

METHODOLOGICAL INNOVATIONS AND MODELS
ON THE STRUCTURE OF REFERENCE GROUP
BEHAVIOR

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ABSTRACT

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By Warren David TenHouten

The adolescent (and non-adolescent) perceives all his referral points (parents, peers, society, siblings, spouse, and self) in their desire and ability to provide opportunities to help him attain social, occupational, financial, and intellectual skills, goals, and roles.

This perception may or may not be "objective," but it will be organized in a well-ordered set of preferences. The adolescent, after perceiving, then attempts to optimize his goal-attaining potential by becoming disproportionately involved with (oriented to) those referral points that are perceived as having the desire and the ability to provide opportunities to help.

It is hypothesised that if referents are perceived as having neither desire nor ability to help attain a goal, the adolescent will be involved with that referent at a low level. This hypothesis is supported, and it is shown that the proportion of adolescents involved with referral points at any given level is a fixed fraction of the proportion involved at the next highest level of involvement.

It is hypothesised that if referents are perceived as having both the desire and the ability to help attain a goal, the adolescent will be involved with that referent at a high level. This hypothesis is supported, and it is shown that the proportion of adolescents

involved with referral points at any given level is a fixed fraction of the proportion involved at the next lowest level of involvement.

A third hypothesis is deduced from the mathematical description of the first two hypotheses. In the case where there is either desire but not ability or not desire but ability, the proportion of adolescents involved at increasing levels of involvement increases at a decreasing rate, has a maximum, and then decreases at an increasing rate. This hypothesis is supported.

More generally, it is hypothesised that Stouffer's proposition about intervening opportunities is a special case of a more general and sociological formulation. The proposition that adolescents at a given social distance (based on perceived desire and interest to help...) away from any and all referral points is directly proportional to the perceived ability to provide opportunities at that social distance, and inversely proportional to the sum of the intervening opportunities at all lesser social distances, is also substantiated.

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REFERENCE GROUP BEHAVIOR

By

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PREFACE

This thesis began with an attempt to construct a model for a cross-cultural study of adolescent behavior. The result of this effort was a model much broader in scope than the original intent.

Some broad hypotheses were developed out of this model. They were empirically tested in a questionnaire administered to an undergraduate sociology class. The hypotheses were all supported by the data, but the population contained a significant number of non-adolescents.

The result is that this is a general model for reference group behavior, with some general propositions about reference group interaction.

No attempt is made here to explain the structural variations of respondents in different social and demographic categories. What is done is to present a methodological and propositional framework for examining adolescent-reference group interaction in different social structural conditions. In this sense, this research is the early groundwork for a cross-cultural study.

CHAPTER I

A MODEL FOR A CROSS-CULTURAL STUDY OF ADOLESCENT BEHAVIOR

A. General Orientation

There is much empirical justification for contending that the literature about adolescence reveals some striking continuities in the structure of adolescent behavior. There appear to be certain elementary processes involved that go on in very different types of societies. Further, this elementary social behavior may be found in many contexts of sociological interaction, varying from small groups to complex organizations.

What are the basic patterns of interaction between social units such as the adolescent and his reference groups: that is, what social organization is involved? A paper by Gottlieb and Guttman begins with the general orientation that adolescents behave much the same anywhere, in any socio-cultural context, in that they will ask help from referents they perceive as desiring to help them attain a goal, and will not ask help from other referents; and they will turn to those that they perceive as desiring to help them, and not to those that they do not.¹ Any research or theoretical analysis must begin with such predilections for a certain way of stating the problem to be investigated, for certain kinds of hypo-

¹David Gottlieb and Louis Guttman, "Working Paper No. 1," Mimeographed paper, November, 1962, pp. 1-3.

theses, assumptions, and postulates. The values, judgments, and the existing knowledge of the investigators are of course involved in this. When the orientation reaches a certain level of specificity, it can be described as a model.

B. Assumptions for a Cross-Cultural Model

Assumptions, by definition, are not directly under investigation. But they are characterized by the possibility that an empirical study using a certain set of assumption might generate findings that would demand that one or more be discarded or modified.

It is necessary that assumptions are not at variance with postulates in the ~~model~~; this condition will be rigorously met.

Janowitz defines an assumption as "...a proposition about a relationship within objects of study or linking an object of study to other variables, which is taken for granted in the investigation of the immediate problem at hand."² This will serve as a working definition for the following assumptions, which will be used throughout the entire study.

1. The adolescent wishes to attain skills, goals, or roles.³
2. a. The adolescent perceives his parents, peers, society, siblings, and himself.
- b. The adolescent perceives these five in terms of a specific skill, i.e., as potential references.

²Morris Janowitz, "Working Delimitation of the Subject Matter of Social Organization Research," Mimeographed paper, University of Chicago, (Fall, 1962), p. 2.

³Skills, goals and roles are to be understood as ends, and will be used interchangeably.

1. The first part of the document discusses the importance of maintaining accurate records of all transactions and activities. It emphasizes that proper record-keeping is essential for transparency and accountability, particularly in financial matters. The text suggests that organizations should implement robust systems to track every detail, from budget allocations to expenditure reports.

2. The second section addresses the challenges faced by organizations in managing their resources effectively. It highlights the need for strategic planning and the allocation of funds based on long-term goals. The author argues that without a clear vision and a structured approach, organizations risk mismanaging their assets and failing to achieve their intended purpose.

3. The third part of the document focuses on the role of leadership in ensuring the success of an organization. It stresses that leaders must be proactive in identifying potential risks and opportunities. The text advises that effective communication is key to aligning the team and ensuring that everyone is working towards the same objectives. Leaders are encouraged to foster a culture of innovation and continuous improvement.

4. The fourth section discusses the importance of regular monitoring and evaluation of organizational performance. It suggests that organizations should establish key performance indicators (KPIs) to measure progress and identify areas for improvement. The text notes that regular reviews allow leaders to make informed decisions and adjust strategies as needed to stay on track.

5. The fifth part of the document touches upon the importance of maintaining strong relationships with stakeholders. It argues that a network of supportive partners and community members can significantly enhance an organization's impact. The author encourages leaders to engage in open dialogue and seek feedback from all parties involved to ensure that the organization remains relevant and responsive to the needs of its community.

6. The final section of the document provides a summary of the key points discussed and offers some concluding thoughts. It reiterates the importance of transparency, strategic planning, effective leadership, and continuous evaluation. The author concludes by expressing optimism about the future of organizations that embrace these principles and work towards sustainable growth and positive social impact.

- c. The adolescent perceives that these four referents have differential power means (ability) and intentions to help him toward his goal.
3. The five potential referents mentioned in 2. a. constitute an exhaustive list, regardless of the cultural setting.
4. Goals may vary from society to society.
5. Nothing is said here about the criteria used by the adolescent in the selection of ends.
6. No statement is ever made about the "objectivity" (the validity) of the adolescent's perceptions with respect to goals or reference groups.
7. Perception precedes involvement. Perceptions can be made without involvement, but involvement cannot occur without perception..
8. The adolescent is the initiator in his involvement.

These will be referred to as "preliminary assumptions." Other assumptions will be added as the model is built, and these eight will be re-examined.

C. An Applicable Methodology: The Metatheory of Facets

A group of postulates is a group of statements which purports to define an object of study. Here, the object of study is a system of interaction. In Guttman's terminology, a postulate can be a facet, or an element of a facet--more technically, a statement about a facet. The five facets will constitute the observational basis for developing and

deriving a metatheoretical system, or model. Any theory is ultimately defined in terms of its facets, i.e., it must be concerned with various sets of elements. The presentation of the five facets in the next sections will rely heavily on "Facet Design" as developed by Guttman.⁴

For now, a very brief discussion of Facet Design and Facet Analysis (which together are defined as Facet Metatheory) is sufficient.

If V is a set (a collection of things) defined as the Cartesian product (Cartesian space) of two sets A and B such that $V = AXB = AB$, then A and B are facets of V . This is all that "facet" means. Suppose that A is composed of elements $a_1, a_2, \dots, a_n$ (the number of elements may even be infinite, but that is of no concern here), and B is composed of elements $b_1, b_2, \dots, b_m$. Clearly V has n times m elements, where "times" means ordinary arithmetic multiplication. This is the only sense in which the word "product" is used in Cartesian product: it does not imply manipulation, only the structuring of facets and their elements in (here, sociological) space. There are n ways of choosing an element from A and m ways of choosing an element from B , so there are n times m possible profiles over A taken with B .

⁴"The technical concept denoted here by 'facet' occurs widely in the social and other sciences, as well as in mathematics, but strangely has never been given a standard name. Christening the concept by 'facet' was formally proposed by Louis Guttman, "An Outline of Some New Methodology for Social Research," Public Opinion Quarterly, 18 (Winter, 1954-55), pp. 395-414, esp. p. 399. Prominent sociologists who have used the concept extensively in their own work, albeit rather informally, include Pareto, von Viesse, Parsons, Sorokin, Dodd, among others," in Guttman, "A Structural Theory for Intergroup Beliefs and Action," American Sociological Review, 24 (June, 1959), p. 13ff.

For any element of V , call it v , $v = aXb = ab$, where it is understood that a is an element of A and b is an element of B . v is defined as a profile over V ; a and b are defined as the co-ordinates of V . The set V can be defined as the set of all possible profiles v over A and B .⁵ This example ~~has~~ only two facets, but of course a Cartesian space can be composed of any number of facets.

In this model, there will be five facets, symbolized as a Cartesian product $V = PABCD$, where

P = the population of adolescents: a variable number of elements,

A = behavior of adolescent: two elements,

B = behavioral properties of referents: two elements,

C = references: five elements, and

D = Ends (Skills, Goals, Roles).

V will be referred to as the "Facet Paradigm". $V = PABCD$ is a Cartesian product, and $v = pabcd$ is a profile over V . For any set V , there are elements $v_0, v_1, \dots, v_n$. The set of all subsets of V is called the power set, denoted by $\mathcal{P}(V)$. The subset with no elements is called the empty set and denoted $\emptyset$.

By considering only A , B , and C as variable facets, where P and D are fixed facets, $\mathcal{P}V^* = ABC$, contains fifty-three profiles, that is fifty-three unique combinations of $v \in V^*$. Thus,

⁵For a fuller explication of the vocabulary of facets, see Guttman, "Notes on Terminology for Facet Theory," reprinted from the Proceedings of the Fifteenth International Congress of Psychology (Amsterdam: North-Holland Publishing Company, 1959), pp. 130-132. A good introduction to abstract systems is Daniel T. Finkbeiner, II, Introduction to Matrices and Linear Transformations (San Francisco and London: W. H. Freeman and Company, 1960), pp. 1-18.

$$P_{ABC} = X_{ABC} + X_{AB} + X_{AC} + X_{BC} + X_A + X_B + X_C;$$

$$53 = (2 \times 2 \times 5) + (2 \times 2) + (2 \times 5) + (2 \times 5) + 2 + 2 + 5.$$

The task in this research project is to "explain" X_{PABCD} . This will require an hypothetical-deductive theoretical system including hypotheses, assumptions, and postulates. This is Facet Analysis.⁶ Questionnaires will be administered (in a sense, tests) to a population of adolescents, to test the level of validity of components of propositional systems. The design of the entire experiment is

$X_{PABCD} \rightarrow$ Real scores, how the adolescent scores and interrelates variables.

There is a slight distinction between a profile and a variable. For example, a_1c_1 is both a profile and a variable, but c_1c_2 is not a profile because it contains two elements from one facet. So the explanation of the elements in the model requires the addition of all the variables that are not profiles. For the facets A, B, C, and D there are 24 such cases within facets, and many more between facets.

Facet designing consists of defining the variables of a given study as Cartesian products of the elements of sets of more inclusive concepts. The novelty, and the usefulness, of Facet Metatheory is that it formalizes the intuitive processes involved in constructing relevant concepts and variables for a scientific study. This "spelling out" of facets

⁶Guttman, "What Lies Ahead for Factor Analysis?," Educational and Psychological Measurement, 18 (No. 3, 1958), pp. 506-511. Such an explanatory system does not need to exhaust all interrelations of all variables.

decides which of these should be retained. A result of this formalization is that it clarifies which elements are common to different variables and which ones are dissimilar among themselves.⁷ For

example, given four variables

1. $a_1b_1c_1$ such that they
2. $a_1b_1c_2$
3. $a_1b_2c_2$
4. $a_2b_2c_2$

they form a perfect Guttman scale, we can say that the four variables are ordered by similarity or contiguity. Foa's contiguity hypothesis states that the empirical correlations between variables increases with the semantical similarity of the elements of the facets in the profiles. For example, 1 and 2 differ only in the C facet, whereas 1 and 4 differ in all three facets. Hence the contiguity hypothesis would predict that 1 and 2 will be more highly correlated than 1 and 4, in making the "leap" from semantical structure to the statistical structure of observed (scored) data.^{8,9} The utility of scaling variables is illustrated by Guttman's reformulation of a study by Bastide and van den Berghe.¹⁰

⁷Uriel G. Foa, "The Scientific Development of the Isreal Institute of Applied Social Research," Mimeographed paper, n.d.

⁸Uriel G. Foa, "The Contiguity Principle and the Structure of Interpersonal Relations", Human Relations, 11 (August, 1958) pp. 229-238.

⁹The distinction between semantical and statistical structures, as different levels of systems of components, is developed by Guttman in "The Principal Components of Scalable Attitudes", and "A New Approach to Factor Analysis: The Radex", both in Paul F. Lazarsfeld, ed., Mathematical Thinking in the Social Sciences (Glencoe, Illinois: The Free Press, 1954).

¹⁰Roger Bastide and Pierre van den Berghe, "Stereotypes, Norms and Interracial Behavior in Sao Paulo, Brazil," American Sociological Review, 22 (December, 1957), pp. 689-694, which is discussed

A = Subject's behavior B = Referent C = Referent's Intergroup Behavior

a_1 = belief b_1 = subject's group c_1 = comparative
 a_2 = overt action b_2 = subject himself c_2 = interactive

<u>Subuniverse</u>	<u>Profile</u>
1. Stereotype	$a_1 b_1 c_1$
2. Norm	$a_1 b_1 c_2$
3. Hypothetical Interaction	$a_1 b_2 c_2$
4. Personal Interaction	$a_2 b_2 c_2$

An immediate result of this semantic analysis is to show that the four variables are only some of the $2^3 = 8$ combinations of these elements.

These four variables are ordered semantically: they are also ordered sociologically. The meaning of the sociological order is the degree of face-to-face contact with the Negroes, progressing from a weak to a strong type of behavior of the subject vis-a-vis Negroes. The degree is strongest in personal interaction, not so strong in hypothetical interaction, less yet in norm, and weakest in stereotype.¹¹ The facet pattern shows, for example, that the nearest neighbor of stereotype is norm: they differ only within facet C. Such reasoning shows the semantic contiguity of the attitudes.

in Guttman, "A Structural Theory for Intergroup Beliefs and Action," American Sociological Review, 24, (June, 1959), pp. 3-4.

¹¹Guttman, "The Structuring of Sociological Spaces," Technical Note No. 3, Contract N. AF 61(052)-121, (December, 1961), p. 10. This report is a portion of the Proceedings of the Fourth International Congress of Sociology, Stresa, Italy, (1959).

On the non-empirical, conceptual level, perfect scales are possible, as the example shows.

The next problem is how to use this semantic structure in order to make predictions about the statistical relations among the parts of the substructured semantic space. In this study, as with the example, this can be attained by computing correlation matrices. This gives considerable insight into the adequacy of the facets in a model. If the contiguity hypothesis holds (Foa doesn't contend it always will, even if the facets are adequate), there is some methodological justification for retaining the substructured sociological space. In the example, the contiguity hypothesis was supported, and the pattern of inter-correlations formed a simplex, as predicted.

Considerable parsimony is attained by Facet Design in constructing questionnaires, as all questions can be structured with a clear picture of the variables involved. The several hypotheses tested in Chapters 2 and 3 are based on four questions about five referents.

The following criteria seem quite fundamental to any research design. Facet Metatheory certainly satisfies these criteria, and emerges as a powerful methodological tool for the structuring of sociological spaces:

1. The need for clear dimensions.
2. The need to order variables, e.g., from higher to lower. But however they are ordered, variables should be articulate and not ambiguous.
3. The need to work with variables instead of concepts.
4. The need for a neutral family name for any given variable. Variables are frequently named only on one end of a spectrum, e.g., "alienation" means the negative of something that has a positive, "commitment." Alienation and commitment are

the negative and the positive extremes on a continuum of "involvement." Here there are three concepts, but only one of them is a variable. The family name is necessary, both for comparisons within a family, and between families.

5. Variables may be close, and hide under different labels, but they should be distinct.

D. Some Further Orientations

All the hypotheses we generate from the model, and the model itself, involve decisional processes on the part of the adolescent. Simon suggests two alternatives for formulation of such a model: this model will contain itself entirely to the first (see assumptions 6, page 3):

1. Inquiring into the properties of the choosing organism, and
2. Inquiring into the environment of choice.¹²

It is the choice of using only the first alternative that gives this study cross-cultural potentialities. Studies of adolescent behavior based on the second alternative must wait on a great deal of theory and substantively comparable data on the socio-economic structures of different kinds of societies.

The adolescent's perceptions, particularly his information about certain properties of potential or actual reference groups, is an important behavioral property. We are assuming, it seems, that the adolescent has knowledge about the relevant aspects of his reference groups in his social environment with respect to his goals. This knowledge may

¹²Herbert Simon, "A Behavioral Model of Rational Choice," in Simon, Models of Man (New York, London: John Wiley and Sons, Inc., 1957), p. 242.

not be "objective, but it will be organized in a relatively well-ordered set of preferences. And we assume that the adolescent has evaluative (or "ranking") skills that will enable him to "calculate" alternative choices of involvement (orientation) to optimize his preferences.

Simon distinguishes three givens within which "rational" choice is made:

1. The set of alternatives open to choice,
2. Relations that determine the goal-attainment as a function¹³ of the alternative chosen,
3. A preference ordering of alternatives.¹⁴

An implicit orientation to this study is the notion that the adolescent is somehow optimizing, i.e., choosing the reference group that has the intention and power to help him attain a particular skill, role, or goal. To the extent that he optimizes reference groups (on the basis of his perceptions), the adolescent is rational. We never hypothesize that the adolescent is always rational, but the general notion is worth bearing in mind -- even if only to see under what conditions the adolescent will behave non-rationally. This begins to sound like Economic Man, but there

¹³A profile is a functional relationship between elements from sets. A function is a binary relation, i.e., a relation whose Cartesian product is defined by two facets. A function is identical to a mapping. See, e.g., Robert R. Stoll, Sets, Logic, and Axiomatic Theories, Ch. I. See also Guttman, "Notes on the Terminology of Facet Theory," cited in footnote 5.

¹⁴Simon, op. cit.

are crucial differences. The rationality (or lack of it, as the case may be) of an adolescent is hypothesized not "globally" or "objectively," as with Economic Man, but rather as restricted to maximizing his goals on the basis of his own perceptions and knowledge.

E. The Facet Paradigm: A Cross-Cultural Model of Adolescent Behavior

The following schema appears in the paper by Gottlieb and Guttman:¹⁵

<u>Adolescents</u>	<u>Reference</u>	<u>Relation</u>	<u>Object of Relation</u>
	(society)	(need for)	
(adolescent) ranks	(parents) in their	(status on him on	(skills)
	(peers)	asking for	
	(himself)	help)	
		(ability to help)	

Note: Facets are underlined, and elements are in parentheses.

"Ranks" is not a facet because it is what the adolescent does in an interviewing situation, i.e., it is a statement about his interaction within the interview situation rather than with his references. We have assumed that the "...adolescent has evaluative (or 'ranking') skills that will enable him to 'calculate' alternative choices....," (page 12). Also, the preliminary assumptions on page 3 indicate that the sociological content of evaluation or "ranking" is differential

¹⁵Cf. Vladimar Cervinka, reported by Stuart C. Dodd, "A Dimensional Theory of Groups," Sociometry, XI, (February-May, 1948), pp. 100-107. Cervinka developed a theory utilizing essentially the same formulations as used in this paper: both formulations were developed independently.

perception. This is equivalent to saying that the adolescent perceives facets and elements of facets as variables. Also see assumption 2. c.: "The adolescent perceives these reference groups as having differential power means (ability) and intentions to help him toward his goal." In summary, ranking is evaluative perception. Evaluation is behavior in an interview situation; perception is behavior vis-a-vis reference groups.

There seems to be one other ambiguity. It is in the Relation facet. (Need for) and (Ability to help) are behavioral properties of the References, whereas (Status on asking for help) is a property of the Adolescent.

So we have two properties for the Adolescent: 1. (Perception); and 2. (Status on asking for help), which we will call involvement or orientation. And we also have two properties for the Reference: 1. (Need for), which we will call desire or intention; and 2. (Ability to help).

Considerable space has been used to describe the substantive aspects of the study by Bastide and van den Berghe which was reformulated by Guttman (see pages 8-10; sources are described in footnote 9). There is a remarkable similarity to the facets developed in Guttman's paper and in those just introduced in this section. The comparison can be displayed in the following paradigm:

Guttman's Analysis of
Bastide and van den
Berghe

Further Analysis of Gottlieb
and Guttman's Mimeographed
Paper

<u>Subject's Behavior</u>	<u>Facet</u>	<u>Adolescent's Behavior</u>
(belief)	(element)	(evaluative perception)
(overt action)	(element)	(orientation or involve- ment)

<u>Referent's Intergroup Behavior</u>	<u>Facet</u>	<u>Behavioral Properties of Referents</u>
(comparative)	(element)	(need for, desire, intention)
(interactive)	(element)	(ability to help)

<u>Referent</u>	<u>Facet</u>	<u>Referent</u>
(subject)	(element)	(self)
(subject's group)	(element)	(subjects groups: parents, peers, society, siblings)

Note: Guttman's paper labeled the second and third facets differently than they will be in this paper. He call the Referent "B" and Referent's Intergroup Behavior "C"; here, B and C will be reversed in the "Facet Paradigm" to follow. There is semantical commutativity between these facets.

Guttman's analysis of Bastide and van den Berghe, and the further analysis can both be summarized with the following statement:
Type of behavior of a subject vis-a-vis a type of intergroup behavior of a type of referent (with respect to a certain goal of the subject.
This seems to be a generic statement about interaction.

The facets and elements in the model will be presented next, In the Facet Paradigm. The terms will be presented now and defined in Section F. This is a necessary first step in model building, or in research in general--to carefully define the variables that are to be used. It is then necessary to develop postulates and propositions relating variables to each other. This will be attempted in Section G, and in Chapters 2 and 3. Some mechanisms deduced from the assumptions, and some general propositions will be advanced.

The Facet Paradigm: $V = PABCD$

<u>Facets</u>	<u>Population of Adolescents</u>	<u>Adolescent's Behavior</u>	<u>Behavioral Properties of Referents</u>	<u>Referents</u>	<u>Skills, Goals, Roles</u>
V	$=$	P	vis-a-vis		
		A	B	C	D
				to help P attain	
	(p_0)	(perceives)	(desire	(self)	(social)
		a_1	or	c_1	d_1
	(p_1)		intention)	(parents)	(occupa-
			b_1	c_2	tional)
(elements)	(p_2)	(becomes	(power	(peers)	d_2
	.	involved	means or	c_3	(intel-
	.	with or	ability	(society)	lectual)
	.	oriented to)	to provide	c_4	d_3
	(p_n)	a_2	opportu-	(siblings)	(financial)
			nities)	c_5	d_4
			b_2		

An example of a profile over $V = PABCD$: Let p_0 represent lower class adolescents in a given population, and choose a $v = p_0 a_1 b_2 c_2 d_2$.

v = (The lower class adolescent's) (perceptions) vis-a-vis the (ability to provide opportunities) of his (parents) to help him attain an (occupation);

V = A type of Adolescent's Behavior vis-a-vis a type of Interactive Behavioral Property of a type of Referent to help him attain a type of Skill.

F. Definitions of Facets and Their Elements

P: The population of adolescents. This refers to the sample we draw. The work "universe" will be reserved for the parameter of adolescents from which the sample is drawn. Adolescents will be defined in terms of an age bracket from a particular universe, e.g., all males in Tokyo from 14 to 18 years of age. In another social setting, there might be another choice of ages defined as adolescents, but this will present no great methodological problems.

Elements for this facet are obtained by characterizing a sample by some criterion, such as father's occupation, or such as religious preference.

A: Adolescent's behavior. The two elements in this facet are exhaustive with respect to goal-directed behavior.

a_1 : (perception). Bastide and van den Berghe call this element "belief." Evaluative perception is approximately the same, except that we know the adolescent is able to evaluate by assumption. The content of perception will be elaborated in the next section, "An Interfacet Mechanism."

a_2 : (involvement, or orientation). This is interpersonal exchange,

and overt behavior, in contradistinction to a_1 , which is an internally contained, or covert, behavior. Involvement means the adolescent has actually made a choice on the basis of his perceptions (by hypothesis), and is involved with his referents in certain ways. In a sense, he is either "using" them or not.

Involvement can vary from positive "commitment," to a near-zero "calculative," to negative "alienation."¹⁶

B: Interactive properties of referents. This facet is in a sense the set of perceived outcomes and actual outcomes of facet A. The adolescent chooses from $A = (a_1, a_2)$ in certain ways. How he chooses will be hypothetical, but choice must be somehow made from both a_1 and a_2 . So the two elements of B determine a functional relationship determining the perceived outcomes and orientational outcomes. The variables a_1b_1 and a_1b_2 are perceived outcomes; the variables a_2b_1 and a_2b_2 are actual outcomes, that is, outcomes of interaction. Hence there is a mapping of the elements of A into the elements of B.

b_1 : (intention or desire). Goldhamer and Shils define a person as having "...power to the extent that he influences the behavior of others in accordance with his own intentions."¹⁷

¹⁶This is closely related to Etzioni's use of "orientation," in Amitai Etzioni, A Comparative Analysis of Complex Organizations (Glencoe, Illinois: The Free Press, 1961), Chapter 1, in which Etzioni develops a terminology for a compliance relation between elites and lower participants in complex organizations.

¹⁷Herbert Goldhamer and Edward A. Shils, "types of Power and Status," American Journal of Sociology, 45, (September, 1939), p. 171. Behavior is defined as both overt and covert, i.e., power refers to both elements of adolescent's behavior--perception and orientation.

It is in this optative sense that "intention" will be used in the model. It can also be viewed as the perceived social interactional "distance" from referents.

In their first working paper, Gottlieb and Guttman used "desire" for this element. The two words do not mean quite the same thing. For example, if an adolescent with high ability perceives his parents are able to help him attain a goal, they may intend to help him because "It's his life, and we should help him attain his own goals," but may at the same time be disappointed in his choice of goal, and lack psychological "desire" to help him, or lack "agreement" with his choice of goal. Considerable caution must be used in naming this element "desire" or "agreement."

We also want to be consistent with Bastide and van den Berghe's usage of this element as comparative relative to the adolescent's goal. "Desire" connotes interaction outside of the goal-directed context; the model is concerned with the adolescent's goals, not the goals of his referents.

b₂: Ability or power means. Parson's definition of power illustrates another aspect of this facet, the interactive. He says "Power is the ability to help another actor carry out roles or norms (here, ends) he supports."¹⁸ A referent can have power potential (ability) without (intention) to help; and a referent can have (intention) without (ability).

¹⁸Talcott Parsons, The Social System (Glencoe, Illinois: The Free Press, 1951), p. 121, in Etzioni, Ibid., p. 4. Emphasis and parenthetical insert added. Etzioni uses "power means" in a sense equivalent to (ability): the terms will be used interchangeably here.

C: Referents, or referral points. By assumption 3 (page 3), parents, peers, siblings, society, and self are an exhaustive list of elements for the referent facet. Society is the largest category: it makes the list exhaustive. In chapters to follow, however, (self) will be left out and (spouse) will be added.

D: Skills, goals, and roles. Homans makes an adequate definition of goals: "A goal (end) is a part of the behavior to be explained, by assuming that goal achievement is a reward which one's activities get from another person, another group, or the environment."¹⁹ To this, the (subject's group) element, the (subject himself) element must be added. The only difference between Homans and this model is the length of the chain of activities which are goal-attaining.

G. An Inter-Facet Mechanism: A Dynamic Aspect of the Model

The dynamic postulates in this section are largely deduced from the eight preliminary assumptions. In the mechanism, we will consider only facets A and B, which are the behavioral facets.

In his work on the Metatheory of Facets, Guttman again and again substructures facets in sociological space that are called stimulus facets and response facets. This is of course more a consequence of Guttman's substantive interests than of Facet Theory itself, but at the same time it is certainly true that Facet Theory lends itself readily to this kind

¹⁹George C. Homans, Social Behavior: Its Elementary Forms (New York, Burlingame: Harcourt, Brace & World, Inc., 1961), p. 89. Parenthetical insert added.

of analysis.

In this section, we will use the terminology of stimulus and response, but we do not intend the terms to be interpreted in a purely psychological sense; the mechanism is social-psychological, or even sociological, in that interpersonal exchange is involved, as well as perception.

The B facet can be considered a stimulus facet, and the A facet can be considered a response facet.. This is closely related to our assumptions.

The adolescent is stimulated perceptually by the two elements of B, that is, a_1b_1 and a_1b_2 . Following this perception (assumption 7, page 3) the adolescent responds (becomes involved with) a referent by initiating (by assumption 8, page 3) an interactive process with the referent, on the basis of his perception of B, that is, a_2c_1 . The adolescent, upon being stimulated cognitively, which is not interaction, then responds (a_2) by his involvement. His involvement is interaction. For the purposes of this model, we will initially be concerned with interactions initiated by the adolescent.

This sequence of events is usually neither rapid nor continuous. For example, an adolescent may perceive the intentions and ability of his parents to help him attain an occupational goal for several years before he becomes involved with them in attaining this goal.

To review the close relation of the mechanism to our assumptions, it can be stated that the mechanism satisfies assumption 8, "Adolescent is the initiator," and also assumption 7, "Perception precedes involvement."

The properties of this mechanism can be formalized in a manner used by Guttman.²⁰

There are three facets involved:

P = population of respondents, here the P facet,

S = stimuli variables, here the B facet, and

R = response categories, here the A facet.

We are considering a set P who are responding (R) to alternatives which are stimuli (S).

In general, $P \rightarrow R_s (s \in S)$, where R_s are possible categories for stimuli = (a_1, a_2) and where the stimulus $s (s \in S) = B$ facet.

$PS \rightarrow R$, i.e., adolescent will respond to the stimuli.

The stimuli are faceted: $S = S_1 S_2$. So $PS_1 S_2 \rightarrow R$. For any $p \in P$, in conjunction with $s_1 \in S_1$ and $s_2 \in S_2$, there corresponds a particular response.

In the inter-facet mechanism, interaction can be reformulated to mean an exchange of stimuli between the adolescent and some sociological unit. The exchange need not be continuous.

²⁰Guttman, "Introduction to Facet Design and Analysis," p. 132.

CHAPTER 2

TWO BASIC PROPOSITIONS

A. A Differential Equations Model

Our general sociological orientation to the substantive topic of adolescent behavior, and more generally, to reference group behavior, presented in Chapter 1 is not to be confused with sociological theory. Broad postulates were presented, indicating the types of variables to be accounted for. Facet analysis enabled us to reach a level of specificity which can be described as a model for a cross-cultural study. The stage has now been reached where relations between variables can be specified.¹ The initial orientation that there are elementary social processes involved in this interactive behavior can be substantiated if basic hypotheses can be developed, tested, and confirmed. If this can be done, it will be possible to develop propositions that will hold up cross-culturally.

In Working Paper Number 1, Gottlieb and Guttman hypothesized that adolescents will become involved with referents they perceive as having the ability to help them attain goals, and will not become involved with referents they perceive as not having the ability to help them attain goals. They also hypothesized that adolescents will become involved with referents they perceive as having the desire to help them attain goals, and will not become involved with referents they perceive as not having the desire to help them attain goals.

¹Robert K. Merton, "The Bearing of Sociological Theory on Empirical Research," in Social Theory and Social Structure (Glencoe, Illinois: The Free Press, 1957), pp. 86-89.

These "two basic propositions" can be stated more formally, in the vocabulary and notation of our model:

-
1. If an adolescent (perceives) that a referent has neither the (desire) nor the (ability) to help him attain a given goal, he will be (involved) with that referent at a low level.
 2. If an adolescent (perceives) that a referent has both the (desire) and the (ability) to help him attain a given goal, he will be (involved) with that referent at a high level.
-

We will now develop a system of differential equations to describe these propositions. By doing so, we are also able to deduce a propositional statement about the additive union of the two ambiguous cases: desire but no ability, and ability but no desire.

Let the following notation describe $B = (B_0, B_1, B_2)$:

$(a_1 b_1)$ = perceived desire to help, where

1 = evaluated positively, and

0 = evaluated negatively;

$(a_1 b_2)$ = perceived ability to help, where

1 = evaluated positively, and

0 = evaluated negatively;

$B = (a_1 b_1, a_1 b_2) = (\text{perceived desire, perceived ability})$;

$B_0 = (0, 0) =$ adolescent evaluates both the desire and the ability of a referent to help him attain a goal negatively;

$B_{1a} = (0, 1) =$ adolescent evaluates desire negatively but ability positively;

$B_{1b} = (1, 0) =$ adolescent evaluates desire positively but ability negatively;

$B_1 = (0, 1) \cup (1, 0) =$ all the B_{1a} and all the B_{1b} cases;

$B_2 = (1, 1) =$ adolescent evaluated both desire and ability positively.

From our two propositions, we can make statements about changes in B_0 and in B_2 with respect to changes in involvement, where $B = f(a_2)$. We are implicitly considering level of involvement as some function of time. For all changes in both of these "congruent" cases, we can ignore the negligible (if even possible) effect of the adolescent changing from B_0 to B_2 instantly, or of changing from B_2 to B_0 instantly.

Using involvement as some function of time is sociologically realistic, as we are dealing with a socialization process, of learning to attain goals over a period of time and activity. And, by definition, goals are not attained.

Let m equal the net probability of changing from B_0 to B_1 at varying levels of involvement. By our propositions, as involvement increases, the probability of an adolescent being B_0 decreases. Hence, the net sign of m is negative.

Let k equal the net probability of changing from B_1 to B_2 at varying levels of involvement. By our propositions, as involvement increases, the probability of an adolescent being B_2 ~~increases~~.

We can represent the statements made so far with the following system of differential equations:

$$(1) \quad \frac{dB_0}{da_2} = -mB_0,$$

$$(2) \quad \frac{dB_1}{da_2} = mB_0 - kB_1, \text{ and}$$

$$(3) \quad \frac{dB_2}{da_2} = kB_1.$$

Our data, to be presented in the next section, will give us empirical approximations to the graphs of these three equations. By solving the equations for B, and differentiation of the equations, i.e., finding the second derivatives, we can determine the general shapes of the curves for B.

(1a). Solution of B_0 :

$$\frac{dB_0}{da_2} = -mB_0;$$

$$\frac{dB_0}{B_0} = -m(da_2);$$

$$\log_e B_0 = -m(a_2) + c^*;$$

$$B_0 = ce^{-m(a_2)}$$

Boundary conditions:

$$\text{At } a_2 = 0, B_0 = ce^0 = c.$$

(1b). Solution of B_1 :

$$\frac{dB_1}{da_2} = cme^{-m(a_2)} - kB_1;$$

$$dB_1 = cme^{-m(a_2)}(da_2) - kB_1(da_2);$$

Using an integrating factor, $e^{k(a_2)}$,

$$e^{k(a_2)}dB_1 + B_1ke^{k(a_2)} = me^{k(a_2)}e^{-m(a_2)}da_2;$$

$$B_1 = \frac{cm}{k-m} e^{-m(a_2)} - \frac{cm}{k-m} e^{-k(a_2)}.$$

Boundary condition:

$$c = \frac{-cm}{k-m}.$$

(1c). Using a probability distribution, for all a_2 ,

$$B_0 + B_1 + B_2 = 1.$$

(1a*). Second derivative of B_0 :

$$\frac{d^2B_0}{da_2^2} = -m(dB_0) = -m(-mB_0) = m^2B_0, \text{ which is greater than 0 for all } a_2.$$

(1b*). Second derivative of B_1 :

$$\frac{d^2 B_1}{da_2^2} = d(mB_0 - kB_1)$$

$$= m dB_0 - k dB_1$$

$$= m(-mB_0) - k(mB_0 - kB_1)$$

$$= -m^2 B_0 - kmB_0 + k^2 B_1. \text{ If } k \text{ is less than } m, \text{ the slope is}$$

everywhere concave down. B_1'' can have a critical value if m equals k or is less than k . In general, the second derivative of B_1 will be negative, as k is negative in (1).

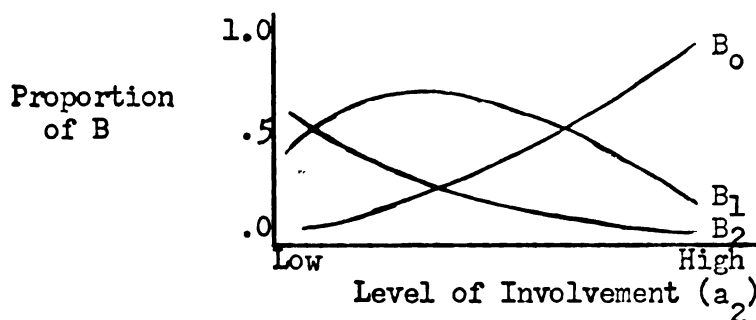
(1c*). Second derivative of B_2 :

$$\frac{d^2 B_2}{da_2^2} = d(kB_1) = k(dB_1) = k(m^2 B_0 - kmB_0 - k^2 B_1).$$

In contradistinction to (1), k is positive in (2). Hence, the second derivative of B_2 will in general be positive.

On the basis of the deductive statements we have made about the system of differential equations, we can determine the general shapes of the B curves. This is the main advantage to using such a model. The other advantage has been that we have been able to deduce a proposition about B_1 from our original two propositions.

Figure 1. $B = f(a_2)$



B. Data and Testing of Propositions

We were able to test these propositions on the basis of a questionnaire administered to 447 students in an undergraduate sociology class at Michigan State University, in April 1963. 409 questionnaires were coded to test this model. Each respondent was asked about five referents, so the number of possible responses was $5 \times 409 = 2045$. The actual number of codeable and applicable responses was 1573.

The sample is a fairly representative cross-section of the entire student body, though this is not the universe to which we eventually hope to generalize.

The relevant items were scaled with integers. Scaling is in general dependent on the choice of mathematical model which states differences in response as a function of location on an underlying dimension of scaleable data. The model consists of (1) level of measurement stated (nominal, rank, etc.), (2) the graph of the item as a function of location on the underlying continuum, (3) the judgment of the respondents, and (4) the mathematical pattern, by which it is determined whether the continuum is scaleable.

We defined the referent categories as follows for the respondents as follows:

"You have described your occupational goal in preceeding questions. Now we would like to find out some things about your relation to the people who may help you attain your goal.

Consider all the possibilities you have for getting help to attain your job goal:

- (a) PARENT(S) or guardian
- (b) Your PEERS (Those close to your own age that you interact with)
- (c) Your SIBLING(S): Brother(s) and/or Sister(s), if applicable
- (d) SOCIETY: People in other relations to you, such as teacher or adult friend, or significant people in society generally. This is our catch-all category, so place everything that won't go in other categories here.
- (e) SPOUSE, if applicable."

"Desire to help" is considered present if the respondent answers

"Strongly Agree" or "Agree" to the following question:

(Item 29) "Indicate for the following groups the extent to which they agree or disagree with your choice of occupational goal."

<u>Referent</u>	<u>Strongly Agree</u> + 2	<u>Agree</u> + 1	<u>Indifferent</u> 0	<u>Disagree</u> - 1	<u>Strongly Disagree</u> - 2
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PARENTS

PEERS

SIBLINGS

SOCIETY

SPOUSE

"Ability to help" is considered present if the respondent answers "Great Ability" or "Some Ability" to the following question:

(Item 31) "To what degree do each of these groups have the ability or power to help you attain your occupational goal?"

	<u>Great Ability</u> 3	<u>Some Ability</u> 2	<u>Little Ability</u> 1	<u>No Ability</u> 0
<u>Referent</u>				

PARENTS

PEERS

SIBLINGS

SOCIETY

SPOUSE

Four questions under Item 27 were constructed as indices of involvement with (orientation to) the five categories of referents. They dealt with (1) frequency of discussing goal, (2) frequency of respondent going to the referent for advice or assistance, (3) how often the referent offered advice or assistance, and (4) how much actual contribution has the referent made toward attaining the goal.

Item 28 is asked immediately after these four indices of involvement: this question ordering made Item 28 meaningful to the respondent. The question is asked as follows:

(Item 28) "Indicate, in general, the degree to which you interact or are involved with the following groups with respect to attaining your occupational goal."

<u>YOUR POSSIBLE GROUPS</u>		<u>YOUR LEVEL OF INVOLVEMENT</u>					
PARENTS		5	4	3	2	1	0
PEERS		5	4	3	2	1	0
SIBLINGS		5	4	3	2	1	0
SOCIETY		5	4	3	2	1	0
SPOUSE		5	4	3	2	1	0
Very Highly Involved	Highly Involved	Moderately Involved	Little Involved	Very Little Involved	Not Involved At All		
<u>5</u>	<u>4</u>	<u>3</u>	<u>2</u>	<u>1</u>	<u>0</u>		

If a respondent failed to answer any of Items 28, 29, or 31 for a referent, all his responses about that referent were thrown. Any answers that were multiple, e.g., circle both 4 and 5 for parents on Item 28, were also considered non-applicable. The total of 472 non-applicable responses were distributed as follows: 11 for parents, 8 for peers, 77 for siblings, 25 for society, and 351 for spouse.

The results of the coded questionnaire are presented in Table 1.

Table 1.--Responses for Five Referents to Dichotomized Levels of Desire and Ability to Help Attain an Occupational Goal, and to Level of Involvement

Level of Involvement a_2	Referents D	B = (Desire to Help, Ability to Help)				TOTALS
		(0, 0)	(0, 1)	(1, 0)	(1, 1)	
		No Desire No Ability	No Desire Ability	Desire No Ability	Desire Ability	
Not Involved At All	Parents	10	3	7	1	21
	Peers	5 55.4%	1 6.6%	8 35.5%	1 2.5%	15 100.0%
	Siblings	41 (N = 67)	3 (N = 8)	24 (N = 43)	0 (N=3)	68 (N = 121)
	Society	10	1	4	1	16
	Spouse	1	0	0	0	1
Very Little Involved	Parents	9	5	19	1	34
	Peers	16 34.4%	3 13.1%	27 50.8%	1 1.6%	47 99.9%
	Siblings	30 (N = 63)	10 (N = 24)	40 (N = 93)	0 (N=3)	80 (N = 183)
	Society	8	5	5	1	19
	Spouse	0	1	2	0	3
Little Involved	Parents	4	7	13	16	40
	Peers	15 20.4%	3 8.8%	30 38.0%	22 32.8%	70 100.0%
	Siblings	22 (N = 51)	2 (N = 22)	32 (N = 95)	13 (N=82)	69 (N = 250)
	Society	10	10	20	30	70
	Spouse	0	0	0	1	1
Moderately Involved	Parents	7	4	17	82	110
	Peers	22 8.0%	15 11.3%	46 21.6%	71 59.1%	154 100.0%
	Siblings	25 (N = 37)	22 (N = 52)	24 (N = 100)	33 (N=273)	83 (N = 462)
	Society	4	11	12	82	109
	Spouse	0	0	1	5	6
Highly Involved	Parents	2 1.6%	5 6.6%	5 13.9%	75 77.9%	87 100.0%
	Peers	2 (N = 5)	5 (N = 20)	16 (N = 42)	60 (N=236)	83 (N = 303)
	Siblings	0	0	8	12	20
	Society	1	10	9	84	104
	Spouse	0	0	4	5	9
Very Highly Involved	Parents	0	2	6	98	106
	Peers	0 0.0%	1 3.1%	5 5.1%	26 91.8%	32 100.0%
	Siblings	0 (N = 0)	0 (N = 8)	1 (N = 13)	11 (N=233)	12 (N = 254)
	Society	0	5	1	60	66
	Spouse	0	0	0	38	38
TOTALS	Parents	32	26	67	273	
	Peers	60	28	132	181	
	Siblings	97 (N = 233)	42 (N=134)	129 (N=386)	69 (N=830)	
	Society	33	37	51	258	
	Spouse	1	1	7	49	

Table 1 indicates an unusual distribution for two referents, siblings and spouses.

Siblings are not highly involved with the respondents. 217 siblings are categorized having little, very little, or no involvement, whereas only 115 are moderately, highly, or ~~very~~ highly involved. The non-sibling distribution here is 345 at the lowest three levels, and 904 at the highest three.

Siblings also fall disproportionately into the (desire, no ability) case, particularly at the three low levels of involvement.

The definition given for sibling accounts for a lot of this: no criteria are given for ordinal position, sex, or age. For siblings a lot younger than the respondent, it is highly improbable that they have developed much potential to help the referent attain an occupational goal, even though they might approve of the goal, and desire to help. The category is meaningless in terms of the respondent's three year old sister. But in terms of the definition for sibling, she should have been included. Of the non-applicable and uncodeable responses excluding spouses, 64% were of the sibling category. If this was entirely due to not having a sib, then 77 of the 409 respondents did not have a sib. This is highly improbable. The conclusion is that respondents answered non-applicable for much younger sibs, even though the letter of the instructions indicated they should have been included. This conclusion is supported by remarks written in the margin by several respondents.

Married respondents are highly involved with their spouses, and perceive that they have a lot of desire and ability to help.

It is not the distribution of spouses in Table 1 that is misleading; it is the sample itself: spouses are over-represented relative to a typical adolescent population. The sample included a lot of non-adolescents, and these respondents are far more apt to be married. Spouses were included to make the reference facet exhaustive. Exhaustiveness was attained at the price of a distorted sample.

There is also a weakness in the scaling for level of involvement revealed by the data in Table 1. There appears to be only a slight psychological distinction between being "Highly Involved" and "Very Highly Involved" for (1, 1) relative to the psychological distinction between "Moderately Involved" and "Highly Involved." The percentage increase for the former is 19%, but only 14% for the latter. There is apparently a greater psychological space between moderate and high than between high and very high, though the percentage distributions at each involvement level show that very high is more extreme than high. The difficulty is that both high and very high are extreme responses: both are highly correlated with (1, 1).

Equation (1c*) predicts that B_2 will accelerate as involvement increases. But, contrary to prediction, B_2 has an inflection point, and then decelerates. The deceleration of B_2 in turn creates an unusual B_1 curve. Equation (1b*) predicts B_1 will, in general, decelerate as involvement increases, though this is not necessary. B_1 has an inflection point, and then accelerates.

The psychological mid-point of the involvement scale seems to be "Little Involvement." But the scale has an even number of alternatives,

and therefore has no integral midpoint. On the basis of the psychological reality of the scale, the use of two extreme positive responses over-represents that end of the continuum.

On the basis of these weaknesses in the scale, there is adequate justification for grouping the responses "Highly Involved" and "Very Highly Involved."

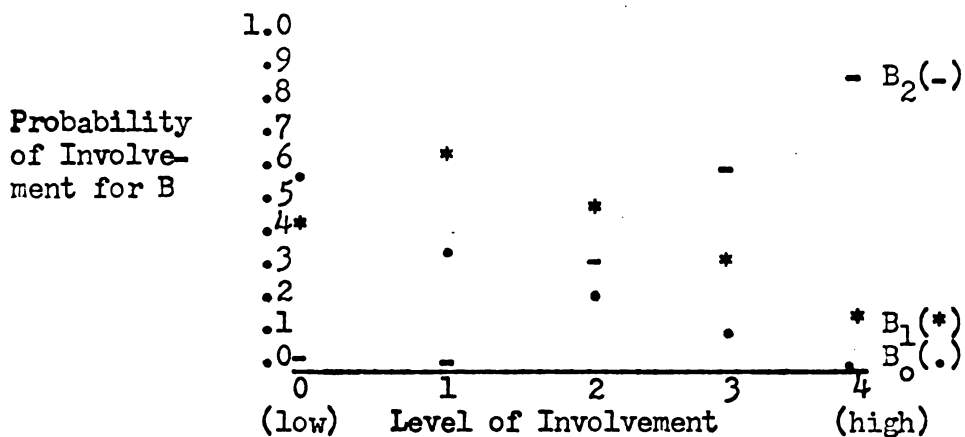
To test our propositions, a probability distribution will replace the percentage distribution in Table 1. A five-point involvement scale will be used. And (0, 1) and (1, 0) will be combined for the B_1 values. Table 2 and corresponding Figure 2 will test our propositions for all five referents, and Table 3 and corresponding Figure 3 will re-test, with siblings and spouses deleted.

Table 2.--Level of Involvement with Parents, Peers, Siblings, Society, and Spouse, by Dichotomized Response to Desire And Ability to Help Attain an Occupational Goal*

Level of Involvement With Five Referents	B = (Desire to Help, Ability to Help)			TOTALS
	(0, 0) = B_0	(0, 1) and (1, 0) = B_1	(1, 1) = B_2	
Not Involved at All	.554	.421	.025	1.000
Very Little Involved	.344	.639	.016	.999
Little Involved	.204	.468	.328	1.000
Moderately Involved	.080	.329	.591	1.000
Highly Involved or Very Highly Involved	.009	.149	.842	1.000

*Source: Table 1.

Figure 2. Level of Involvement with Parents, Peers, Siblings, Society, and Spouse, by Dichotomized Response to Desire and Ability to Help Attain an Occupational Goal*



Source: Table 2.

B_0 behaves as predicted. The first derivative is negative; and the second, positive.

B_1 and B_2 behave quite well, but B_1 almost has an inflection point at "Little Involved"--at the psychological midpoint, and B_2 almost has an inflection point at "Little Involved." In each case, there is almost no concavity at involvement levels 2, 3, and 4: the functions become nearly linear.

For B_2 , the N at 1 and 2 is 3 responses. So the slight decline from 0 to 1 can be ignored. With a larger sample, this would probably not occur.

Another look at Table 1 reveals a highly plausible explanation for the deviance in B_1 and B_2 at the higher involvement levels. The answer is to be found in the B_1 category. B_1 is composed of two cases, (0, 1) and (1, 0). We have earlier referred to these as the "ambiguous" cases. The connotation is premature.

In Table 1, the distribution of $(1, 0) = (\text{desire, no ability})$ is .355, .508, .380, .216, .099 for five values of involvement, from lowest to highest. This is a well-behaved concave-down curve. Desire but no ability is perhaps logically ambiguous, but it is clearly not psychologically ambiguous.

In Table 1, the distribution of $(0, 1) = (\text{no desire, ability})$ is .066, .131, .088, .113, .050 for five values of involvement, from lowest to highest. This is a poorly-behaved curve. It slumps at the psychological midpoint, "Little Involved:" both adjacent cases are larger. No desire but ability is perhaps logically ambiguous, and it is also psychologically ambiguous. Here is the case where the referent is perceived as somehow not wanting to use his potential to help the respondent attain his goal. The responses are polarized at the extremes, either toward psychological rejection and withdrawal from involvement, or to a level of high involvement. We have implicitly based our two propositions on perceptual optimization and rationality; but where the stimulus facet is perceived as ambivalent, this rationality is lacking, and the respondent is confused about how involved he ought to be, to attain his goal.

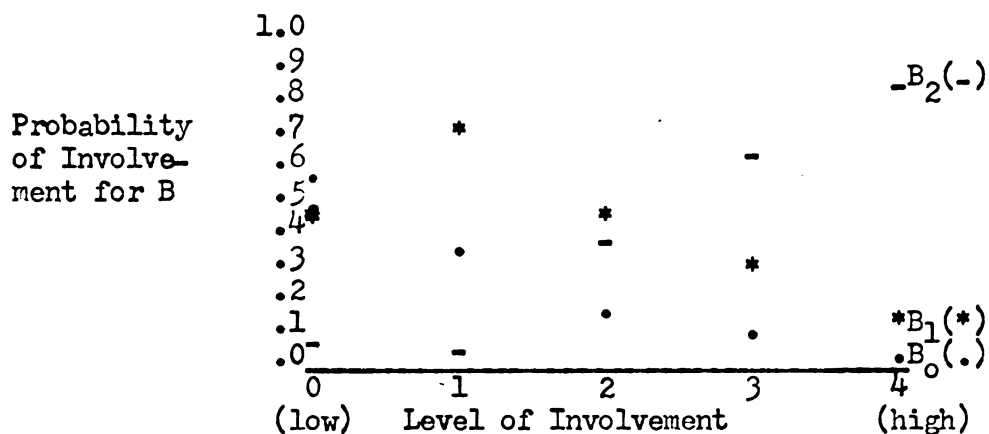
We can now return to the problem of siblings (the inadequate question) and spouses (the distorted sample), and ask what effect they have had on the shapes of the B curves. We will re-test our propositions, with siblings and spouses deleted. The results are presented in Table 3 and Figure 3.

Table 3.--Level of Involvement with Parents, Peers, and Society, by Dichotomized Response to Desire and Ability to Help Attain an Occupational Goal: Probability Distribution*

Level of Involvement With Three Referents	B = (Desire to Help, Ability to Help)			TOTALS
	(0, 0) = B ₀	(0, 1) and (1, 0) = B ₁	(1, 1) = B ₂	
Not Involved at All	.481	.462	.058	1.001
Very Little Involved	.367	.717	.033	.999
Little Involved	.161	.461	.378	1.000
Moderately Involved	.088	.281	.631	1.000
Highly Involved or Very Highly Involved	.010	.147	.843	1.000

*Source: Table 1

Figure 3. Level of Involvement with Parents, Peers, and Society, by Dichotomized Response to Desire and Ability to Help Attain an Occupational Goal*



Source: Table 3.

Deleting siblings and spouses has had almost no effect on the structure of the relationship between B and a_2 . Relative to the distribution of involvement for the other three referents, siblings are under-involved and spouses are over-involved. The total effect of throwing both out is that they tend to cancel each other. In Section D, we will consider all five referents.

C. A Methodological Evaluation of the Model

We have assumed there **exists** a differentiable function

$$a_2 = f(I), I = 0, 1, 2, 3, 4,$$

where a_2 is the level of involvement and I represents the integral values for involvement we obtained from responses to Item 28.

There are three functional relationships between a_2 and $B = (B_0, B_1, B_2)$, such that for each of the five values of I there corresponds one and only one value for each case of B. This is not a continuous function. And we must be careful about assuming continuity for the following two reasons:

1. We initially asked each respondent to make six discriminations for level of involvement with each referent. Research on scaling has indicated that people cannot meaningfully make much more than seven discriminations on scaled items. In this case, it was necessary to reduce the number of discriminations from six to five in the analysis of the data. But if our differential equations are meaningful, we must have continuous functions, for all differentiable functions must be continuous. The continuity criterion means we must have infinite discriminatory power on the

part of the respondents for involvement. This assumption is not justified.

2. Any sample we draw is finite. As the ratio of discriminations over a sample of size N grows larger, the three-dimensional histogram (the values in both tables and figures) will fluctuate irregularly, and then collapse. And if this ratio becomes improper, there must necessarily be discontinuities. Such an improper ratio is exactly what happens in the limiting process that defines differentiation.

In spite of these logical and methodological shortcomings, differential equations are a useful tool in generalizing about, and making deductions about, a set of interrelated propositional statements.

It is necessary to be extremely careful about making unreal assumptions. The substantive assumptions have been presented in Section B, Chapter 1. We will attempt throughout to keep our methodological assumptions explicit, minimal, and realistic.

With this in mind, we will next re-work our propositions in terms of difference equations, limiting ourselves entirely to the integral values of involvement. This can be done with no loss of generality.

D. A Difference Equations Model

By constructing difference equations analogous to our differential equations, we can easily solve for m and k . This will also enable us to determine the "goodness of fit" for the B

curves B_0 and B_2 . This will lead to the theoretical distribution of the B_1 curve.

Deviation in B_2 has already been established, which is explained by the psychological reality of $B_{1a} = (0, 1)$. So the model will fit B_2 worse than B_1 . In this sense, the model is inadequate, but it is concomitantly adequate in that it will make possible a rigorous measurement of the degree of inadequacy. Also, other kinds of samples can be used in future research to determine the generality of the model. Samples from less advantaged groups and strata than college students may show less over-involvement in B_2 .

Define P_n as the probability of an adolescent in the B_0 case being involved at level n , where $n = 0, 1, 2, 3, 4$. We know from our data, presented in Table 2, that $P_0 = .554$.

Proposition (1) can be reworded to mean that the probability of B_0 being involved decreases as n increases, i.e., if $\Delta P_n = (P_{n+1}) - P_n$ is negative, we know the direction of change. We also need to know the magnitude of change. In our differential equation model, we have expressed the relation that the probability of involvement is a fraction, call it m , of the next highest level of involvement:

$$P_1 = mP_0,$$

$$P_2 = mP_1,$$

$$\dots$$

$$P_n = mP_{n-1}, n = 0, 1, 2, 3, 4.$$

In general, $P_{n+1} = mP_n$. Subtracting P_n from both sides, we obtain $P_{n+1} - P_n = mP_n - P_n$. Therefore,

$$\Delta P_n = (1 - m)(-P_n).$$

In words, this means the actual decrease in probability of involvement at increasing levels of n , ΔP_n , is a fixed fraction $(1 - m)$ of the maximum possible decrease, which is $(-P_n)$.

Finally $B_1 = mB_0$,
 $B_2 = mB_1 = m^2B_0$, and in general,

$$(4) B_n = m^n B_0, \text{ where } n = 0, 1, 2, 3, 4.^1$$

Formula (4) enables us to test our proposition. $(.554) = (.344)$ which implies $m = .6$. The theoretical and empirical values and percentage distributions are presented in Table 4 and Figure 4. Goodness of fit is measured by χ^2 , which is computed from the percentage distributions.

Table 4.--Empirical and Theoretical Distributions of Level of Involvement with Five Referents Perceived as Having No Desire and No Ability to Help Attain an Occupational Goal*

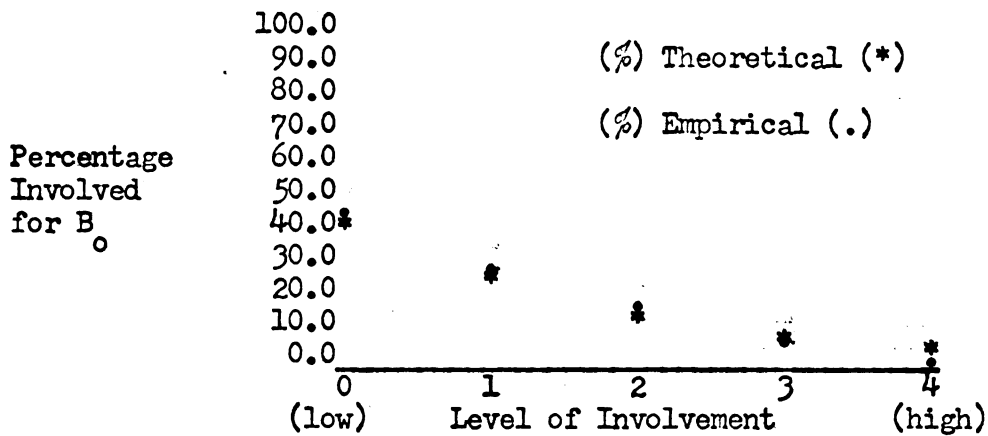
Level of Involvement with Five Referents	Empirical Distributions		Theoretical Distributions	
	Prob.	(%)	Prob.	(%)
Not Involved at All	.554	(46.5)	.554	(43.6)
Very Little Involved	.344	(28.9)	.332	(26.0)
Little Involved	.204	(17.1)	.199	(15.6)
Moderately Involved	.080	(6.7)	.119	(9.3)
Highly Involved or Very Highly Involved	.009	(.8)	.071	(5.6)
Total		(100.0)		(100.1)

$$\chi^2 = 5.05$$

*Source: Table 2.

²Samuel Goldberg, Introduction to Difference Equations (New York London: John Wiley & Sons, Inc., 1961, pp. 2-4.

Figure 4. Level of Involvement with Five Referents Perceived as Having No Desire and No Ability to Help Attain an Occupational Goal*



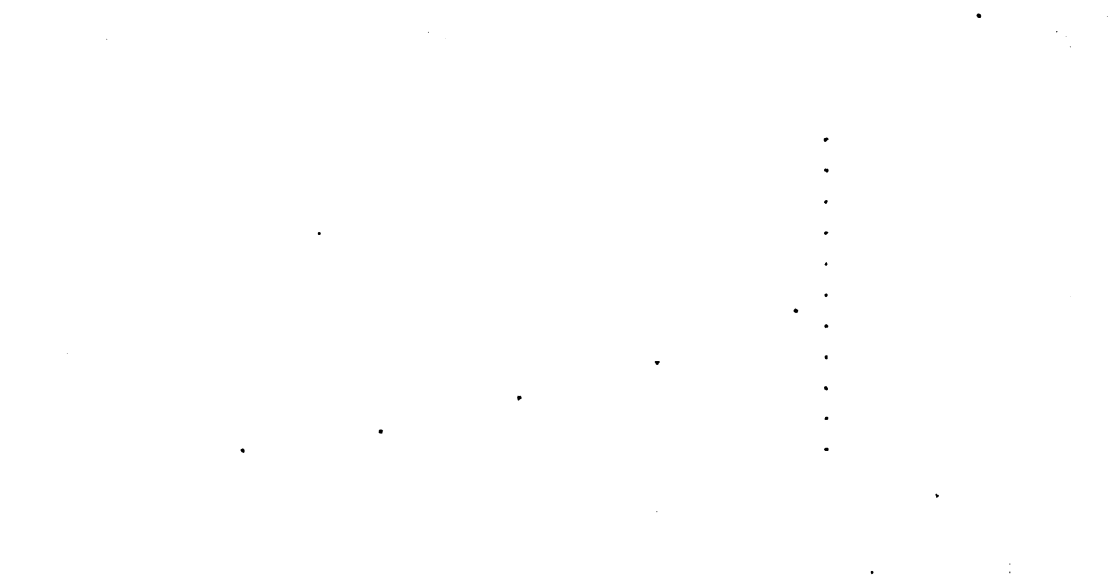
*Source: Table 4.

The fit is good. The theoretical curve, however, does not come as close to vanishing at 4 as the empirical value. Our first hypothesis is confirmed, and the mathematic description--Formula 4--is adequate to obtain a highly significant χ^2 of 5.05.

A difference equation can also be obtained for B_2 = (Desire, Ability) by much the same procedure used to obtain Formula 4 for B_0 . But it is necessary to change the argument to a certain extent, for at the two lowest levels of involvement for B_2 , the sample N is 3. And the percentage involved at the second level (1) is lower than the percentage for the second level (2). This problem of sample size is obviated by an obverse argument from highest to lowest.

Our second hypothesis is that the probability of involvement increases as involvement increases for B_2 . We can equivalently say that the probability of B_2 decreases as involvement decreases.

More specifically, we hypothesise that the probability of involvement is a fraction, k , of the probability of the next highest



The graph shows a steady increase in the percentage of the population aged 65 and over, starting at approximately 10% in 1950 and reaching approximately 30% by 2050. This trend is driven by several factors, including the aging of the baby boom generation, which was born between 1946 and 1964. As this generation ages, the number of people aged 65 and over will continue to grow. Additionally, life expectancy has increased significantly over the past century, leading to a larger proportion of the population living longer lives. This demographic shift has important implications for society, including the need for increased healthcare and social security resources. The graph also highlights the importance of planning for the future, as the aging population will require more support and resources in the coming decades.

level of involvement.

$$(5) P_{n-1} = mP_n,$$

.

$$P_1 = mP_2,$$

$$P_0 = mP_1, \text{ where } n = 4, 3, 2, 1, 0.$$

Subtraction of P_n from both sides of Formula (5) yeilds

$$P_{n-1} - P_n = mP_n - P_n, \text{ and}$$

$$-\Delta P_n = (1 - m)P_n.$$

In words, this means the decrease in probability of involvement at decreasing levels of involvement, $-\Delta P_n$, is a fixed fraction $(1 - m)$ of the maximum possible decrease, which is P_n .

In general, the empirical curve is not very concave up, as predicted; in particular, involvement is deviantly high at "Moderately Involved," having a probability value of .591. The solution for k is .7: for this k , the curve does not come close to vanishing, as does the empirical curve. The theoretical percentage distributions have the values 47.3%, 26.1%, 14.3%, 7.9%, and 4.3% from highest involvement to lowest. This is not an adequate description of B_2 .

We can, however, determine the k that has the best goodness of fit, as measured by chi-square. In every case, it was necessary to group the two lowest percentages at the two lowest levels of involvement, so that χ^2 will be applicable. We obtain a curvilinear distribution:

Table 5.--Chi-square Values for Different choices of K in B_2

Values of k :	.5	.54	.55	.56	.6	.7
Chi-square:	10.82	10.71	10.09	11.22	15.47	22.33

As k decreases, the theoretical curve is lowered, and chi-square decreases. The increase in error from underestimating the higher level values for involvement is more than offset by the decrease in error from overestimating the lower level values for involvement. A minimum χ^2 of 10.09 is reached at $k = .55$. At smaller k , the error of underestimation of the higher levels of involvement becomes greater than the reduction in error of overestimation of the lower levels.

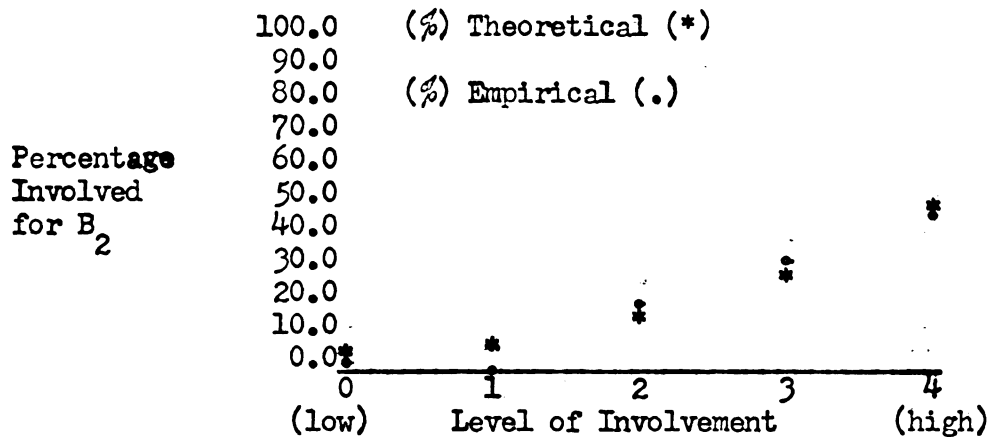
We will use $k = .55$, as it produces the best goodness of fit. The results are presented in Table 6 and Figure 5.

Table 6.--Empirical and Theoretical Distributions of Level of Involvement with Five Referents Perceived as Having Both Desire and Ability to Help Attain an Occupational Goal*

Level of Involvement with Five Referents	Empirical Distributions		Theoretical Distributions	
	Prob.	(%)	Prob.	(%)
Not Involved at All	.025	(1.4)	.077	(4.3)
Very Little Involved	.016	(.9)	.140	(7.9)
Little Involved	.328	(18.2)	.255	(14.3)
Moderately Involved	.591	(32.8)	.463	(26.1)
Highly Involved or Very Highly Involved	.842	(46.7)	.842	(47.3)
Total		(100.0)		(99.9)
$\chi^2 = 10.09$				

*Source: Table 2.

Figure 5. Level of Involvement with Five Referents Perceived as Having Both Desire and Ability to Help Attain an Occupational Goal*



*Source: Table 6.

The relation between B_2 and involvement is more nearly linear than curvilinear. The linear correlation r is .96. A larger sample might raise the percentage of "Very Little Involved" somewhat closer to the predicted level, and "improve" the model. This small sample N at the low-involvement end of the continuum makes it difficult to generalize about the universe of adolescents. Although the goodness of fit of the model may be in doubt, the hypothesis is validated.

Using the best fit $k = .55$ for B_2 , and $m = .6$ for B_0 , we are able to deduce the theoretical values for $B_1 = 100.0 - \%B_0 - \%B_2$, $n = 1, 2, 3, 4, 5$. The results are presented in Table 7 and Figure 6.

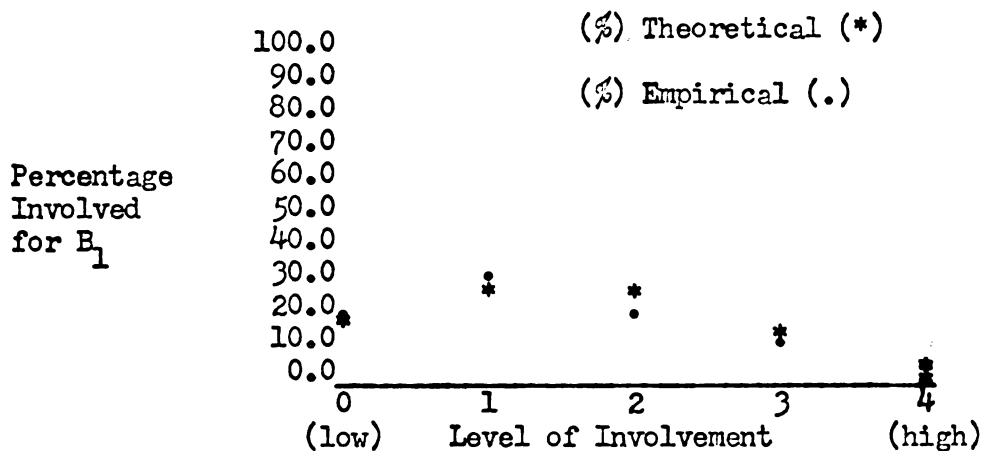
Table 7.--Empirical and Theoretical Distributions of Level of Involvement with Five Referents Perceived as Having Either Desire But No Ability or No Desire but Ability to Help Attain an Occupational Goal*

Level of Involvement With Five Referents	Empirical Distributions		Theoretical Distributions	
	Prob.	(%)	Prob.	(%)
Not Involved at All	.421	(21.0)	.369	(18.9)
Very Little Involved	.637	(31.8)	.528	(27.1)
Little Involved	.468	(23.4)	.546	(28.0)
Moderately Involved	.329	(16.4)	.418	(21.4)
Highly Involved or Very Highly Involved	.149	(7.4)	.087	(4.5)
Total		(100.0)		(99.9)

$$\chi^2 = 1.98$$

*Source: Tables 2, 4, and 6.

Figure 6. Level of Involvement with Five Referents Perceived as Having Either Desire but No Ability or No Desire but Ability to Help Attain an Occupational Goal*



*Source: Table 7.

$$\text{Chi-square} = \sum_{n=0}^4 (\text{empirical}_n - \text{theoretical}_n)^2 / \text{theoretical}_n$$

has two crucial weaknesses as a statistical description of goodness of fit:

1. The predicted values are a mean average of 3.69% off the empirical values. χ^2 divides the squared difference by the theoretical values. Holding the difference (empirical - theoretical) constant, we see that the contribution to χ^2 at a given n is largest where the theoretical value is largest. For example, $(5\% - 7\%)^2 / 5\% = .80$, but $(50\% - 48\%)^2 / 50\% = .04$. In chi-square, equal deviations are weighted more heavily for theoretical values of smaller magnitude than of larger magnitude.

2. Our first objection would be substantively irrelevant if it could be expected that the differences (empirical - theoretical) be smaller for smaller theoretical values. But if we can determine any criterion for size of difference, it is sample N .

Sample N is extremely small ($N = 5$) for the B_0 case at $n = 5$. The χ^2 component at this n is 3.76, which is 74.5% of $\chi^2 = 5.05$.

Sample N is also extremely small ($N = 3$) for the B_2 case at $n = 0$ and $n = 1$. The χ^2 components of these two n s are 8.16, which is 80.9% of $\chi^2 = 10.09$.

In summary, it is not the case that we can expect more exact predictions where the values are small, for by definition of the B -axis (percentage of B_1), the sample size is small when B is small. On the contrary, the small N necessarily associated with small B will create more chance variation, and less exact predictions.

To compensate for these two difficulties with χ^2 , another simple statistic can be employed--the average of the sum of the differences:

$$\bar{X}(\text{Diff.}) = \frac{\sum_{n=0}^4 |(\% \text{ theoretical}_n - \% \text{ empirical}_n)|}{n}$$

$n = 0, 1, 2, 3, 4$. Comparisons of χ^2 and $\bar{X}(\text{Diff.})$ are presented in the following table:

Table 8.--Comparisons of Chi-square and $\bar{X}(\text{Diff.})$ for All Cases of Perceived Desire and Ability to Help Attain an Occupational Goal

(Desire, Ability) 1 = yes 0 = no	Measure of Goodness of Fit	
	Chi-square	$\bar{X}(\text{Diff.})$
$B_0 = (0, 0)$	5.05	2.94%
$B_1 = (0, 1) \text{ and } (1, 0)$	1.98	3.86%
$B_2 = (1, 1)$	10.09	4.23%
Average	5.68	3.69%

Our two objections are confirmed. Only B_1 , with an $\bar{X}(\text{Diff.})$ slightly above average, has a very small χ^2 . The explanation is that B_1 is the only B case that has a large sample size at every level of involvement.

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CHAPTER 3

A SOCIOLOGICAL REFORMULATION OF STOUFFER'S THEORY OF INTERVENING OPPORTUNITIES

A. Propositional Schema

The movement of people in space is a fundamental aspect of sociological inquiry. Since the classic statement by Ravenstein,¹ research has overwhelmingly shown a close relationship between mobility and distance. Ravenstein's basic proposition that "Most people go a short distance; few people go a long distance," has been validated at a high level.

A standard approach to the study of this two-variable relationship is the "push-pull" schema: what factors push migrants from their place of origin, and what pulls them to their destination. This introduces a third variable, which is independent, and is used in demographic research and population studies to explain the relationship between mobility and distance, which are dependent. This third variable is the opportunities structure: at the place of destination, and at the place of origin.

Stouffer found empirical and theoretical inadequacies in the push-pull explanations, and developed a refinement of the opportunities

¹E. G. Ravenstein, "The Laws of Migration," Journal of the Royal Statistical Society, 48, (June, 1885), pp. 167-235; 52, (June, 1889), pp. 241-305, in Samuel A. Stouffer, Social Research to Test Ideas (Glencoe, Illinois: The Free Press, 1962), p. 69.

variable. He said there is no necessary relationship between mobility and distance, and introduces the concept of intervening opportunities.

He hypothesized that

"...the number of persons going a given distance is directly proportional to the number of opportunities at that distance and inversely proportional to the number of intervening opportunities."²

Stouffer was able to relate empirical data very closely to theoretical expectations based on this hypothesis. The proposition seems to fundamentally generic to a demographic approach, that it merits an attempt to generalize it to sociological analysis. If we can develop a proposition that is sociological, Stouffer's proposition will potentially become a special case of a general sociological law.

Analogies between demographic migration and sociological orientation can be organized in the following paradigm:

DEMOGRAPHIC MIGRATION

1. Migration to a physical point; movement over physical space.
2. Perceived physical distance properties of the point of destination, with accessibility defined in terms of "physical friction of space" and measured by criteria such as time and distance.
3. Perceived opportunities to attain goals at potential points of destination.

SOCIOLOGICAL ORIENTATION

1. Orientation (involvement) with a referral point; movement over social space.
 2. Perceived social distance properties of the referral point of destination, with accessibility defined in terms of "social friction of space" and measured by criteria such as desire and interest.
 3. Perceived opportunities to attain goals at potential referral points, i.e., the perceived ability to help of the referral points.
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² Stouffer, Ibid, p. 71. This article was first published as "Intervening Opportunities: A Theory Relating Mobility and Distance," American Sociological Review, 5, (December, 1940), pp. 845-867.

Such a generalization of Stouffer's basic proposition allows it to be reformulated entirely within a context of the elements in the Facet Paradigm developed in Chapter 1.

Stouffer found the usual push-pull analysis relating mobility to opportunities to be an oversimplification. Our hypothesis relating orientation to "...ability to provide opportunities..." (page 15) to be an oversimplification of the same order. A more subtle, and more general, kind of hypothesis is found in the theory of intervening opportunities. Stouffer has demonstrated this in a demographic context; in this chapter, an attempt will be made to demonstrate that the proposition is extensible to a sociological orientation.

Proposition: The proportion of adolescents oriented to referral points a certain social distance away is directly proportional to the perceived ability to provide opportunities of all referral points at this social distance, and inversely proportional to the abilities of all intervening referral points at all closer social distances.

This can be represented by a difference equation:

$$\frac{\Delta P}{\Delta S} = \frac{K}{X} \frac{\Delta X}{\Delta S}, \text{ where}$$

$\frac{\Delta P}{\Delta S}$ = Proportion of adolescents oriented to referral points a social distance S away (actually, a band, with the closer edge of S being $S - \frac{1}{2} \Delta S$ away and the far edge $S + \frac{1}{2} \Delta S$). In the model, this is $a_2 c_1$ for ΔP , and b_1 for ΔS .

$\frac{\Delta X}{\Delta S}$ = Opportunities to provide help of all referral points at a social distance band S away. In the model, this is $a_1 b_2$.

$X_s = \sum_{i=1}^{s-1} \Delta x_i$, $s = 1, 2, 3, \dots, n$. The intervening opportunities, i.e., the sum of the ability to provide opportunities for all referral points closer than S . Note that at the closest social distance, 1, there are no intervening opportunities.

K = a constant of proportionality.

S = social distance. In the model, this is $a_1 b_1$.

B. Operationalization of Variables

1. Social Distance

This variable is concerned with the (orientation) element of the referral point's behavioral properties, as (perceived) by the adolescent.

Guttman has demonstrated that all scaleable attitudes have many (technically infinitely many) principal components.¹ The psychological interpretation given to the first component is the direction of the attitude.² This has been measured by Item 28 in the questionnaire (on page 28) which was designed to determine if referral points are perceived as favorable, neutral, or unfavorable to the adolescents choice of occupational goal. This is the first index of social distance to be

¹Principal components "...are also known in mathematics and physics by various other names such as principal axes, latent vectors, eigenvectors, or eigenfunctions," in Guttman, "The Principal Components of Scalable Attitudes," in Paul F. Lazarsfeld, Mathematical Thinking in the Social Sciences (Glencoe, Illinois: The Free Press, 1954), pp. 428 ff; see also pp. 224-226. A formal mathematical treatment of principal components is presented in Guttman, "The Principal Components of Scale Analysis," in Samuel A. Stouffer et. al., Measurement and Prediction, Vol. 4: Studies in Social Psychology in World War II (Princeton, New Jersey: Princeton University Press, 1950), pp. 312-361.

²Guttman, "The Principal Components of Scalable Attitudes," pp. 219-226.

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used in S.

The second principal component of the (intention) element is the intensity component.

"If (a) scalable attitude has a meaningful zero-point (point of indifference), then as people have rank farther and farther to the right of it, they should become more and more positive, and hence more and more intense. Similarly, as ranks get farther and farther to the left of the zero-point, they should become more and more negative, and hence also indicate more intensity. Intensity accordingly should have a U- or J-shaped relation with the underlying rank order."³

The following question was designed to measure the second principal component of the (intention) element:

(Item 30) "How much interest do these groups take in your attaining your occupational goal?"

	Very Intensely Interested 3	Some Interest 2	Little Interest 1	No Interest 0
<u>Referent</u>				
PARENTS				
PEERS				
SIBLINGS				
SOCIETY				
SPOUSE				

We hypothesise that perceived "Agreement" with the adolescent's choice of goal (in a context of helping him) is the first principal component of the scalable (intentions) attitude--which is direction, and that perceived "Interest" in helping the adolescent attain his goal is the second principal component--which is intensity. The test of this

³Guttman, Ibid., p. 229.

the first of these is the fact that the
the second is the fact that the
the third is the fact that the
the fourth is the fact that the
the fifth is the fact that the
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the eighty-third is the fact that the
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the eighty-fifth is the fact that the
the eighty-sixth is the fact that the
the eighty-seventh is the fact that the
the eighty-eighth is the fact that the
the eighty-ninth is the fact that the
the ninetieth is the fact that the

hypothesis is simply to determine if the relation is curvilinear, or U-shaped.

Table 1.--Percentage "Very Intensely Interested" or "Some Interest" at Each Rank of "Agreement" with Choice of Occupational Goal, for Five Referents

Percentage at "Very Intensely Interested" or "Some Interest"	Rank of "Agreement" with Choice of Goal				
	Strongly Agree	Agree	Indifferent	Disagree	Strongly Disagree
	97.3%	88.6%	44.9%	60.0%	42.8%
Total	686	740	336	40	7

The hypothesis is in general validated. The deviant value is 42.8%, but $N = 7$, which is extremely small--too small to reject the hypothesis.

Social distance will be defined on the basis of the first two principal components of (intentions) as follows:

$$S = \text{Agreement} + \text{Interest}.$$

Each component of S will be equidistantly scaled from 0 (the point of minimum distance) to 3 (the point of maximum distance). The range of social distance is thus scaled from 0 to 6. There must be at least one tie on any scale: where agreement is nearest and interest farthest, and where agreement is farthest and interest nearest. Tied combinations will be added together as a single social distance. Each distance will be given a rank number, 1, 2, ..., n , but these ranks are not necessarily equidistant.

The U-shaped relation, and the general tendency toward perceived high agreement and high intensity presents a sampling problem for S. As the respondents are unevenly distributed, there are several cases with few entries. The original design for S was a twenty-point scale (nineteen unique points). This had to be rejected because eight of the nineteen distances had less than ten cases, which weighted the individual case too heavily. This problem was overcome by dichotomizing the four-point scale for "Interest," as in Table 1.

The resultant matrix for S is presented in the following table:

Table 2.--Social Distance, S, Social Distance Rank (1-9), and Number of Cases, N, For Five Referral Points

Level of Interest	Level of Agreement				
	Strongly Agree	Agree	Indifferent	Disagree	Strongly Disagree
DISTANCE . .	0	.75	1.50	2.25	3.00
Very Intense or Some	0 N = 668	.75 (2) N = 656	1.50 (3) N = 151	2.25 (4) N = 24	3.00 (5) N = 3
Little or None	3 N = 18	3.75 (6) N = 84	4.50 (7) N = 185	5.75 (8) N = 16	6.00 (9) N = 4

The first measure of social distance, devised by Bogardus⁴ in 1925, was a Racial Distance Scale. A set of seven items was used to measure

⁴Emory S. Bogardus, "Measuring Social Distance," Journal of Applied Sociology, 9, (1925), pp. 299-308.

degrees of social acceptibility, or social distance. The Bogordus Scale ordinally measures the direction and intensity in a way that the components cannot be separated out. Krech and Crutchfield cogently criticise this scale: "Social distance is a complex quality, related in the most intimate way to the ego standard of the individual, his concepts of prestige in the...group..." and "...social distance from an object may in some cases be markedly independent of the general affectivity of the object."⁵ This is an attempt to isolate the components, as they are in Table 2. Since Kramer's⁶ elaboration in 1949, the concept is applicable to other individuals in various personal and social relationships.

2. Opportunities

At each social distance, an index of the perceived ability to provide opportunities to help the adolescent attain an occupational end can be established. This is based on Item 31 (page 28):

$$\frac{\Delta X}{\Delta S} = 3(\text{probability of "great ability"}) + 2(\text{probability of "some ability"}) + 1(\text{probability of "little ability"}).$$

X_s can be deduced from this.

3. Orientation

There is now enough information to predict the distribution of adolescents involved over S. An independent measure of involvement can

⁵David Krech and Richard S. Crutchfield, Theory and Problems of Social Psychology (New York: McGraw-Hill Book Co., 1948), pp. 222.

⁶B. N. Kramer, "Dimensions of Prejudice," Journal of Psychology, 27, (1949), pp. 389-451.

be constructed, to test the proposition by giving an "actual" distribution of involvement over S. This is based on Item 28 (page 29).

$$\text{Real } \Delta P / \Delta S = 2(\text{probability of "very highly involved"}) + 1(\text{probability of "highly involved"}).$$

The index of oportunities measures the whole range of perceived ability. Orientation will be given a more restricted interpretation, as only the two highest levels are considered.

Section C will test the proposition, for all referents, and for each referent separately.

C. Data and Test of Proposition

Table 3.--Perceived Ability to Provide Opportunities to Help Attain an Occupational Goal, Level of Involvement, and Social Distance, for Five Referral Points: (N) and Probability Distribution

OPPORT- UNITIES	(least)		Social Distance					(greatest)	
	1	2	3	4	5	6	7	8	9
Great Ability	(271) .406	(146) .222	(15) .099	(4) .174	(3) .167	(4) .048	(10) .054	(3) .188	(0) .000
Some Ability	(241) .361	(289) .440	(47) .311	(6) .261	(6) .333	(19) .226	(33) .178	(7) .438	(0) .000
Little Ability	(107) .160	(174) .265	(49) .324	(8) .348	(4) .222	(35) .417	(55) .297	(2) .125	(3) .075
No Ability	(49) .073	(47) .072	(40) .265	(5) .217	(5) .278	(22) .262	(87) .470	(4) .250	(1) .025
TOTALS	(668) 1.000	(656) 1.000	(151) 1.000	(23) 1.000	(18) 1.000	(84) 1.000	(185) 1.000	(16) 1.000	(4) 1.000
ORIENTATION									
Very High Inv.	(208) .311	(60) .091	(2) .013	(1) .044	(1) .056	(3) .036	(3) .016	(0) .000	(0) .000
High Inv.	(178) .266	(147) .224	(18) .119	(4) .174	(2) .111	(4) .048	(4) .022	(3) .188	(0) .000
Mod. Inv.	(160) .240	(237) .361	(48) .318	(14) .609	(5) .278	(15) .178	(16) .086	(2) .125	(1) .250
Little Inv.	(70) .105	(113) .172	(33) .218	(1) .044	(5) .278	(29) .345	(35) .189	(5) .312	(1) .250
Very L. Inv.	(37) .055	(73) .111	(39) .258	(2) .087	(3) .167	(25) .298	(48) .259	(2) .125	(1) .250
Not Inv.	(15) .072	(26) .040	(11) .073	(1) .044	(2) .111	(9) .107	(79) .427	(4) .250	(1) .250

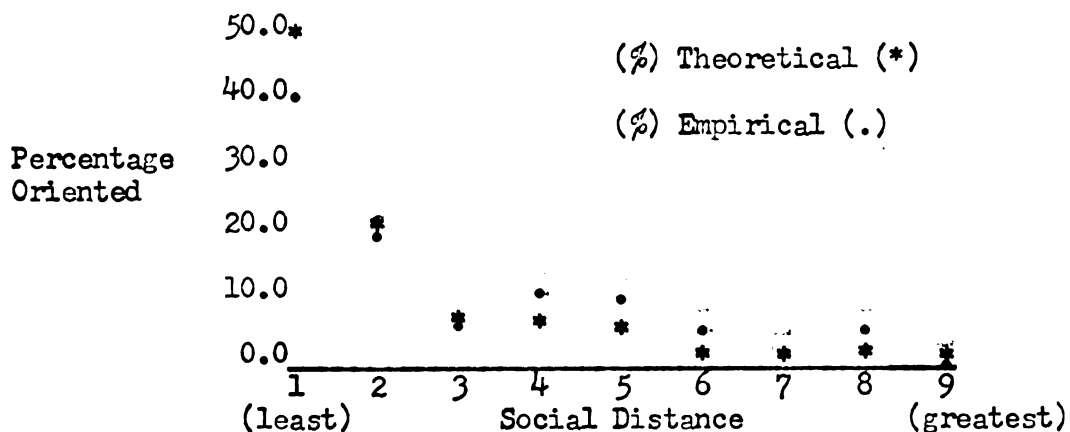
Table 4.--Test of Hypothesis for all Referral Points*

S	$\frac{\Delta X}{\Delta S}$	X	$\frac{1}{X}$	$\frac{\Delta P}{\Delta S}$ Hypo.	$\frac{\Delta P}{\Delta S}$ (%)Hypo.	$\frac{\Delta P}{\Delta S}$ (%)Real	$\frac{\Delta P}{\Delta S}$ Real
1	2.100	-----	-----	2.100	49.9%	40.1%	.888
2	1.811	2.100	.476	.862	20.5%	18.3%	.406
3	1.243	3.911	.256	.318	7.6%	6.5%	.145
4	1.392	5.154	.194	.270	6.4%	11.8%	.262
5	1.384	6.546	.153	.212	5.0%	10.1%	.223
6	1.013	7.930	.126	.128	3.0%	5.4%	.120
7	.815	8.943	.112	.091	2.2%	2.4%	.054
8	1.565	9.758	.102	.160	3.8%	5.3%	.118
9	.075	11.323	.088	.066	1.6%	0.0%	.000

$$\bar{X}(\text{Diff.}) = 3.12$$

*Source: Table 3.

Figure 1. Percentage Distribution of Orientation over Each Social Distance, for all Referral Points*



*Source: Table 4.

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The data in Table 3 can be broken down by each referral point: parent, peers, siblings, society, and spouse. Computations can then be done for each referral point, to test the hypothesis.

Sampling problems are anticipated, so it is necessary at the outset to establish certain "ground rules" for grouping adjacent social distances:

Any S with N less than 5 is to be grouped with the nearest lesser distance with N of 5 or greater.

To avoid distortion of the scale of social distance, no distribution at any S is to be moved more than two distance ranks.

Empty cases will be left out of the computations.

The social distance of grouped Ss is the mean of the S of each included rank, e.g., if 8 and 9 are grouped, the distance of the values combined is 8.50.

They hypothetical and real distributions are presented in the following tables and corresponding figures.

Table 5.--Test of Hypothesis for Parents

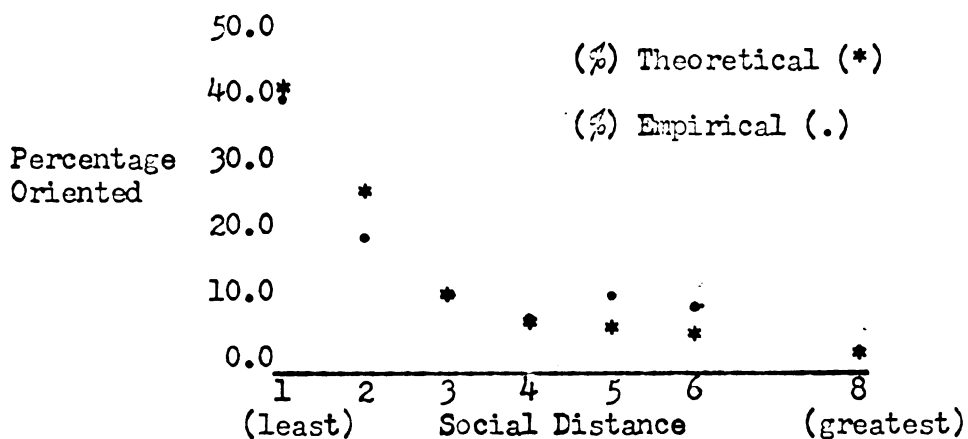
S	1	2	3	4	5	6	7	8	9
Predicted % Distribution	52.2%	19.8%	7.8%	5.6%	6.0%	1.9%	2.2%	2.8%	1.8%
Real % Distribution	42.0%	20.7%	8.4%	11.6%	12.9%	0.0%	0.0%	4.3%	0.0%
$\bar{X}(\text{Diff.}) = 3.44$									

A scatter plot comparing 'Theoretical' and 'Empirical' data across nine levels of 'Social Distance' (1 to 9). The Y-axis represents 'Percentage Oriented' from 0.0 to 60.0. Theoretical data points are marked with asterisks (*) and Empirical data points with dots (.). Theoretical values are generally higher than empirical values, especially at lower social distances.

Social Distance	Theoretical (%)	Empirical (%)
1 (least)	0.0	0.0
2	20.0	0.0
3	7.0	0.0
4	4.0	10.0
5	4.0	10.0
6	0.0	0.0
7	0.0	0.0
8	1.0	0.0
9 (greatest)	0.0	0.0



Figure 3. Percentage Distribution of Orientation over Each Social Distance, for Peers*



Source: Table 6.

Table 7.--Test of Hypothesis for Siblings

S	1	2	3	(4	5)	6	(7	8	9)
Predicted % Distribution	61.8	18.8	7.8		6.3		2.5		2.7
Real % Distribution	76.2	20.4	3.4		0.0		0.0		0.0
$\bar{X}(\text{Diff.}) = 5.31$									

Figure 4. Percentage Distribution of Orientation over Each Social Distance, for Siblings*

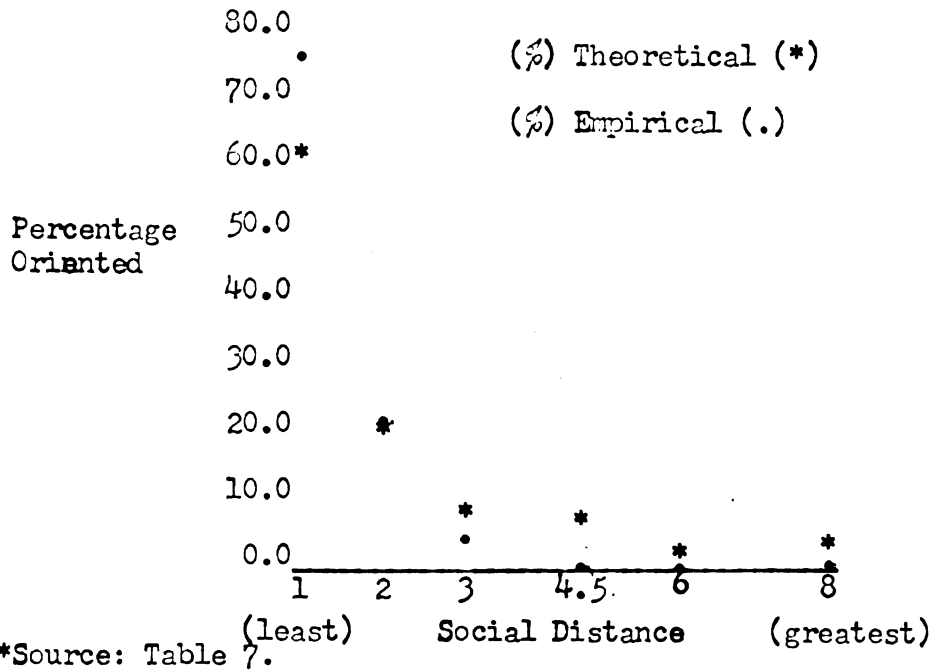
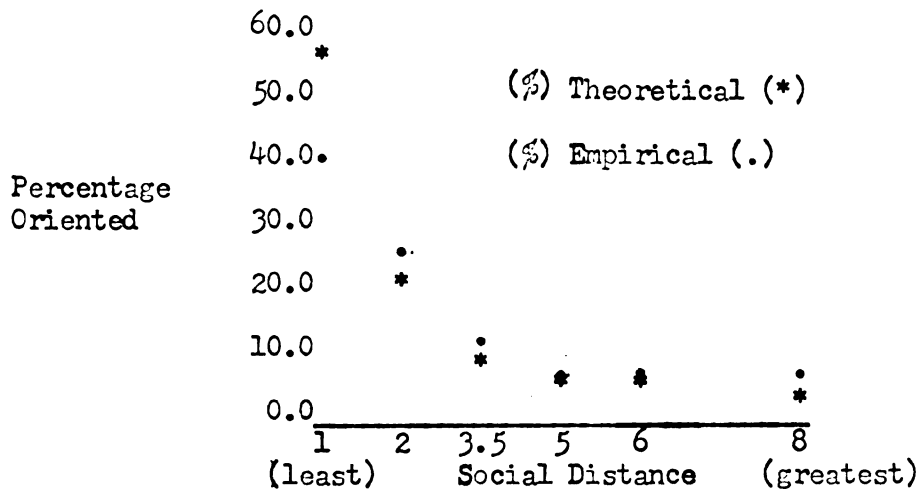


Table 8.--Test of Hypothesis for Society

S	1	2	(3	4)	5	6	(7	8	9)
Predicted % Distribution	57.4	21.2		8.9	4.7	4.3		3.4	
Real % Distribution	40.4	26.7		12.8	5.2	7.3		7.5	
$\bar{X}(\text{Diff.}) = 5.73$									

Figure 5. Percentage Distribution of Orientation over Each Social Distance, For Society*

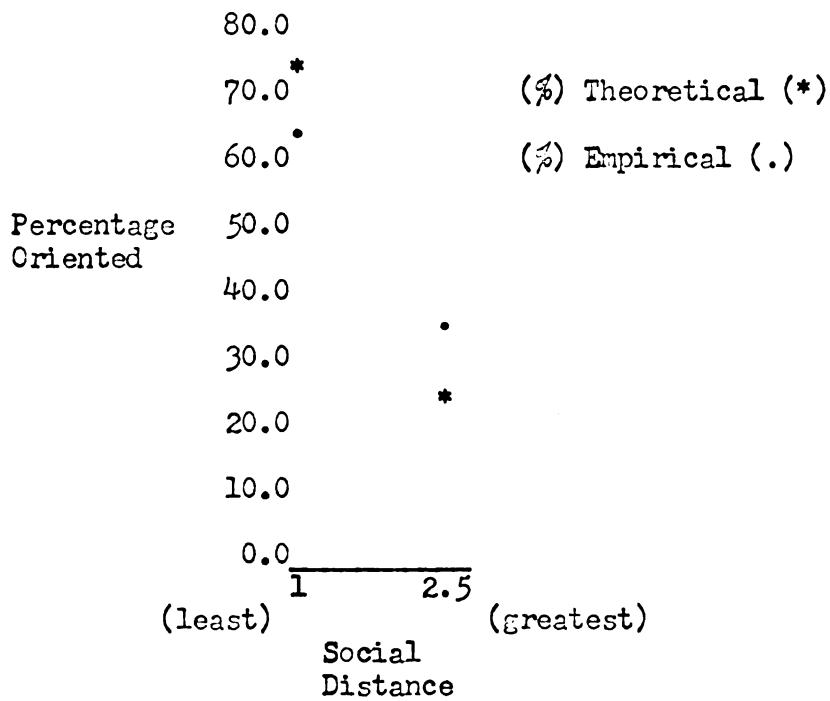


*Source: Table 8.

Table 9.--Test of Hypothesis for Spouse

S	1	(2	3)	4	5	6	7	8	9
Predicted % Distribution	74.9	25.1							
Real % Distribution	64.0	36.0							
$\bar{X}(\text{Diff.}) = 10.9$									

Figure 6. Percentage Distribution of Orientation over Each Social Distance, for Spouse*



CHAPTER 4

CONCLUSIONS AND IMPLICATIONS

Our general orientation that adolescents show a great deal of continuity between their perceived opportunities from referents and their actual involvement with referents is in general substantiated, on the basis of the data analyzed.

Further analysis needs to be directed at a breakdown of the population, to see which kinds of respondents (male, female, parent-oriented, peer-oriented, urban, non-urban,...) behave as predicted, and which do not. It is hypothesised that every category will exhibit consistency and cognitive rationality. This may or may not hold up. Certainly it can be anticipated that there will be systematic differences both within and between societies, and within and between referents.

The models in the second chapter show that for a certain population, which is both adolescent and non-adolescent, and which is considered with and without consideration of siblings and spouses, the propositions brought forward are validated. Here, again, the next question is whether this behavior will hold up cross-culturally. The model permits future research to find different distributions of involvement for different perceptions of desire and ability. A breakdown should also be made by each referent. For example, male and female adolescents can be expected to show differential involvement with parents that are perceived as providing the same opportunities, as

the social role expectation differ between sexes in all societies.

A descriptive model has been presented, to hypothesise what variables are relevant to a study of adolescent behavior, and to see in what ways these variables are interrelated. A closer look at the social structure, within which these processes are hypothesised to take place, is needed to explain why the variables in the model are related as they are. Even if the hypotheses and models could describe adolescents in all cultural settings, they would not constitute a scientific explanation. Much of the description presented here is methodological, but the explanation of the interrelationships must be theoretical and sociological.

This paper is a preliminary model, and an orientation to the study of adolescent behavior involving a fixed number of variables. The usage of Guttman's facet design and analysis has been of considerable utility in developing the model and the Facet Paradigm. The value of this methodology has been far greater than is apparent from the paper as written, as it was highly suggestive in choosing what variables are relevant, and in what ways they are semantically interrelated, and interrelated by our assumptions and postulates.

But we are essentially finished with Facet Theory and the algebra of abstract systems. It has given a start. But defining variables and making assumptions about them is not the stuff of sociological knowledge: it is only prolegomenous. Where the paradigm has led us to here bounds the difference between definitional systems and hypothetical-deductive systems. The philosophical implications of this can be illustrated by the

theories of Parsons-Smelser and of Homans.¹ This paper attempts to begin to do what Homans did in The Human Group.² So a brief exegesis of the methodologies of both will be instructive..

Parsons calls his system of interrelated concepts a theoretical model. It is a model, but it is not a theoretical model. His combining of pattern variables look like, but on such a high level of abstraction, they become virtually tautological and definitional. Like Parsons, this paper has developed a definitional system of variables and postulates: but it is never claimed that this constitutes a theory. It does not explain in any philosophical sense.

In the first Homans book, The Human Group, a lot of propositions of the type "x varies as y" are developed. This is heavily inductive, building up from empirical case studies. The model developed in Chapter 1 enables us to follow a similar procedure. By reviewing the literature on adolescence, we will attempt to generate--by an inductive process--propositions interrelating variables that appear in the model. Hopefully,

¹See Carl G. Hempel and Paul Oppenheim, "The Logic of Scientific Explanation," Parts I and II, in Feigl and Bradbeck, Readings in the Philosophy of Science. Also see Ernest Nagel, The Structure of Science: Problems in the Logic of Scientific Explanation (New York & Burlingame: Harcourt, Brace & World, Inc., 1961), Preface and Chapters 1 and 2.

The methodologies are contrasted sharply in their respective theories of human exchange: See Talcott Parsons and Neil J. Smelser, Economy and Society (Glencoe, Illinois: The Free Press, 1956), and see George C. Homans, Social Behavior: Its Elementary Forms.

²(New York: Harcourt, Brace, and Company, 1950). The parallels are substantive as well as methodological, for Homans deals with reference groups and social structure. See Merton, "Continuities in the Theory of Reference Groups and Social Structure," in Social Theory and Social Structure, p. 285.

after the propositions developed in this paper, and from a review of the literature, are empirically tested in a cross-cultural setting, it will be possible to borrow or invent more general (anatomical) propositions, which, in conjunction with a conceptual schema, will lead to some kind of a theory. From such a theory, the described propositions can be deduced. This is precisely what Homans did in Social Behavior. But at this stage, as with Homans in The Human Group, we are about to engage in "The first process, the process of building up from the empirical to the more general ..., " with the ultimate purpose of "...building back down from the general to the empirical. The first is an act of creation, which has no rules of procedure that will insure you success; the second has definite rules, the rules of logic."³

This technique is debatable, but it can be defended on the grounds that the process itself contributes to sociological knowledge, as propositions are useful, where definitions alone are not.

One other concept, in Chapter 3, needs a note of explanation. As indicated, social distance is used quite differently here than in the usual way. Perhaps the concept is too stretched here. But it is used in a nominal sense, to define the equal weighting of two variables, which, in conjunction with a third, the opportunity structure for each case of the sum of the other two, predict level of involvement.

Social distance, as a concept, lead this research to a theoretical formulation of a relationship between three variables, to explain a fourth.

³Social Behavior, p. 10.

So social distance was useful in forming this hypothesis, but the test of the hypothesis is not contingent on the concept. For, as stated, it is nominally defined.

If the reader objects to calling the sum of agreement and interest (direction and intensity of perceived intentions) social distance, he is encouraged to call it whatever he likes. And if he objects, he is objecting to the statement that the proposition is a generalization of Stouffer's theory of intervening opportunities; but he is not objecting to the hypothesis, nor to the testing of the hypothesis.

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