improvement specialists"; these consultants usually work with a teacher, at the teacher's request, providing him with information about the quality of his teaching and ways to improve it.

This chapter will explore the implications of G.S.T. for classroom consultants and will compare them with mechanistic implications for consultants. In order to provide a context in which to discuss these implications, the analysis will be applied in reference to the "Clinic Process". The Clinic Process is a particular method used by classroom consultants to help teachers improve their teaching. It was developed by the Clinic to Improve University Teaching and is currently used by the Center for Instructional Resources and Improvement (CIRI), both of the University of Massachusetts. Before describing the Clinic Process, it should be emphasized that the Process itself should not be viewed as mechanistic or consonant with a G.S.T. view, although, as will be shown, there are ways in which the Process facilitates viewing the classroom as a system, and other ways in which it facilitates viewing the classroom

as a mechanism. The chapter will also show how the Process can be used in accordance with both the mechanistic and G.S.T. approaches and ways in which a G.S.T. application of the Process may be more effective.

The Process begins by a teacher's contacting CIRI and requesting the help of a consultant. Several points should be made about the initiation of contact between the teacher and the consultant. Although teachers only become involved in the Process by their own request, there is no systematic inclusion of students in the decision of whether the Process will be used in a given classroom. As a result, students cannot be expected to be willing participants in teaching improvement efforts, even if the teacher and consultant clearly believe the efforts would benefit students too. It should also be noted that the improvement of teaching is not the only motive a teacher will have for initiating the Clinic Process, although in most situations it is the teacher's major motives. Teachers also ask to work with a consultant because they are very good teachers and expect to get praise for their teaching from the consultant that they do not get from their colleagues, or because they want to be able to say to their personnel committees that they have worked on their teaching, or for other reasons.

After the initial contact, the Clinic Process proceeds as follows:

1. Initial Interview. The consultant interviews the teacher to obtain a basic description of the course and to find what the teacher's concerns are about his teaching.

2. Data collection. The consultant visits the teacher's classroom, observes the class, videotapes it, and administers to the students a questionnaire asking the students to rate the teacher's performance on 38 different teaching skills. (See Appendix A for the questionnaire.) The teacher is asked to rate himself on those same skills and also to predict how the students will rate him. The questionnaire also asks more general questions about students.

3. Localization. The teacher and consultant meet, each having privately reviewed the videotape and the results of the questionnaire. They come to an agreement about what the teacher's strengths are, and also decide on one or more areas of the teacher's performance to bring improvement in.

4. Improvement strategies. The consultant suggests ways in which the teacher might improve his teaching. The teacher tries these out in class with the consultant providing whatever support is needed, including encouragement, helping the teacher plan his teaching, and observing the classroom again to see how well the teacher is carrying out the consultant's suggestions.

5. Data re-collection. The consultant administers a short questionnaire to the students focussed on the skills the teacher was trying to improve to find whether the students see improvement in those areas.

Using the Clinic Process as a context, this chapter will explore the implications of G.S.T. for classroom consulting, following the same structure as section 2.5, the section in Chapter II on family therapy. Sections 4.1 will consider data collection, 4.2 will discuss

problem definition, 4.3 will discuss intervention, and 4.4 will summarize the chapter.

4.1 Data Collection

The most important implications for data collection coming from G.S.T. derive from the G.S.T. assumption that all aspects of the observed classroom--teacher behavior, student behavior, consultant behavior, the environment in which the classroom operates, etc., are interrelated; there is a need, therefore, to collect information on a wide range of areas and to keep the interrelatedness of the various aspects of the observed classroom in mind while collecting data. The mechanistic view, on the other hand, would see the classroom as being unilaterally controlled by the teacher; as the teacher is seen as acting independently of the students, data collection would focus exclusively on the teacher with a mechanistic application of the Clinic Process.

Differences between the G.S.T. and mechanistic views of communication also have implications for data collection. The mechanistic view holds verbal descriptions of events to be generally accurate and valid, especially if all observers of the event give the same verbal description of it. (Kelley, 1974) The G.S.T. view, on the other hand, holds that verbal descriptions are determined not only by the events described but also by the concepts and interests of those giving the descriptions, and that consensus among descriptions is not necessarily an indication of truth. (See subsections 2.24 and 3.314 on myths, and subsections 2.31 and 3.41 on

assimilation and communication.)

This section will explore in greater detail the implications on data collection of these differences between the G.S.T. and mechanistic views.

4.11 The "Consultant + classroom" system.

The G.S.T. view holds that the classroom consultant's observing a classroom may change that classroom. A teacher may be nervous about being observed and may therefore not teach as well. On the other hand, a teacher may come to class especially will prepared on a day when he is being observed by a consultant, and may teach exceptionally well when observed. The mechanistic view, in implying that the presence of an observer does not change an observed event, would lead the consultant to assume in the first case that the teacher always taught that poorly and in the second class that the teacher always was that well prepared.

The consultant may become involved in the "consultant + classroom" system in other ways. I have spoken with one consultant who felt his job was to help the teacher use and improve his strong points. He wanted to help each teacher to develop his own style as a teacher according to his own abilities. In so doing, this consultant made himself an ally of the teacher's. He collected the data he would need for the sake of the teacher's development, and he evaluated changes in terms of their value to the teacher. In all of this, the teacher's duty to serve his students could easily be overlooked. Thus, the consultant is not an outside observer of the classroom, but a full

member of the "consultant + classroom" system, advancing the causes of some members at the expense of others' causes, and analyzing data through biases.

4.12 Classroom myths and observation.

That the teacher and most of the students share a belief about a class may indicate that the belief is justified, or it may be an indication of a classroom myth, that is, a reality distorting belief about the classroom shared by most classroom members. (See section 3.314.) The mechanistic view would lead the consultant to assume affrement of description to imply the description was valid, while the G.S.T. view would suggest the consultant also be aware of the possibility that the members of the classroom share a distorted belief about the classroom. For example, consider the French class discussed in subsection 3.314 in which the teacher used the same methods every day, the teachers and students felt no need to add variety to classroom methods, but teacher and students appreciated the increased variety introduced by the consultant. On the basis of the teacher's and students' evaluations of the course, one might conclude there was no need to increase the variety of teaching styles used by the teacher. A similar analysis holds for the class discussed in subsection 3.44. Here, both teacher and students would say, if asked, that communication was open and two way, although students did not really feel free to ask questions. Both of these examples underscore the need for live observation to supplement oral reports. Through the initial interview and the student questionnaire alone, a consultant using the Clinic Process would have little chance of breaking

through a classroom myth. The addition of the videotaping and the classroom observation greatly increases the possibility of uncovering the distortion of the myth. The inclusion of live observation and videotaping as a standard procedure in the Clinic Process therefore facilitates the consultant's making a G.S.T. application of the Process.

4.13 The need to observe students' behavior and interrelationships of behaviors.

The mechanistic view, holding the teacher to unilaterally and independently control the classroom, would imply a need for data to be collected only about the teacher's behavior. The G.S.T. view, however, implies a need for data to be collected also about student behaviors and about patters of interactions between classroom members because a) the classroom is controlled by the behaviors of all classroom members, not just those of the teacher, b) even to understand the teacher's behavior one needs to understand the context of his behavior provided by the students, and c) there is need to understand not only the behaviors of individual members but also how members affect each others' behaviors. The following examples will demonstrate these three needs.

The first point is most clearly illustrated in the context of a discussion class. The quality of a discussion depends clearly not only upon the teacher's behavior but also upon the teacher's behavior but also upon the students. In order to evaluate a discussion, information is needed not only about the teacher's skills as a discussion leader but also about the students' skills in evaluating arguments, pursuing other participants' points, listening to other people's

positions, encouraging others to talk, etc. In order to know how to improve a discussion, one needs to know the students' discussion skills, their interests in participating in a discussion, and their reasons for being in the class. Thus, the G.S.T. approach implies a need to collect data about student performance, interests, and skills.

The need to collect data about the context of student behavior within which the teacher acts can be shown in relation to a calculus course I consulted with. In one class, the teacher was demonstrating how to solve a particular problem. His demonstration was well organized. He would occasionally ask students how to proceed with the problem at times rather than doing the entire example himself, and some students would always be able to say how the solution should proceed. All of these behaviors would be indications of good teaching if they happened in the context of a class whose students were all comfortable with the pace of the presentation. In this class, however, two thirds of the students were busily taking notes during the entire presentation. While the teacher asked if there were any questions, and while a handful of the students participated in the problem solving, the bulk of the students looked back and forth between the blackboard and their notebooks, transferring the contents of the former to the latter, and barely being able to keep up with the teacher. Most of the students in the class did not have the time to formulate their questions, nor even the time to consider whether they had any questions. Thus, observation of the context in which the teacher was acting indicated that he was moving

too quickly for the bulk of the class, although a videotape of just the teacher would have indicated that he was an excellent lecturer.

The same example also illustrates the need to collect data about patterns of interaction among classroom members. If one focuses on the teacher's behaviors, which the mechanistic view would lead one to do, the teacher's asking students if they follow him appears to be an indication of good teaching. If one focuses on the patterns of interaction, however, which the G.S.T. approach would suggest, it is seen that the teacher's questions are not followed by the appropriate response by students. The teacher's behavior, his asking for questions, seems adequate. The pattern of interaction, his asking for questions followed by silence from students who are too busy to know if they have any questions, indicates there is a problem in the class.

The Clinic Process allows data collection about student behaviors, about the context of the teacher's behaviors, and about the patterns of interaction in the class; these can all be captured on videotape or recorded by an observer in the classroom. To some extent, it even encourages data collection in these areas; the student questionnaires, for example, give information on the students' opinions of the teacher's skills, and these opinions form part of the context in which the teacher acts.

However, in other ways, the Clinic Process allows and encourages a mechanistic data collection. Although the videotape allows recording of the students' behavior, many videotapes of classrooms focus on the

teacher. Again, the questionnaires give information about the context of the teacher's actions by indicating the opinions of him held by the students he works with; however, student opinions are sometimes seen only as an indication of the teacher's level of skills and not as an indication of, for example, the respect the students might show him. Also, the questionnaire draws attention to the teacher and to his skills and away from student behavior and interactions among classroom members. The Clinic Process does not draw attention in a discussion section to whether students encourage each other to speak, whether students listen to each others' comments, or whether students have other skills necessary for good discussion; the student questionnaire draws attention rather to the teacher's skills at "facilitating discussions among students as opposed to discussions only between the instructor and students" or to the teacher's "overall ability as a discussion leader" (Clinic to Improve University Teaching, 1974). This focus on the teacher's skills can affect the way a consultant would intervene, say, in a discussion section in which students cut each other off. It might lead the consultant to encourage the teacher to take a more directive role in discussions even though it might be more appropriate for the teacher or the consultant to show the students a videotape of one of the class discussions and show the students how they could improve their discussions by not cutting each other off.

In summary, the Clinic Process allows the consultant to collect data about student behaviors and interactions among classroom members,

which the G.S.T. approach would encourage. In several ways, especially in the focus of the questionnaire, the Process leads the consultant to focus on the teacher's behaviors, a focus consonant with a mechanistic view of the classroom. In so doing, the Process may lead the consultant to ignore problematic student behaviors or problematic teacher-student interactions.

4.14 The need for information about "non problem areas" of the classroom.

The mechanistic view, holding that each aspect of the classroom is independent of all others, would suggest a need to collect data only about those areas of the class that seem problematical. The G.S.T. view, however, would imply a need to collect data about nonproblem areas of the class. Even if a teacher indicates in the initial interview what areas in his teaching he would like to improve, there is a need to collect information about the total functioning of the classroom, even aspects of it which do not seem to be problematical. This may help localize a classroom problem. If students do not find adequate explanations of material in a teacher's lectures, it is helpful to know that the teacher answers questions well; this indicates that the teacher is capable of giving adequate explanations, but focuses on the wrong areas in his lectures, and needs to develop greater two-way communication in his lectures. An over-all questionnaire about the classroom, such as is used in the Clinic Process, can also expose problems that were previously unknown. A common example of this is that the questionnaire data may indicate that the teacher is not adequately informing the students of what they

need to do for their grades in the course nor how well their performance is progressing. In some cases, there may be a resulting insecurity that interferes with course work although no individual student expressed that insecurity to the teacher previously.

One other area of the classroom that should be investigated more is student goals within the class. In addition to finding what the teacher's goals for the class are, and whether there appear to be any problems in students' achieving those goals, the consultant should also find why the students are in the class and what they want to learn in it. This may explain lack of student motivation if, for example, most students are taking the course only to fulfill a requirement. It can also aid the teacher and consultant in constructing examples which are in areas of interest to the students to illustrate principles which the teacher feels the students should learn.

4.2 Problem Definition

There are four places in the Clinic Process which explicitly call for problems to be defined: during the initial interview (when the teacher may indicate to the consultant particular problems he feels in his teaching), when the consultant reviews the data he has collected, when the teacher reviews the data, and when the consultant and teacher discuss their readings of the data, and when the consultant and teacher discuss their readings of the data. During this last step the teacher and consultant agree upon areas of the classroom to work on.

Both the mechanistic and the G.S.T. views have implications for how problems should be defined. Because the mechanistic view holds the teacher's behaviors to determine what happens in the classroom it implies that most classroom problems are ultimately due to a fault of the teacher. Because the mechanistic view sees knowledge and perception as copies of reality, it implies that one "finds", "discovers", or "locates" problems rather than that one "defines" problems. On the other hand, the G.S.T. view would see a classroom problem as a malfunctioning of the entire classroom system. The formulation of the problem (e.g. whether one says that the problem is that the teacher answers questions poorly or that students are not articulate and persistent enough in their questioning) is seen as being as much a matter of construction as a matter of discovery. As will be discussed below, the Clinic Process facilitates application of the mechanistic view in some ways and of the mechanistic view in others.

The following example will be used throughout this section:

I was at one time a consultant to a statistics class. Students in the class were not learning the material as well as it seemed they ought to. There was some difficulty in students' asking questions of the teacher. The teacher often became impatient with the students' questions. He felt that they themselves should have known the answers to the questions they asked because they should have entered the course with that knowledge, because he had answered that same question ten times in class already, or for some other reason. His impatience

showed, and students were reluctant to ask questions. When questions were answered, they were often not answered in a way that proved useful to the questioner; the teacher found it hard to take the perspective of a student well enough to know what the student needed.

The intervention I suggested was for the teacher to break the class into groups of five students and give a statistics problem for the groups to work on. By working on a problem, individual students were able to see what they did and did not understand. What they did not understand they were able to ask another group member about without risking the teacher's sarcasm. Most students reported that they found the groups to be enjoyable and valuable.

4.21 Defining the problem as in the system and not in the individual.

The mechanistic view holds problems to exist in individuals; the G.S.T. view holds problems to exist in the system as a whole. By focussing on the teacher's skills, which the mechanistic view would have one do, one might say that in the classroom just described, the problem is the teacher's poor question answering skills; the solution to the problem would then be to improve the teacher's question answering skills. Instead, I defined the problem as being that the classroom system was not operating so as to enable students' questions to get asked. The resulting intervention thus by-passed the teacher and his question answering skills altogether and entailed a restructuring of how students interacted with each other.

4.22 Defining the problem as currently caused and solvable.

The mechanistic view holds that the most obvious and bothersome aspect of a problem situation is what must be corrected. The G.S.T.

view implies there is no one correct way of defining a problem, it leaves room for the consultant to define problems in such a way that they are solvable. Had the problem in this statistics course been defined as the teacher's sarcasm and lack or empathy for his students, intervention would have had to entail major changes in the teacher's attitudes and personality as a whole. These, however, have been developed over a number of years. A consultant might well consider the task of changing the teacher's personality to be an impossible one.

On the other hand, in many respects the "way in which class members are interacting" is currently caused and changable. Simply by saying "Break into problem solving groups" the teacher can change the way students interact with each other so that students felt free to ask questions and could get their questions answered.

4.23 The relationship between problem definition and intervention.

The mechanistic view holds problems to be self-defined. The G.S.T. view sees a relationship between problem definition and intervention. The relationship between problem definition and intervention runs in two directions. First, the way a problem is defined determines the intervention. A problem in a teacher's skills calls for a different improvement strategy from a problem in students' getting their questions answered. Secondly, the kinds of interventions a consultant is accustomed to making effect the kinds of information he collects and the way he defined problems. Another consultant might not be comfortable working with students but might be skillful at designing

homework. Such a consultant might collect no information about students' classroom behavior but might have carefully studied the homework assignments and might have suggested changes in the homework assignments. I, on the other hand, paid little attention to the homework assignments but focused on in-class behaviors which I felt more skilled to redesign.

4.24 On what a malfunctioning is.

The G.S.T. view defines a "problem" as a malfunctioning of the classroom system which is currently caused and solvable. A "malfunctioning" might be best defined as a state of operation of the classroom system in which members' goals are not being served by the classroom. This definition may be contrasted with a skills definition, more compatible with the mechanistic view, which would hold a classroom problem as the teacher's lack of a certain set of skills.

In a system theory approach to problem definition, a lack of teacher's skills is a symptom of malfunctioning, but not the malfunctioning itself. Very often a lack of skills will result in goals' not being met. Often, however, a teacher can compensate for a lack of skills with other skills. In the end, what is important is not how well a teacher structures or paces his lectures, but how well the students are learning what they and the teacher want them to learn, how much satisfaction the students and teacher derive from the class, how much teaching the class promotes the teacher's professional development, and how well the class fulfills its other purposes.

The Clinic Process allows the consultant to define a problem in

any way he wishes. However, it facilitates mechanistic problem definition in two ways. First, because the Process at no point explicitly requires the consultant to ask the students their goals for the course, the consultant is led to be concerned with how well the class is fulfilling the teacher's purposes and to pay less attention to the students' purposes. Second, the questionnaire leads (but does not force) the consultant to focus on the teacher's skills and to define problems as being poorly developed teaching skills rather than unfulfilled classroom goals. As a result, the consultant may be led to ignore existing problems or to work on aspects of problems which are not those most amenable to change.

4.3 Intervention: Where, When, By Whom, and How

4.31 Where intervention is made.

It has been said that a change in any classroom member's behavior will impact on other classroom members. Strictly speaking, this means that one cannot talk of changing only one part of a classroom as a change in any part of the classroom will eventually mean a change in the classroom as a whole. Nevertheless, a consultant must choose a point of entry into the system, in the sense of deciding whether to a) talk with the teacher outside of class and suggest ways in which the teacher might behave differently in the class, b) talk with the students individually or as a group and suggest ways in which they might behave differently in the class, c) talk with the teacher outside of class and suggest ways in which he might restructure the students' classroom behaviors, d) do none of these. In a

mechanistic approach, intervention is made at the point of the behavior of the person responsible for the class, which is assumed to be the teacher; if students are not learning from the teacher's lectures, the consultant would try to improve the teacher's lecturing skills. The focus on the teacher's skills in the Clinic Process leads the consultant to intervene at the point of the teacher's skills, although the Process by no means requires such an approach. Institutional and social norms, however, do make it much easier to work with teachers than with their students, as does the fact that the consultant is brought into the class at the teacher's request, not at the students' request. (Institutional norms are at play in this last point too as it would not be normal in most institutions for students to request the help of a consultant for a class.) It is more acceptable for a consultant to instruct students in how to ask better questions. Given the institutional norms, student behaviors are most easily changed by restructuring the class or by helping the teacher train the students.

Whereas the mechanistic approach suggests that the point of entry should always be the teacher, the G.S.T. approach suggests that the point of entry should be at the point where the consultant has the most leverage, that is, where the most improvement can be achieved for the least effort expended. Thus, while the mechanistic approach would automatically lead to improving a teacher's lectures by working on the teacher's lecturing skills, under some circumstances, the G.S.T. approach might lead the consultant to increase students'

learning from lectures by improving their question asking skills. The notion of leverage derives from the G.S.T. assumption of inter-dependence of roles; it is assumed that an undesirable aspect of one role can be changed through a change in another role. Therefore, the consultant might as well choose the point of entry that will achieve the greatest results for the least effort rather than automatically making a direct attack on the target role. The G.S.T. approach thereby offers the consultant a flexibility missing in the mechanistic approach.

The following are some considerations determining where leverage lies. Not all of the consideration derive from G.S.T. in a direct way. Rather, it is characteristic of the G.S.T. approach to seek leverage rather than to automatically seek a more direct improvement.

a. Who has the most motivation to change. Any intervention will require some classroom member(s) to put forth effort in changing old patterns of behavior. Students who are taking a course only because it is required of them or teachers who value their teaching much less than their research may not be motivated to put much effort into changing their behaviors. On the other hand, students who are bored or who are frustrated because they are not getting what they want from a course, or teachers who feel it is important for them to be good teachers would be motivated to change their own behaviors. The consultant should direct his efforts toward suggesting to classroom members who are motivated to change how they could change their behaviors in ways which would improve the classroom.

b. Where an intervention can be designed. Analysis of classroom problems at times reveals several choice points. If a classroom problem is caused by factors a, b, and c, and if factors a, and b seem very difficult to change, then the consultant should direct his attention to changing factor c. For example, I once consulted with a group of language instructors. They wanted to know what they could do about their students' coming to class unprepared, as this required them to spend class time covering material the students should have learned at home. The students would not learn the material from their own motivation because they were not interested in it; they only took the course because it was required. On the other hand, the instructors were not free to demand a given level of performance from students as criterion for a passing grade although that might have coerced students into studying; there was a danger that too many students would be failed, that not enough students would choose that department to fulfill their language requirement, and that therefore the department would lose faculty positions. The problem was therefore not defined as "how can we get students to come to class prepared" but "how can we best work with students who come to class unprepared". This seems like a less than ideal approach to the problem, but it was the best possible approach given the nature of the students, the teachers, and the institution.

c. Negative and positive feedback. The literature on feedback does not lend itself to making a description of where negative and positive feedback are likely to occur in the classroom, nor how they

can be fostered or countered. On theoretical grounds, however, it would seem that the notions of negative and positive feedback have four implications for where the consultant can find leverage:

First, the consultant should try to make changes which will multiply themselves through positive feedback. A teacher might be shown how to respond to students' questions in a more positive manner which encourages more student questions. The increased number of student questions might please the teacher while giving him more practice in answering questions in an encouraging way. Thus, the students' questioning and the teacher's positive response to questions might increase the frequency with which the other happens. A small intervention thus might result in a large change in classroom dynamics.

On the other hand, the consultant should avoid making changes which will be countered by negative feedback; a change strategy should not be introduced which will require students to do so much more work that they will complain to the teacher and lessen his desire to implement to strategy.

Third, change in one part of the classroom may be best brought about by inducing negative feedback from another part of the classroom. If class discussions are disrupted by students' interfering with each others' comments, the teacher can be shown how to intervene to reduce such interference.

Finally, change can be introduced by interrupting an existent negative feedback cycle. A teacher can be kept from interrupting

students whenever they ask questions if there is a need for more student questioning in the course.

d. Networks. Although all classroom roles are interdependent, some are more interdependent than others. That is, changes in some classroom members' behaviors are liable to have greater impacts on the classroom as a whole than are changes in others' behaviors. As a rule, the consultant should choose as the point of entry classroom members who have greatest influence on other members' behaviors. Very often this will be the teacher, although in some situations particular students will have influence over other students.

In addition to leverage, the choice of where to make a change should be influenced by a conception of desirable roles for classroom members; interventions should be made which will make individual classroom members "healthiest". The concern for health comes from the G.S.T. notion of the classroom as a goal seeking system, one of those goals being the development and growth of classroom members. Of course, questions of health are matters of values. My own notions of the desirability for students to be autonomous and to feel a responsibility for the quality of their classrooms may be opposed by others who hold different values. The debatability of questions of value, however, should not lead to their being ignored. Consider a classroom in which a lecturer is not understood by his students. Most improvement specialists would attack this problem by training the teacher to give clearer lectures; this choice might even be supported by the notion of leverage as it may well be easier to change

the teacher's behavior than that of a class full of students. A different choice of point of intervention may result, however, if we ask whose behavior is most pathological. If in the class under consideration the students do not ask the teacher questions but simply attend the lectures and become confused by them, the teacher's behavior seems not to be abnormal. It is, after all, quite difficult to talk clearly to a group of thirty people who do not react to one's speech. On the other hand, it seems unhealthy for the students to allow someone to talk to them, not understanding what that person is saying and not giving that person the information he needs in order to clarify his communication. Certainly these students would not allow their friends to confuse them without at some point saying "I don't understand what you're saying. Could you tell me what you mean by ...?" If the teacher were trained to give clearer lectures, the students' passivity would be reinforced; the students would have a stronger belief that clarity of lectures is the responsibility solely of the teacher. On these grounds, one might want to train the students to be better question askers rather than training the teacher to be a better lecturer.

A similar situation might exist in a classroom where a teacher has difficulty obtaining students' cooperation in designing a curriculum because the students cannot or will not articulate what they want to learn in the course. It might be very easy for a consultant to help the teacher design the curriculum on his own. However, the behavior that seems unhealthiest here is the students'. It would seem that an

eighteen-year-old ought to be able to say what he wants to learn in a given course. Again, accommodating the teacher's style to the students' inability to articulate their interests can only reinforce this inability. Although it might be easiest to change the teacher's behavior, on the basis of health, it is the students' behavior that should be changed.

4.32 When intervention is made.

Although the Clinic Process does not itself indicate when intervention should be made, classroom consultants make their interventions outside of class time. The privacy of an office lends itself to discussing data about a teacher's performance and an unpressured atmosphere is required for a teacher to honestly consider ways in which he might restructure his classroom.

The G.S.T. notion of dependence of behavior on context implies that a skill is not necessarily best worked on outside of the context in which it is used. Consultants could also make interventions during class time, an option rarely considered. In addition to telling the teacher outside of class that he puts pressure on students while answering their questions, a consultant could interrupt the classroom when the teacher puts pressure on a student in order to show to the teacher what he had just done. In addition to encouraging the teacher to solicit more questions from his students the consultant might interrupt the classroom when it is clear to him that many students do not understand what the teacher just said although no student asked a question; this might be a good opportunity to find

out from the students why none of them asked a question and to show them the teacher's need for information from them about when he is not being clear. There are reasons for not intervening in a class in progress. Most of all, it breaks social conventions; it is simply a very unusual way to spend time in a classroom and the unusualness of it may prevent classroom members from fully participating in discussion in class about the class. Also, the classroom situation lacks the psychological safety that may be needed for classroom members to discuss their own imperfections and those of other classroom members. Finally, it may be difficult to obtain the cooperation of students in improvement efforts. Many students adopt behaviors in classrooms which allow them to remain uninvolved with classroom events; these students would be unwilling to become engaged in discussions with a consultant during classtime which would require them to become more involved in the class. On the other hand, in-class intervention has several benefits. It can allow discussion of a classroom event while all people who were party to it are present with the event fresh on their minds. Also, it allows the consultant to bring to a member's attention a behavior of his just as the member exhibits that behavior. This allows the consultant and member to discuss the behavior while all relevant information is available and allows the member to recognize what leads him into exhibiting that behavior. Real time intervention seems a promising technique for classroom consultants to borrow from G.S.T. influenced family therapists.

4.33 By whom the intervention is made.

There are several factors which may lead to a consultant's being

better qualified than a classroom member to collect data and to intervene.

a. As the G.S.T. view of communication indicates, some requests become nonsensical when made by a given classroom member. In the workshop described in subsection 3.22, I wanted the participants to act more independently of my directions than they were acting. I could not, however. have made the request "Act independently of my wishes" because it would have been paradoxical. Participants could have complied with the request only by showing dependence on the request itself. However, a consultant could have made the request "Act independently of the teacher's wishes". Students could have complied with that request; their compliance with the consultant's wish would not have contradicted their independence from me.

b. It has been stated before that the mechanistic approach holds problems to be self-defined whereas the G.S.T. approach holds the definition of a problem to be a product of the viewer's concepts. A teacher may view a situation as non-problematical or may conceptualize a problem situation in a way that does not facilitate its rectification. A consultant may be useful in pointing out an unrecognized problem or in conceptualizing a recognized problem in a more useful way. For example, a mathematics teacher I was consulting with used class time to demonstrate proofs and to solve problems in front of the students. If a student asked a question about a homework problem, the teacher would solve the problem on the blackboard without asking what it was about the problem that was difficult for the student nor

what the student's understanding was of how to solve the problem. The teacher knew his mathematics well, but he did not know his students' understanding of mathematics nor what his students needed in order to increase their understanding of mathematics. On viewing a videotape of the classroom, the teacher remarked that he was pleased with his teaching, that his performance as a teacher was much as he thought it ought to be. When viewing the tape, he saw a competent mathematician flawlessly proving theorems and solving problems; it is likely that he himself learns mathematics best from straightforward presentations of areas of the field that are new to him. When I looked at the videotape, I saw the teacher ignoring the students' approach to mathematics; I saw the students' approach as being as important as the proofs and the teacher's problem solving methods. In this case, a consultant was needed not only because the teacher needed to develop his teaching skills but also because he needed help in understanding there was a problem in his classroom.

c. A consultant may be able to recognize an area of the classroom that needs improvement which is avoided or not recognized by classroom members because of a classroom myth. In the example of the French class discussed in subsection 3.314, none of the classroom members would have been able to introduce variety into the teacher's teaching methods because of the prevailing classroom myth that there was no need for more variety in the classroom. The consultant, not being invested in that myth, was able to see and act on the monotony in the class.

4.34 How to intervene.

The major form of intervention coming out of the Clinic Process is the improvement of a teacher's skills. If a teacher's lectures are unclear, the teacher is shown how to give better lectures; if the teacher does not ask thought provoking questions, he is shown how to ask better questions. The focus on the teacher's skills is facilitated by the use in the Clinic Process of a student questionnaire asking the students to rate the teacher's performance on 38 teaching skills, and by the availability of literature and research helping the teacher improve individual skills. The focus on teaching skills also facilitates application of the mechanistic assumptions of unilateral causality and role independence; if something is wrong in the classroom, the teacher is assumed to be the cause, and the only way seen of improving the classroom is to directly improve the teacher's skills which cause the problem. The G.S.T. approach would suggest that there are several choices to make in deciding how to intervene.

First one must decide whether to initiate first or second order change. Because of its focus on teacher's skills, there is a tendency in the Clinic Process to initiate first order rather than second order change. Without specifying exactly how to choose a change strategy, the G.S.T. approach would suggest an openness to changing the structure of the classroom rather than improving the present structure. Again, if a teacher's lectures are unclear, it may be more appropriate to divide a class into small work groups than to try to improve the teacher's lecturing.

Another choice point is between changing classroom behaviors and

changing the ways in which they are perceived. Again, problems do not stand self-defined. If a teacher feels there is a problem in his class in that students do not come to class prepared, the teacher himself contributes to the definition of the problem. First, in his means of stating the problem, the teacher chooses to bring attention to one aspect of the class, the fact that students come into class without having done their homework; someone else might look at the same class and notice instead that the students come to class (as opposed to many being absent) or that students seem unable to do the work (without focussing on why they cannot do the work), or that the teacher does most of the talking in class. The point is that the class itself allows an endless variety of veridical ways of being described, and it entails an element of choice on the teacher's part to describe the class as one in which students come unprepared. It also entails an element of choice to label the fact of the students' unpreparedness a problem. To someone else, it might not be a problem. It might even be seen as progress if the teacher had been concerned about students' blindly doing what they were instructed to do without regard for their own interests.

The teacher, then, has some amount of choice in how he is to perceive his classroom and as to whether the perceived aspect is to be seen as problematical. A classroom problem can therefore be affected not only by changing the classroom but also by changing the way the teacher perceives and judges his classroom. Many teachers report that use of the Clinic Process does not affect how they go about teaching,

but that simply by talking about their teaching they feel better about it. For example, one teacher I worked with wanted to foster independence in his students. Part of his structure was to base much of the students' grade on independent projects to be completed at the end of the year. The students, through questionnaires, indicated that they were unsure of what work was expected of them and that the teacher was not informing them well of their progress in the class. The teacher saw a problem in the students' not knowing how they were doing in his class, and sought ways to restructure the class to allow students greater knowledge of the progress. I pointed out to him that the students' unsureness might in fact be an indication that he was progressing towards his goal of fostering student independence; I saw his students' uncomfortableness from not knowing what their grades would be as part of the process of weaning the students from dependence on faculty judgment of their work. When I spoke to the class as a whole, the students concurred, saying that their questionnaire responses indicated only that they had less information in this class than others about their grades, but not that they felt the lack of information was problematical. The teacher was reassured by this new point of view, and the problem was solved without changing the classroom structure.

One general form of intervention suggested by G.S.T. is the use of feedback cycles. As was indicated in subsection 4.31, a positive feedback cycle can be introduced to institute a change in the classroom, or an existing negative feedback cycle can be broken if it reduces a

desirable aspect of the classroom. Again, there is not yet developed a technology specifying under what conditions and in what ways a feedback cycle related intervention can best be made, and this point cannot, therefore, be expanded on.

One final form of intervention suggested by G.S.T. influenced family therapy is the therapeutic double bind. Some teachers ask for help with their teaching, but bring with them an attitude that they could only be helped by someone who has been teaching in their discipline longer than they have. That is, part of the teacher's motivation for asking for help seems to be to prove that the consultant cannot help him. Family therapists' work suggests that the consultant might instruct the teacher that his teaching has some weaknesses to it but that the consultant does not feel able to help the teacher improve. I do not know whether this approach has been attempted, but if the experience of family therapists is paralleled in the classroom consultant's case, the teacher may improve to show the consultant he is wrong in predicting the impossibility of improvement.

A similar paradoxical instruction is suggested by family therapists' techniques of "prescribing the symptom". A teacher who is unaware of the degree to which he insults his students might be instructed to insult his students. (This might be best done in the safety of a context such as micro-teaching, where the teacher practice teaches to a small group of students who are trained to give the teacher verbal feedback on his teaching.) In consciously trying to insult his students, the teacher might become aware of how little he

has to change his standard teaching behaviors in order to comply with the instructions that he makes those behaviors insulting; he might become more aware of how much he does insult his students and might be able to reduce his insulting behaviors.

In summary, the G.S.T. approach suggests a number of choice points for the consultant and teacher to make in deciding how to intervene. If a teacher is lacking in a particular skill, that skill can be improved (a first order change) or the class can be restructured so that skill is not needed (a second order change). A choice can be made to do neither of these but to consider what had appeared to be a problem to not be problematical. If the teacher's skill is to be improved, this can be done directly, by working with the teacher, or indirectly by working with students or by arranging feedback cycles in a way that will facilitate the desired behaviors by the teacher. If the teacher is to be worked with, this can be done by directly working with the teacher on his skill or by giving the teacher a paradoxical instruction. The choice of directly working with the teacher on his skill, which the mechanistic approach leads to, is thus only one of a number of options seen by the G.S.T. approach.

4.4 Chapter Summary

The most important point in this chapter is that the classroom consultant should conceive of problems as being classroom problems and not teaching problems, and that the best improvement strategy is not necessarily directed at the "problem" behavior. The following

chart summarizes the chapter in greater detail. Again, there is no implication that the mechanistic view is held in its entirety by anyone; it is included here to give contrast to the G.S.T. view and because parts of it are held by some or seem at times to be dictated by common sense. In particular, it is not implied that the Clinic Process is entirely mechanistic, as in many ways it is compatible with a systems view of the classroom.

Summary Chart of Chapter Four

Classroom Aspect	Mechanistic View	G.S.T. View
Data Collection:	The consultant is an objective, detached observer	The consultant becomes involved with the classroom, and affects it by observing it, and choosing from possible interpretations of the data
	Data need to be collected about problem areas of the teacher's behavior	Data need to be collected about every part of the classroom. All classroom members' opinions are needed. Data must be collected while class is in progress
Problem Definition:	There is "a problem" to be discovered. Usually it is the teacher's problem, usually a lack of skill. It may or may not be solvable	The problem is constructed by the consultant in such a way that it is solvable. The problem is in the classroom and is not a problem of any individual classroom member. The problem is always that the classroom is not fulfilling its purposes.

Classroom Aspect	Mechanistic View	G.S.T. View
Interventions:	Made wherever the problem is—usually the intervention consists of improving teacher's skills.	Made wherever the consultant has leverage on the problem. Made to increase growth of classroom members as individuals
	Help the teacher and/or the students improve what they are doing	Improve the performance of the classroom at its current activity or appropriately restructure the class. Or, change the way the classroom is perceived.

CHAPTER V

IMPLICATIONS OF GENERAL SYSTEM THEORY FOR CLASSROOM MEMBERS

The theoretical and practical perspectives described in earlier chapters should apply as well to the classroom member as they do to researchers and consultants. The conceptual implications of G.S.T. for understanding the college classroom, developed in Chapter III, apply without change to the classroom member who seeks a better understanding of his classroom. The strategies for changing the classroom, developed in Chapter IV, apply with little revision to the classroom member who wishes to improve his classroom. As is discussed in subsection 4.33, there are ways in which the classroom member may not have as clear a perception of the class as a consultant, and there are interventions that may be better made by a consultant, but the general change strategies to be used by a classroom member are in essence the same as those to be used by the consultant.

There seems to be little need, therefore, to develop a special conceptual and change model for the classroom member. In my experience as a student, a teacher, and a classroom consultant, however, I have noticed particular mechanistic assumptions made often by classroom members which interfere with optimal functioning of the classroom. There does seem to be value in describing immediate, practical implications of G.S.T. for classroom members. At least one common mechanistic assumption, taken from my experience, will be discussed for each of the major aspects of the G.S.T. approach identified in Chapter II; role interdependence, change and stability, communication, openness

of the system, and change strategies. The effects of the assumptions will be demonstrated as well as the advantages in some circumstances of replacing the mechanistic approach with a G.S.T. approach. Again, the mechanistic assumptions referred to are not necessarily stated explicitly nor even made consciously be classroom members. The assumptions can, however, be inferred from members' behavior.

5.1 Role Interdependence

Both teachers and students commonly assume that most of what happens in the classroom is unilaterally caused by the teacher, as was indicated throughout section 3.2. The G.S.T. approach, on the other hand, holds that each classroom member depends on other members to provide the context needed for his own behavior, and that all classroom members play a casual role in everything that happens in the classroom.

Some of the effects on teachers of the mechanistic assumption have already been discussed in relation to my own teaching. I have at times designed a class structure without keeping in mind whether my students would have the skills or the inclination to play their parts in it. Upon finding students not to have the necessary skills, e.g. the ability to articulate their goals for the course, I have ignored the possibility of developing the needed skills in the students but instead changed my role e.g. by becoming more directive. Here I followed the mechanistic assumption that if the teacher causes the classroom and if the classroom and if the classroom is not working

well, then it must be the teacher who should be changed. Lately, I have been attempting to develop my students' skills as well as my own following the G.S.T. assumption that roles are interdependent. By helping my students articulate their goals, inform me of when I am not being clear to them, and tell me when assignments are not helpful to them, I have found I can bring about classroom improvement by improving students' contributions to the classroom.

Students too assume that teachers unilaterally cause the classroom. I have shown over a hundred students a videotape of a college classroom in which a teacher makes clumsy but well intentioned attempts to involve the students in a discussion and in making decisions about the course. He asked the class for suggestions for paper topics; when suggestions were not forthcoming, he repeated his request for suggestions instead of finding out why there were no suggestions or giving the students help in formulating paper topics. He also tried to initiate a discussion about why papers should be written, apparently in an attempt to help students see the benefits they will derive from writing papers. However, the teacher accepted student statements to the effect that "I do papers because the are assigned" at first with amusement, and then, as such statements dominated the conversation, with annoyance. When a student said he did papers "in order to learn how to do research" the teacher expanded upon this point, ignoring the evidence other classroom members had just presented that the bulk of the students in the class only write papers because their grades depend on it.

Almost all of the students who have viewed this tape can identify the teacher's clumsiness; on first viewing, no student has seen the contribution of the taped students' behavior to the uneasiness of the taped classroom. The taped students react hostily to the teacher but never give him the direct feedback he needs to correct his behavior. It is only after a long discussion of the dynamics of the classroom in question that any of the students viewing the tape see that the students in the tape play a causal role in that class. The taped students had a range of options open to them by which they could have changed the classroom including sending the teacher an anonymous note, talking with the teacher after class about what the student appreciates in the class and how class could be improved, or insisting in class that their points of view not be ignored. Not all of these options are easily taken by students who are, after all, in low power positions. But by not taking any of them, the students contribute to the teacher's not changing his behavior. It is clear to me from my own teaching and from discussions with other teachers that explicit statements made by students about ways in which they would like to change the classroom can make a difference in the content or structure of a class. Yet many students seem not to see that they might play a causal role in their own classes or might be able to effect changes in their classes.

5.2 Change And Stability In The Classroom

General System Theory places a focus on the notion of homeostasis

but it is clear even without a theoretical perspective that people have goals and that they direct their behavior so as to better pursue those goals. However, teachers and students often behave as though they believe that students do not have goals or that student goals and student behaviors are totally unrelated.

In designing courses, teachers typically ignore students' goals. This is most obvious in instances where the teacher has ready on the first day of the semester a syllabus outlining everything to be covered in the course and how it will be covered, a syllabus prepared without prior consultation with the students who are to act in accord with the syllabus. Of course, the institution also makes it harder to take student goals into account by requiring teachers to complete book orders and extra fees for courses before the courses begin. By ignoring student goals which are consonant with the teacher's goals for the course, the teacher loses the opportunity to make use of student motivation. (See Rogers, 1969) Teaching will be easier and learning will be longer lasting if the content covered or the examples used to illustrate principles are of interest to students. Also, students will feel more responsibility in, say, a class in introductory psychology which is discussing interpretations of dreams, if the topic was included because the students were interested in it than if it was included because the instructor wanted to include it and never discussed with the students whether they were interested in it. It should also be noted here that teachers of courses typically taken by students only because the course is required often seem

puzzled by their inability to increase student interest in the course. The teacher of a required language course, who is in that position because he finds language fascinating, may be surprisingly naive in his inability to understand that his students have other interests and other goals and are simply not interested in helping the teacher construct a more exciting German class.

Students too are not mindful of the role of their goals in their own school performance. I have heard students concerned and puzzled about low grades they are getting after complaining that none of their courses are of interest to them. They seem to believe that their good intentions and, at times, hard work, can make up for the facts that they have little interest in the subjects discussed in courses they take and that the work they do for those courses prevents them from becoming involved in activities of greater interest to them. Further perspective on the relation students see between their goals and their courses comes from one instructor of freshman rhetoric who asked his students to write papers about their experience in college. Those papers and the discussions which followed indicated clearly that those students separated their classes from their lives, and had no expectation that anything learned in their courses would be of interest or value to them nor that topics of interest or value to them should be in their courses. The students indicated that their courses were concerned with "knowledge", which could only be created by specialists, about which students could only have opinions, and which could not apply to students' lives. What was of interest to the students, how

to get along with people, how to get a job, how to become independent of parents, etc they felt they could only learn from experience and not at all from courses. These students apparently would not take a psychology course in order to find out how to develop their relationships with others, nor a business course in order to help them find or create a job, nor would they attempt to make changes in a course in order to make it more relevant to their own interests. I have asked students to write papers describing an ideal semester, one in which they would be learning only those things which they at the moment were interested in learning. In only a few cases was there an overlap at all between a student's ideal semester and the courses he was presently taking.

There is a need for students to cooperate with teachers in creating more effective and more enjoyable classes and for students to develop the abilities they have and not focus in a self-defeating manner on areas in which they are not interested and have low competence. These can only happen if both teachers and students maintain a greater awareness of both the tendency of individuals to pursue their own goals and of the effects this tendency has on groups of individuals.

5.3 Communication

Three commonly made mechanistic assumptions about communication will be discussed here.

The first assumption is that most communication allows only one

interpretation. That any message, no matter how clearly organized, can be misinterpreted was pointed out to me as a result of a lecture I gave on child development. In attempting to devise a format by which I could coherently compare in one lecture the developmental theories of Gesell, Piaget, and the Behaviorists, I decided to focus on three aspects of each theory: the aspects of the developing person considered, the factors thought to be in control of development, and the ways in which those factors were thought to operate. Using these three aspects to simplify the theories in question, I was able to sketch and compare the theories in, I believed, a clear way not open to misinterpretation. In the course in question, the Student Senate had a note taking service whereby any student in the course could buy notes originally taken by a paid employee of the Senate. In this class, the note-taker tape recorded every lecture and transcribed the tapes verbatim thus guaranteeing, one would think, the accuracy of the notes. The notes for the lecture in question, however, made reference to "The Three Aspects of Developmental Theories", presenting my simplified scheme as though it were a centuries old tradition within psychology rather than a few categories devised the night before the lecture. The note taker was probably operating from a belief, common to many students, that every aspect of a teacher's lectures is derived from his expertise as an authority in his field, and from a desire, as a note taker, to provide the students in the class with those key elements most likely to appear in exams later in the course. The resulting distortion of a well organized message by

verbatim recording underscored for me the need for two-way communication to guarantee that communications are understood as they are intended to be.

The second commonly made mechanistic assumption about communication is that there can be no communication about communication i.e. no metacommunication. Students and teachers talk with each other about a wide range of subjects, the content of the class, what courses students should take in the next semester, and even current events which bear little relevance to the course. But classroom members almost never talk with each other about how their classroom behaviors affect other members. And this is not because members have no need to question or inform other members about communications in class. One often hears students talk about how they wish various of their teachers would change their behaviors in class, and teachers often wonder about their inclass performance. It would seem the natural and most helpful things to do in such cases to talk about the topic in question; yet this is rarely done. From my experience as a teacher and as a student I know both the value of metacommunication and the reluctance to engage in it. As a student I have been able to bring about change in a class I have taken by talking with the teacher about how the class affects me. As a teacher I have at times interrupted a lecture I have been giving when I notice that it is boring my students; by talking with the students about why the lecture was boring them and why none of them interrupted the lecture even though the boredom was more salient to them than to me (after all, the lecture

was on a topic of interest to me), I have been able to improve my classroom performance. In all cases, however, I experience a reluctance to initiate discussion about classroom communication as though I was breaking an unstate rule against metacommunication. Perhaps the uncomfortableness of metacommunication and the infrequency of metacommunication mutually cause each other.

The third commonly made mechanistic assumption about communication is that there is only a content aspect and no relationship aspect of communication. This appears most clearly in teachers' assignments of work to students. When teachers assign work to students, the aspect of the message most focused upon is the content of the message, that is, just what it is that the student is told to do, which chapter he is to read, what topic he is to write on, how long the paper should be, etc. Very rarely do teachers or students make explicit reference to the relationship aspect of the communication, viz., that the teacher is assuming the power to tell the student how to spend his time regardless of whether the student is interested in the teacher's assignment, and the student is allowing the teacher to take that power. There may be reasons why in a democratic society teachers should be able to have the control they have over students' lives, but these reasons are rarely discussed among teachers and almost never discussed between teachers and students. At times it is nearly impossible to bring focus upon the power aspect of classroom communication. For example, in general discussion of problems students have in college, I asked one student what problems she was having with her courses, and

she said she was not having any problems. This puzzled me as earlier in the semester she had remarked that she was taking an astronomy course only because it was a required course and not because she had any interest in astronomy. When I asked her about the discrepancy between her taking a course she had no interest in and her later claim not to have any problems with her courses, she replied that the astronomy course was not too hard and that the teacher made an effort to make the course interesting and offered students several options in fulfilling requirements for a grade. Whenever I would try to turn conversation to the point that her participation in the course was a result of someone's assuming the authority to tell her what to learn, she would return the conversation to the course content and the fact that "The course isn't too bad". She would not or could not discuss the relationship aspect of the course but only discussed its content aspect.

5.4 Openness

Classroom members typically make the mechanistic assumption that the classroom is self-contained and unrelated to other systems. Teachers demonstrate this assumption in a number of ways. Some teachers assign students work as though that course was the only aspect of the students' lives. This is especially detrimental to older students who may have families to support while being full time students. Similarly, some teachers do not reduce the amount of material covered in their courses when their institutions change from a semester to a

quarter system, as though the course could operate independently of the university calendar. As another example, many teachers expect the last few days of school before a vacation to be just like any other days, and are disturbed by the restlessness and small numbers of students who attend class at those times; such teachers ignore the wider social context their courses and students operate within. Finally, I have seen attempts in myself as a teacher to reorient my students' attitudes toward education, unmindful of the effects other classes and peers would have in returning my students' attitudes to what they were originally.

5.5 Change Strategies

Two commonly made mechanistic assumptions about how to bring about classroom change will be discussed here.

Often a teacher or a student will not deal with a problem because he assumes that to do so will require changing the structure of the entire institution or a piece of it too large for the individual to change. The G.S.T. approach, on the other hand, points out the possibility of changing the way a structure affects a person without changing that structure. As Haley stated it, if the problem cannot be solved, it is the wrong problem. Students who are disinterested in large parts of the subject matter of a course or who would rather write one large paper than the many small papers assigned often feel they must live with their difficulties because they are powerless as individuals to change the structure of the entire class. In so doing

they ignore the possibility of approaching the teacher with a request to change what they as individuals will do in the course. Many teachers would be so delighted at having a student take that initiative and interest in the course that they would gladly allow the student to pursue the course in his own way if this did not involve much extra work for the teacher.

Teachers too may leave problems unsolved feeling powerless to change the structure of their departments. Consider as an example, a particular psychology instructor who was assigned each spring semester to teach one large introductory social psychology course and one small course on behavior of small groups. This teacher had devised a means of teaching the former course which depended on discussion sections led by undergraduate teaching assistants. For several years, he essentially taught three courses, the two assigned him and a third course training his undergraduate assistants so they would be able to run their discussion sections competently. The department only credited him with teaching two courses as his training course was unofficial; he was unable to get official recognition for it, and the department would not release him from teaching the second course. Finally, he realized how he could resolve his problem without changing the department structure. He simply made being an assistant in the introductory social psychology course a prerequisite for being a student in the small group class, and used the small groups class as the vehicle for training his undergraduate assistants and having them learn about small groups by studying their own discussion sections.

He was therefore able to teach the larger class the way he wanted to, to teach only two courses and get credit for both of them, and to teach adequately his assistants about small groups in a manner consistent with their own interests. (Dorris, 1975)

The second mechanistic assumption made about changing the college classroom is that some aspects of the classroom are the teacher's responsibility and some are the students' responsibility and that one should not put effort into an aspect of the classroom that is another member's responsibility. This relates to the assumption of unilateral cause discussed in section 5.1, and the discussion about the videotape of the freshman rhetoric course serves as an example here. I asked students how they would react to the teacher in question, and one student replied that the teacher was not worth responding to. I asked the students what they could have done, were they students in that class, to improve the class, and many responded that improvement of the class is the teacher's, not the student's responsibility. The students therefore systematically resist taking action which might improve their own lives.

Teachers too resist taking action in areas they believe to be someone else's responsibility. I have spoken with several introductory mathematics teachers who refuse to take the time to review the algebra their students need review in because the students were supposed to know algebra before taking the class. In some cases, there were older students in the class who had not taken a mathematics course since early high school, perhaps ten or fifteen years before enrollment in

the course. In any case, the facts were that many students did not know algebra and that the teacher was the only one in the position to help them relearn algebra, but they would not because they felt it was not their responsibility to.

5.6 Chapter Summary

The following chart summarizes the mechanistic assumptions and their G.S.T. counterparts discussed above. The list of assumptions discussed is by no means complete, but it is intended to demonstrate some of the assumptions which, from my experiences, play a large role in preventing classrooms from operating optimally.

Summary Chart of Chapter Five

Aspect of Classroom	G.S.T. Assumption	Mechanistic Assumption
Role Interdependence	The teacher unilaterally causes almost all classroom events. Students are powerless to change class	All classroom events are caused by all classroom members. Students can have an effect on the classroom
Stability and Change	Students' goals affect neither their behavior nor the classroom	Students pursue their goals and their compliances with the teacher's goal depending on the congruence between the teacher's goals and the students'
Communications	Most communication allows only one interpretation	All communication is interpreted through the listener's concepts and interests

Aspect of Classroom	Mechanistic Assumption	G.S.T. Assumption
Communications (continued)	There is no metacommunication	There is metacommunication
	There is only a content aspect to communication	There is also a relationship aspect to communication
Openness	The classroom is self-contained	The classroom interacts with many outside systems
Change Strategies	The way a system effects one can be changed only by changing the system	The way a system effects one can be changed by making a different use of the system
	One puts effort into changing only those aspects of the classroom which are his own responsibility	One puts effort into changing any aspect of the classroom if that will bring about desired change

CHAPTER VI

IMPLICATIONS FOR RESEARCH

The emphasis of this paper has been on practical implications of G.S.T. for the classroom. In addition, there are implications about how one would conduct and interpret research about the classroom. In order to explore some of these implications, this chapter will analyze and compare two studies referred to earlier in this paper, an experimental study of explaining in the classroom by Gage and colleagues (1971), and an observational study of four sections of an introductory psychology course by Mann et al. (1970). Comparison between the two studies brings out differences between the mechanistic and G.S.T. approaches to three aspects of research which will be discussed in this chapter: what aspects of the classroom should be researched, how research should be conducted, and how research results should be interpreted.

Gage's study was chosen because it is basically consistent with a mechanistic approach to research. Gage's study, discussed previously in subsection 1.22, was an attempt to find what constitutes effective explaining behavior by classroom teachers. Fifty high school social studies teachers were given the same text and were told to each base a fifteen minute lecture on it to give to his class. During the lecture, the teacher was to discourage discussion and question asking in the class. Each class had an observer who recorded and classified the teacher's behavior. "Good explainers" were those whose students scored well on a standard multiple choice question test, and a major

focus of the study was to discover and describe behaviors used by good explainers which helped their students score highly on the test which was given just after the lecture. Gage suggested as an application of his study that teachers who have difficulty explaining material to students should adopt the behaviors used by the good explainers in his study.

Mann's study was chosen because it is basically consistent with a G.S.T. approach to research. The purpose of the study was explained as follows:

> If you were to interrupt a college teacher and ask him what is going on in his class, his answer would probably focus on the material being covered at that moment. The content of the lecture or discussion would be central to his awareness of what was happening. But if you pressed him a bit and asked him if that were really all that was going on, he would probably be able to identify other events: two students whispering, one looking particularly pleased at the political implications of the teacher's last comments, some misgiving on the teacher's part about whether he had represented the facts correctly, and so on. What are these events? What happens in college classrooms beyond the appointed tasks of "covering" and "mastering" the material of the course?
>
> This book presents a study of some of these events, especially the interpersonal and emotional events that occur in the classroom. It is by no means an assault on the importance of the content of education. It merely expands the focus to include aspects of the teacher-student interchange that are often ignored. (p. v)

Four lecture-discussion sections of an introductory psychology course were observed. Each session of every class was tape recorded and every statement by a classroom member was categorized according to the affect it indicated. In addition, questionnaire data were collected from the students throughout the semester and the students

were interviewed near the end of the semester and two years later.

The data were analyzed in a number of ways. The categorized statements were factor analyzed to identify factors underlying the affective aspect of classroom communication. A cluster analysis of the data yielded seven "styles and adaptations" of students which were then explored in greater depth using questionnaire and interview data. The entire transcript for one session of one of the classrooms was presented and analyzed to provide an "investigation of the interplay of affective and task issues in the classroom. (p. 87) A longitudinal study of the development of one class throughout the semester was done to find whether the "analysis of task and affective issues can clarify the gradual and abrupt shifts that occur over 40 or so sessions in the life history of a single class." (p. 225) The four classes were then studied across the semester to answer such questions as "Are there uniformities in the way teachers alter the stresses they place on various aspects of their roles as the term proceeds? Can we find meaningful similarities in the developmental patterns of all the classes?" (p. 243) Finally, the implications of the study for improving college teaching were discussed.

6.1 What Should Be Researched

The first aspect of research to be examined is towards which parts of the classroom it should be directed. The mechanistic approach, holding the teacher to be the central figure in the classroom, would imply that the focus of classroom research should be the teacher, his behaviors, and their effectiveness in helping the students learn

course material; Gage's study is clearly consistent with this approach. The G.S.T. approach, however, holds that the classroom as a system has four aspects to be researched: the interdependence of classroom roles and events, stability and change in the classroom, communication within the classroom, and the openness of the classroom system. The remainder of this section will explain what it means to research those four areas and the ways in which Mann's study researched them.

6.11 Interdependence of classroom roles and events.

Examples of research questions which would bring focus to the interdependence of classroom roles and of classroom events are the following: How do the roles students play affect the roles other students play? How do teachers and teacher roles affect each other? What student and teacher behaviors prevent students from contributing to their classes? How are affective and task events in the classroom inter-related?

Mann indicates his awareness of and focus on the interdependence of aspects of the classroom in the questions he asks and in the way he collects and presents his data. For example, his "investigation of the interplay of affective and task issues in the classroom" does not present cognitive aspects of the class as independent of affective aspects as might happen in a mechanistic attempt to include affect in description of a class. Rather, he seeks to find how pursuit of various goals facilitates or interferes with pursuit of other goals, that is, how the teacher's role as expert, formal authority, ego

ideal, etc. and the students' roles as pursuers of knowledge, pursuers of grades, pursuers of esteem, etc. all provide contexts for and change the meaning of each other.

In Mann's collection and presentation of the data, he does not separate behaviors from their interpersonal contexts, thus maintaining a sense that the behavior of one person in a social situation cannot be understood apart from the behaviors of others in that setting. By presenting an entire transcript of a class, he allows the reader to see the interplay of behaviors. Had he only abstracted, say, teacher behaviors from the transcript and presented these, as a mechanistic approach might suggest, he would have created the impression that the teacher's behavior can be understood apart from the context provided for it by student behaviors.

One of Mann's coding systems places particular emphasis on the contextual aspect of classroom behavior. He defines six roles a teacher can play in the classroom, labelled expert, formal authority, socializing agent, facilitator, ego ideal, and person. Each statement by a teacher is coded according to which of the six roles is being played by the teacher in making that statement. The coding system, however, goes beyond simply indicating whether a given statement shows, for example, that the teacher is or is not playing expert in a given statement as the code allows two other possibilities: the teacher is insisting on playing the expert role over student objections, or the teacher actively refuses playing the expert over student demands that he play expert. In so doing, Mann indicates awareness that the same teacher behavior may

have a very different meaning in the context of different student behaviors.

It should be noted that Gage's study explicitly limits the effects of interdependence of classroom aspects rather than attempting to investigate them. His injunction against students' or teachers' asking questions limits the variation of effect of student behavior on teacher behavior.

6.12 Change and stability in the classroom.

To research classroom stability and change patterns one would ask the following sorts of questions: Is there a useful way of conceptualizing and categorizing the ways in which classrooms resist change, and ways of overcoming these resistances? Are there useful ways of conceptualizing and categorizing classroom myths that might facilitate recognizing them? Currently, what are students' major goals in college and how do these affect their classroom behavior? What are the points of leverage for changing classrooms?

Among the ways Mann studied the resistance of the classroom to change was by analyzing the transcript of a class session. Consider the following segment in which the teacher, Mr. C, had just raised the issue of the increase of differences between black and white school children as they grow older. Mr. C raised the point in order to show that differences between whites and blacks are caused by environment and its interaction with heredity. Mr. Wicker, a student, used the same point to show the differences are genetically caused, partly to defend an answer on a recent test on which he was graded incorrect.

Mr. C: And the part that refers to the fact that these differences are increasing with higher grade levels. Now, what does that mean? Well, what does it mean? What can happen if increases are taking place with higher grade level?

Mr. Monk: Environmental.

Mr. C: Something in the environment is going on because we can't... is it reasonable to assume that genetics suddenly start getting activated with age? Go on, Mr. Wicker.

Mr. Wicker: Well, the decreases become more noticeable. It says... isn't it that they become more noticeable?

Mr. C: It says that these differences are increasing with higher grade level.

Mr. Wicker: The differences between this person (the Negro) and the normal person. But that differences ...

Mr. C: The differences between the Negroes and the whites increase over time.

Mr. Wicker: Yeah, now is that in IQ or in achievement?

Mr. C: In antisocial behavior and school performance. In other words, uh...

Mr. Wicker: In school performance. But... ok... then naturally as you learn... as the material gets more and more complicated the performance of this person is going to be more and more deficient... not necessarily because of environmental differences but because of the complications of the material. (pp. 96, 97, 99)

Mann does not portray the classroom as inert, as though the teacher can do with it what he wants. Even the introduction of a piece of

course content such as the cause of black-white differences can be met with resistance, and Mann explores the resistance and how it is overcome. The resistance is shown to be both explicit, in the student's last statement, and implicit, in his reference to whites as normal. The teacher's attempt to overcome the resistance are both implicit, such as his unnoticed correction of Mr. Wicker's reference to whites as normal, and explicit, such as his questioning in the next segment:

Mr. C: All right. What about the antisocial behavior? Why should that increase over time? Why should the discrepancy increase over time? Mr. Wicker? (quietly)

Mr. Wicker: Well, it's because his lack of mental ability becomes more and more noticeable to him. He comes to feel more and more uncomfortable among the whites.

Mr. C: (calmly) Why does he feel more uncomfortable among the whites?

Mr. Wicker: Because his intelligence isn't up to their level. (p. 103)

Again, Mr. C's point is turned around and used by Mr. Wicker in his resistance. Mann traces the dual to the point where Mr. C wins not so much by the force of logic as by building a consensus of class members which Mr. Wicker could not comfortably resist.

What stands out in the transcript and in Mann's analysis of it is that the reader is not presented with an analysis of the "best way to teach about interactions of heredity and environment" as though a teacher can implement any plan he wants to. Rather, Mann shows a variety of forms of resistance to attempts by the teacher to introduce a content issue to the class (arguing, making subtle use of words), is shown a variety of motives for resisting teacher positions (belief in a

contrasting position, desire for grades, desire for esteem), and is shown a variety of means of overcoming resistance (argument, building of class environment friendly to the teacher's position). Mann thereby gives information about the class as an entity with a life of its own rather than as a mechanism controlled by the laws of momentum.

Again, the contrast with Gage's study is clear. By restricting student participation, Gage mades resistance difficult. He therefore leaves out of his study an important aspect of explaining, explaining a position to someone who actively takes a contrary position.

6.13 Classroom communication.

Research on classroom communication would focus on questions such as the following: What is the variety of concepts teachers and students have of their own and of each others' roles? What forms of paradoxical communication commonly occur in classrooms? What is the interplay between content and relationship aspects of classroom communication?

Mann clearly has interest in the relationship aspect of classroom communication as is indicated by his scoring of the teacher role indicated by each teacher statement. His interest in how one's concept of one's role affects interpretation of communication is best illustrated by his descriptions of student clusters. Consider his treatment of a cluster of students he labels "the compliant students". These are described as typical good students, task oriented, and uninterested in rebellion or disagreement. Mann showed how the compliant students' concept of their role, which is to gain some of the teacher's knowledge and to do what he wants them to do, affects their

interpretation of classroom events:

> There seem to be two kinds of classes that disturb these people to some degree. One of these is the class that does not reward them even when they are doing their best. Their intellectual ability is only about average for the university they attend, and when ... a teacher comes along who goes too fast for them in presenting material and is scornful of many of the contributions they make in class, so that they are not receiving their customary extrinsic rewards, they will become somewhat distressed.
>
> Another kind of class that may upset them is one in which the teacher has, in their opinion, relinquished too much control. In this case, they may feel that the requirements of the class are not clear enough. (p. 150)

Contrast this with the description of the "independents", a cluster of students who are somewhat detached from the class, need room to explore in, and prefer freedom and informality in courses. If a teacher did not praise these students, it might have little effect on them as they are relatively unaffected by teacher praise. On the other hand, if a teacher did not praise a compliant student ever, he would feel unsure of himself because teacher praise indicates to him that he is doing what he is supposed to be doing. And if a teacher asked at the beginning of a class "What did you think of the last chapter we read?" the independent student would be ready to begin a discussion. The compliant student, however, would be quiet, disappointed, and confused as he understands his task to learn the teacher's opinion of the chapter, and not vice versa.

Mann thus gives a view of classroom communication as being affected by members' conceptions of classroom roles and by the goals of classroom members. Gage's interest in communication is limited to studying

efficiency of communicating class content from teacher to student. Again the role of other forms of communication, different from a teacher talking to students, in explanation is lost in the study because such forms of communication are prohibited by the experimental design.

6.14 The openness of the classroom system.

A study of the openness of the classroom system would research such areas as: What other systems have the greatest affect on the classroom, and how do they and the classroom affect each other? How can student behaviors in class be changed through effects of interacting systems such as freshman orientation, dormitory programs, or the counseling center?

Mann's attention to interacting systems is indicated in his treatment of the teaching culture, the group of teachers who influence how a given teacher approaches his teaching. (See section 3.5) The openness of the classroom is also shown in information about students' families and how they affect students' in class behavior. The compliant students, for example, came from families where rebellion was difficult for children either because the parents were strict or because they were indulgent and would be disappointed in a rebelling child, thus inducing guilt. By illustrating the effects of families on student behavior in the classroom, Mann shows that the classroom is not self contained and indicates some ways in which classroom events may be partly caused by extra-classroom events. Gage, on the other hand, restricts the possible influences of other systems on explanation

inside the classroom by forbidding the teacher from using any material, such as points of relation between students' interests and the lecture topic, other than that in the text when lecturing. He therefore studies explaining as though it were a phenomenon that existed completely inside the classroom context.

6.2 How To Design Research

The comparison of Gage's and Mann's studies surfaces three differences between the mechanistic and G.S.T. approaches to designing research, their opinions on: the separation of behavior from its context, the relation between the dependent measure and classroom goals, and the size of the unit to be studied.

6.21 The separation of behavior from its context.

The G.S.T. approach holds that a behavior cannot be understood except in the context in which it occurs, and that a change in the context of a behavior changes the very meaning of that behavior. An implication of this for research is that the researcher must be careful that the experimental manipulations designed to isolate the independent variable do not destroy it instead.

This can be illustrated in the isolation of explaining in Gage's study. The injunction against question asking removes the teacher's behavior from the normal context in which students in which students can ask questions, teachers can ask students if they understand what the teacher has been saying, and in which the student and teacher can make connections between the main topic of discussion and their own interests. In the experimental context, teachers were hampered in their

ability to find out what needed explaining and what explanations were successful, and to deviate from a fixed curriculum in order to construct an explanation that would be meaningful to students because it connected to their interests. Thus, the experimental design removed explaining from the very context many teachers need to make good explanations. Greenbaum (1975) makes the same point somewhat differently:

> We must dispose of the "transfer of teaching" notion which assumes that a good teacher will teach equally well under almost any circumstances. To take a good teacher out of the classroom and ask him to lecture to a hundred students or discuss with ten may be to rob him of the very circumstances that make him good. (p. 2)

General System Theory, with its focus on the connection between behavior and context, is biased in favor of observational studies such as Mann's which did not change the context of the behavior studied. Two notes should modify this bias. First, as the G.S.T. approach itself suggests, almost no study is purely observational. Clearly, as the Gage study indicates, simply carrying out an experiment in the classroom context does not insure that the behaviors studied are provided their proper contexts. Even in Mann's study the presence of classroom observers may have altered classroom communication in some way.

Second, the bias in favor of observational studies is not absolute. Mann, for example, collected questionnaire and interview data about students' opinion of the class, and questionnaires and interviews are quite different from naturalistic observation. The point, rather, is that one should be aware when changing the context of behavior of the degree to which and the ways in which the behavior itself is changed,

and these changes should be taken into account when interpreting results. (See Willems, 1969, for a discussion of conditions under which observational research is most appropriate.)

6.22 Relation of dependent measures to classroom goals.

Treating the classroom as a system, one would focus research on issues related to the classroom's goals and how well they were being achieved. It is likely that most educational and educational psychology researchers would agree with this, but there are three ways in which classroom research currently narrows artificially its focus on classroom goals. First, dependent measures typically relate to the teacher's goals for the course, not to the students' goals. Second, dependent measure typically relate to cognitive goals to the exclusion of affective goals. Third, the dependent measures are typically of short term affects of the classroom to the exclusion of long term effects on students. This subsection will explore these three limitations and how Mann's study transcends them.

Throughout his description of class events, Mann presents information on student goals and achievement of them. His observational data provide information related to such momentary goals as winning an argument, or gaining recognition or winning approval from the teacher by an action in class. In addition, he systematically relates the classroom to student goals by asking the following open-ended questions in interviews and questionnaires: "How is this course related to your overall goals in college? How would you describe these goals? The best thing about this course was... The time I felt we were learning

something exciting was... Give an example of a particularly stimulating period." All of these questions place a focus on what students want from a course, and their answers would be helpful to a teacher who wanted to make use of student motivation in his teaching.

On the second point, Mann clearly does not restrict his data collection to cognitive aspects of the class. Indeed, the major focus of the study is on the affective aspects of the classroom, as was shown in the discussion about the debate between Mr. C and Mr. Wicker. The focus on affect helps the reader identify noncognitive aspects of the classroom and to understand their effects on class progress toward cognitive goals.

On the third point, Mann stands out in that he collects questionnaire and interview data after the classes ended. He asked the following sorts of open ended questions: "Describe any incidences or experiences in your 101 class that had a significant impact on you. Did the class have any influence on your subsequent academic and/or vocational goals? The most important thing I learned in the course was... One way in which the course changed me was..." All of these questions give information about the longer lasting effects of the classroom, which are generally the more important ones, and which the average classroom teacher has no access to in his own case.

Gage's study provides a clear contrast in this case, as he studies the cognitive teacher desired effects of the class immediately after the lecture. Gage's study does not inform us about whether students learned from the lecture anything of interest to them, how students felt about the lecture, nor what they remembered from the lecture even one

week afterwards.

6.23 The size of the unit studied.

The mechanistic view would lead the researcher to focus on small aspects of the classroom in order to achieve a more detailed understanding of them; a further assumption would be that the detailed understandings of various small aspects would add to a full understanding of the whole classroom. Gage's study is consistent with this view. It presents a detailed study of one small isolated aspect of the classroom, explanation. One can infer that if this study were added to others which researched questioning, discussion leading, curriculum construction, etc. that the classroom itself would then have been studied.

While the G.S.T. approach does not preclude all focussing on small units, it denies the easy assumption that the understanding of the whole classroom is obtainable by understanding all of its parts. There is a need ultimately to study the classroom as a whole in order to see how the various parts interact and what their total effect is. Mann clearly makes the whole classroom his unit of study. His experimental treatment, if he can be said to have one, is membership in the class. Many of the questions he asks students measure effects of the classroom as a whole: "How would you rate the overall value of the course? How would you describe Psychology 101 relative to other courses you have taken at the University? The best thing about Psychology 101 was... After taking the course I felt Psychology was..." One wants to know, beyond the impact of each individual class session what the effects of a class are on a given student, and only by studying the class as a whole

can such effects be defined.

6.3 Interpreting and Generalizing From Results

A comparison between Gage's and Mann's studies reveals differences between the mechanistic and G.S.T. approaches to interpreting and generalizing from results in three areas which will be explored in this section: how effects are labelled, the attention paid to the limited variation in the independent variable, and the attention paid to individual differences when applying research results.

6.31 Labelling effects.

A mechanistic approach leads one to isolate one aspect of a situation and to label it "the cause" of the effects of the situation. Thus, Gage considers student performance on the examinations in his study to be the effects of the teacher's explanation. In so doing, he ignores the role students play in listening to the lecture, taking notes, participating in the examination, and providing a context for the teacher to lecture in. Greenbaum (1975) illustrates the effect of an audience in the following way. After discussing a teacher-student diad, he considers adding another student:

> Now, I want to put that second student there to allow the first student and the teacher to talk to each other. All he has to do is sit quietly and be there to serve this purpose. He may do more if he wishes but if he does a great deal more we begin to have a triad rather than a diad... What I am suggesting instead is that he serves many of the functions of an audience and permits the members of the diad to interact in ways that they would not if he were not present. (p. 4)

The effects of audience are ignored in Gage's study, but it is

only because the students provide an audience that the teacher can lecture. To call the lecture solely the teacher's product is to presume a person would give the same lecture to an empty lecture hall as he would to a hall full of students.

Mann is careful throughout his study to attribute cause to the classroom as a whole. When describing a teacher's behavior, for example, he attributes it not only to a trait in the teacher but also to those student behaviors which called out that trait. A clear example of the focus on the whole classroom is his discussion of the eight clusters of students:

> In deriving the clusters, we wanted to be careful to avoid typing students simply according to their personalities... We felt that personality was indeed important, but that we should give primary consideration to the students' feelings during the course of the term... Since the clusters are derived from the interaction process, we would not expect that a given student would necessarily appear in the same cluster in his other courses. Students have radically different reactions to different teachers and subject matter, and their interpersonal styles also change with growth over time during their college careers. Our interest here is not in personality types but in delineating some of the interpersonal styles found in the college classroom. (p. 145-146)

Thus, Mann does not attribute a student's typical behaviors in a course solely to that student, but sees it as coming from the whole classroom.

6.32 Taking into account the limited variation in the independent variable.

The mechanistic approach, by not emphasizing the role of context on behavior, suggests that one can understand the potential in a person, a role, or a function by observing it in a limited number of contexts

and infer that results will transfer to other contexts. Gage's study is in accord with this in his suggestion that explaining can be understood by studying it in one context, one in which all that happens is that the teacher explains. The G.S.T. approach suggests a broader understanding of explaining would derive from a study of it as it happens in the context of discussion and questioning as well as straight lecturing.

A similar dynamic may be at play in Dubin's and Taveggia's (1968) review of nearly a hundred studies of classrooms in order to find differences among teaching methods. A variety of teaching methods - lecture, lecture plus discussion, independent study, and unsupervised independent study - were compared for differences in effectiveness as measured by student performance on final examinations. They conclude; after finding no differences among teaching methods:

> It will add nothing to knowledge to continue to do in the future what researchers have done in the past in studying comparitive college teaching methods. We are confident that to follow the path of past researchers will only duplicate their results....
>
> In this monograph we have reported the results of a careful and systematic re-analysis of the data of almost 100 comparative studies of different college teaching methods. We have found no shred of evidence to indicate any basis for preferring one teaching method over another as measured by the performance of students on course examinations. (p. 45)

Setting aside the question of appropriateness of using as a dependent measure final examination scores, (achievement of a cognitive, teacher set, short range goals,) the conclusion that there is no need to pursue this area of research is unfortunate. The study is not as

conclusive as its authors imply because it does not explore all of the potential of all student-teacher relationships possible. It does not explore all existing relationships (e.g. ones in which students set their own goals) nor relationships yet devised, and the conclusion ought to be more tentative.

Mann indicates an awareness of the limited variation present in his study in his description of student clusters. He shows awareness that for each student studied, the student has been seen in only one context, that of his classroom, and that the student might behave entirely differently in the context of a different classroom or of friends. This is consistent with the G.S.T. practice of considering members' roles rather than the members themselves to be elements of the system. The quiet, shy member of a class may be quite active and outgoing in other situations, as is illustrated by the following description of a discussion section by its leader. After discussing the behaviors of one group member who became increasingly clearly a deviant from the group, the leader continues to describe another group member who had been shy:

> In some sense, a shy group member can be seen as deviant. Such a person often sits quietly, not contributing and, hence, not enhancing the group process. Now, the more Steve deviated and disrupted the group, the more they seemed to want Sally to become part of the group. They often asked for her opinion and praised her actions. This, in turn, gave her more confidence, so by meeting 8, 9, and 10, she was a fully participating member due to the support she got from the rest of the group.... I can see that in another type of group situation, Sally might have continually been left out. Here, however, the situational components demanded that she participate. (Dorris, 1976, p. 25)

6.33 Individual differences and the application of research results.

The mechanistic approach suggests that, given an experiment in which a number of approaches to a given task, the approach proved most effective in that setting is "the best" approach and should be adopted by anyone attempting that task. Gage was consistent with this approach in his suggestion that teachers who have difficulty explaining material to students should make use of the behaviors engaged in by the most successful explainers in his study. In so doing, he ignored two possibilities. First, he ignored the possibility that what is useful explaining behavior when engaged in by one teacher might be useless or counterproductive when attempted by another. Each teacher has his own strengths and style and a new behavior cannot be simply inserted into his repertoire of behaviors. Second, he ignores the point made in 6.32 above that not all possible explaining behaviors are observed in the study. In particular, explanation by discussion is not seen even though for some teachers this might be the best means of explaining.

A few quotations from Mann will indicate his awareness of individual differences and their implications for application of findings:

> An integral part of our notion of diversity is that the teacher's task is to figure out for himself, as a result of his experiences, what works best for himself. One implication for the teaching system as a whole is that fear of one's supervisor's displeasure is not a very helpful force in the total process of shaping one's optimal teaching style.... For some teachers, the official line may be consonant with their skills and inclinations, but for others it is a distraction, a drain on the energy needed to develop their own skills. (p. 344)

> An innovation that one teacher would find liberating might lead another teacher straight to disaster in the classroom. Thus it is important not to insist that everyone be part of some new teaching form. (p. 348)

Mann therefore sees a need, when interpreting and applying results, to take into account the context of classroom variables and teacher characteristics surrounding those results.

6.4 Chapter Summary

The chapter is summarized on the chart below. Two other summary notes should be made concerning why mechanistic research is more prevalent than research consistent with a G.S.T. approach.

First, G.S.T. research may be very difficult to do and requires skills that most research psychologists do not develop. Mann required a huge staff to collect data throughout the semester on four classes and to collect data two years later. In order to code statements according to their affect, researchers needed skills more prevalent among clinical psychologists than among experimental educational psychologists.

Second, unfortunately, many of the results of Mann's study might not be of interest to a large proportion of teachers of undergraduates, especially those most interested in doing research and training graduate students. Many of these teachers define their tasks as preparing students for the final examination. They would not, therefore, be interested in how their courses helped students learn what they wanted to learn, how their courses affected their students' opinions

of themselves, nor what effects the course had two years after the end of the semester. The achievement of teacher desired, cognitive, short range goals therefore receives more than its share of the research.

Summary Chart of Chapter Six

Classroom Aspect	Mechanistic Approach	G.S.T. Approach
What to Study	Best teaching method	Interdependence of roles
		Forms of stability and change
		Communication patterns
		Openness
How to Study	Separate behavior from its context	Look at behavior in its context
	Study short term, teacher desired, cognitive effects	Study achievement of all goals, including students' and affective. Study long term affects
	Break classroom into smaller units	Study classroom as a whole
How to interpret and generalize from data	Consider most effects to be teacher effects	Consider all effects to be classroom effects
	Consider the variability present in a study to be representative of all possible contexts	Keep in mind the limited variability seen in any one study
	The results of a study have the same implications for everyone	Results apply differently to different people.

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APPENDIX A

TEACHING ANALYSIS BY STUDENTS

[TABS]

Section I

In this questionnaire there are some statements concerning a variety of specific teaching skills and behaviors. Please read each statement carefully and then indicate the extent to which you feel your instructor needs improvement. Respond to each statement by selecting one of the following:

1. No improvement is needed
2. Little improvement is needed
3. Improvement is needed
4. Considerable improvement is needed
5. Not a necessary skill or behavior for this course

Please make your decisions about the degree of improvement needed on the basis of what you think would be best for this particular course and your learning style. Try to consider each statement separately, rather than let your overall feelings about the instructor determine all the responses.

1. The instructor's explanation of course objectives.
2. The instructor's explanation of the objectives for each class session and learning activity.
3. The instructor's ability to arouse my interest when introducing an instructional activity.
4. The instructor's explanation of the work expected from each student.
5. The instructor's ability to maintain a clear relationship between the

course content and the course objectives.

6. The instructor's skill in clarifying the relationships among the various topics treated in the course.
7. The instructor's skill in making clear the distinction between major and minor topics.
8. The instructor's skill in adjusting the rate at which new ideas are covered so that the material can be followed and understood.
9. The instructor's ability to clarity material which needs elaboration.
10. The instructor's speaking skills.
11. The instructor's ability to ask easily understood questions.
12. The instructor's ability to ask thought-provoking questions.
13. The instructor's ability to answer questions clearly and concisely.
14. The instructor's overall effectiveness as a discussion leader.
15. The instructor's ability to get students to participate in class discussions.
16. The instructor's skill in facilitating discussions among students as opposed to discussions only between the instructor and students.
17. The instructor's ability to wrap things up before moving on to a new topic.
18. The instructor's ability to tie things together at the end of a class.
19. The instructor's explanation of precisely how my performance is to be evaluated.
20. The instructor's ability to design evaluation procedures which are consistent with course objectives.
21. The instructor's performance in periodically informing me of my progress.

22. The instructor's selection of materials and activities which are thought-provoking.
23. The instructor's ability to select materials and activities which are not too difficult.
24. The instructor's provision of variety in materials and activities.
25. The instructor's ability to use a variety of teaching techniques.
26. The instructor's demonstration of creativity in teaching methods.
27. The instructor's management of day-to-day administrative details.
28. The instructor's flexibility in offering options for individual students.
29. The instructor's ability to take appropriate action when students appear to be bored.
30. The instructor's availability for personal consultation.
31. The instructor's ability to relate to people in ways which promote mutual respect.
32. The instructor's maintenance of an atmosphere which actively encourages learning.
33. The instructor's ability to inspire excitement or interest in the content of the course.
34. The instructor's ability to relate the subject matter to other academic disciplines and real world situations.
35. The instructor's willingness to explore a variety of points of view.
36. The instructor's ability to get students to challenge points of view raised in the course.
37. The instructor's performance in helping me to explore the relationship between my personal values and the course content.

38. The instructor's performance in making me aware of value issues within the subject matter.

Section II

Please mark the appropriate response for each of the following items beside the correct statement number on the answer sheet.

39. Class:

1. freshman
2. sophomore
3. junior
4. senior
5. graduate student

40. Sex:

1. male
2. female

41. Grade point average:

1. less than 1.50 (lowest)
2. 1.50-2.49
3. 2.50-2.99
4. 3.00-3.49
5. 3.50-4.00 (highest)

42. In terms of the directions my life is taking, this course is:

1. relevant
2. somewhat relevant
3. irrelevant
4. I am unsure

43. In this course I am learning:

1. a great deal
2. a fair amount
3. very little
4. I am unsure

44. As a result of this course, my attitude toward the instructor is:

1. becoming more positive
2. becoming more negative
3. unchanged

45. As a consequence of participating in this course, my attitude toward the subject matter is:

1. becoming more positive
2. becoming more negative
3. unchanged

46. I would prefer that this course:

1. become more structured or organized
2. become less structured or organized
3. maintain about the present level of structure

47. Which of the following descriptions of student learning styles most nearly approximates your own? (Choose only one)

1. I like to think for myself, work alone, and focus on learning personally relevant content.
2. I prefer highly structured courses and will focus on learning what is required.
3. I try to get the "most out of classes", and like sharing my ideas with others and getting involved in class activities.
4. I am competitive, concerned about getting good grades, and try to learn material so that I can perform better than others.
5. I am generally turned off as a student, uninterested in class activities, and don't care to work with teachers or other students.

48. About how much time and effort have you put into this course compared to other courses of equal credit?

1. much more
2. somewhat more
3. about the same amount
4. somewhat less
5. much less

49. Generally, how valuable have you found the assigned readings in terms of their contribution to your learning in this course?

1. very valuable
2. fairly valuable
3. not very valuable
4. there have been no assigned readings

50. Overall, I would rate this course as:

1. excellent
2. good
3. mediocre
4. poor