ACT RESEARCH REPORT

No. 47

47

December 1971

THE IMPACT OF COLLEGE ON STUDENTS' COMPETENCE TO FUNCTION IN A LEARNING SOCIETY

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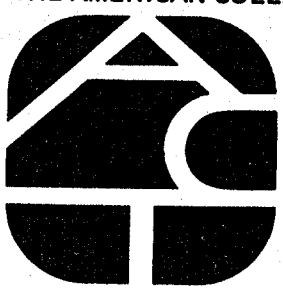
PUBLISHED BY THE RESEARCH AND DEVELOPMENT DIVISION

THE AMERICAN COLLEGE TESTING PROGRAM



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ABSTRACT

Modern society, marked by a high level of technology and change, is aptly called the "learning society" because people continually have to learn new roles. Those who function as leaders and managers of this society, the "technical stratum," go through a socialization process in which higher education plays an important part. A considerable amount of evidence has accumulated that college has an impact on the personality characteristics of students in ways that could be interpreted as giving competence to college graduates to function successfully in leadership roles within such a society. College graduates are more autonomous, independent, flexible, and socially involved, for example, than noncollege graduates. This change in the personality characteristics of college students could be due to student differences upon college entrance, or could be the effects of structural aspects of colleges and universities as social institutions. To explore these two possibilities, data were used from Trent and Medsker's *Beyond High School* study. The student outcome variable chosen to represent socialization to competence was the Social Maturity Scale of the Omnibus Personality Inventory.

Student change on the Social Maturity Scale was found to be related to the social structure of the colleges they attended as well as to student characteristics upon college entrance. Further, the social structure of the colleges by itself exerted a significant influence on student Social Maturity. When the data were reanalyzed controlling for the length of time students were in college and the initial scores on the Social Maturity Scale, the relationships were enhanced. Limitations of the study are described, and implications for comparable research with other social institutions are suggested.

THE IMPACT OF COLLEGE ON STUDENTS' COMPETENCE TO FUNCTION IN A LEARNING SOCIETY

Michael H. Walizer
Robert E. Herriott[1]

Although in recent years almost all American youth have become exposed to elementary and secondary schooling as a form of socialization, today an expanding segment of American society is making its initial contact with higher education. In addition to simply making greater quantitative demands upon the institution of formal education, such a rapid expansion in the "clientele" of American higher education has raised important questions regarding the functions of colleges and universities in contemporary society (Jencks & Riesman, 1968; Goslin, 1965; and Mayhew, 1969). Although a careful analysis of these many and often competing functions would be useful, we shall confine our analysis to simply the socialization function.

Contemporary America is experiencing social change at an unprecedented rate; the scientific revolution, rapid urbanization, and phenomenal population growth have all created a sociocultural context in which social change is, and will continue to be swift (Mack, 1967). One of the consequences of such rapid change has been a shift from a "performance" to a "learning" society (Moore & Anderson, 1969), with a concomitant need for individuals who can adjust and adapt to changing role demands.

In a performance society one could be reasonably certain that if he acquired the skills necessary to adequately perform his ascribed and achieved roles there would be a limited need for subsequent learning of new roles and modification of established ones. However, in a learning society an individual can no longer be certain that the roles, particularly occupational roles, he initially prepares for will adequately see him through his life cycle. On the contrary, individuals can be reasonably certain they will be called upon to fulfill new roles and that the expectations associated with continuing roles will be modified as the society changes. The ability to adopt and adequately carry out new and changing roles as the society changes can thus be viewed as a pre-condition to competence in a "learning" society.

The learning of such new or changing roles is a form of socialization. Although this concept has been used predominantly in the study of child development, it can be viewed more broadly as "the process by which one learns to perform his various roles adequately [Brim, 1968]." More

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[1] This study was completed in Iowa City during the summer of 1970 as a part of the work of the ACT Research Institute. Walizer is an assistant professor of sociology at Western Michigan University and Herriott is a professor of sociology at Florida State University.

specifically socialization can be defined as "any development which entails the modification of the self through the acquisition of personality characteristics [Gottlieb, 1961]." This process of achieving effective participation in a social setting can be called "socialization to competence."

Within every social system there are clusters of personnel with a specific interest in influencing the behavior and values of segments of the population, especially those of children and youth. These clusters can be viewed as *socialization agents* if they have a program of socialization and possess a system of norms, patterns of relationships, or structures of roles (Parsons, 1951). In our society higher education functions, among other things, as a socialization agent consisting of "schools and colleges, their academic practices, policies, and facilities, and the structure of faculties and students who teach and learn in them [Sirjamaki, 1967]."

Two distinct approaches can be used in considering the socialization function of higher education in contemporary American society. One emphasizes what Mannheim (1940) has referred to as "substantial rationality" and focuses upon the perceptions of those engaged in the educational process. Illustrative of such an approach is the work of Palley (1968) who performed a content analysis of the statements of objectives from the catalogs of a large sample of colleges and universities. However, a second approach emphasizes "functional rationality" and focuses upon a series of deductions from known conditions within the larger society. A study by Hodgkins and Herriott (1970) provides an example. Beginning with explicit assumptions about the nature of modern American society, they examined the development of certain forms of social learning not generally acknowledged by educators to be a part of elementary schooling.

It is this latter approach which we shall follow. What we have described as a learning society can be viewed more generally as a society exhibiting a high degree of "modernity." Although this concept is often the subject of disagreement (Anderson, 1966), a consistent theme in all discussions of the modernization process is a society's dependence upon the institution of formal education for the preparation of personnel with both the cognitive and social skills essential to the exploitation of a rapidly advancing technology. Central among the conditions within a modern society which competent individuals must be able to confront successfully are increasing (a) urbanization, (b) specialization, (c) differentiation of the social structure (Durkheim, 1933), and (d) emphasis on functional authority (Moore, 1965). Thus, one of the functions of higher education in a modern society is the socialization of students to develop the personality characteristics enabling them to perform successfully in a highly urbanized, specialized, and differentiated social structure. (For a more extended discussion of the function of formal education in a modern society, see Herriott and Hodgkins, in press.)

One of the most explicit statements regarding the specific personality characteristics required by such a society has been offered by Parsons and Platt (in press). Collegiate socialization, consistent with the principal value pattern of cognitive rationality, is seen to develop within the individual the capacity to accept new levels of achievement for self and for others. This is closely articulated with the acceptance of necessary functional authority connected with these levels of achievement. Also, such socialization develops the capacity to participate in, and to accept, an extensively differentiated environment.

Broadly speaking, the "ideal product" of such a process of socialization can be seen as one who (a) tends toward universalistic standards of evaluation, (b) has the ability to evaluate and adjust to his position within a highly differentiated network, and (c) within this wide spectrum of differentiation and pluralism will accommodate necessary authority. In addition, the qualities of flexibility, autonomy, and ego strength are congruent with these socialization goals.

These qualities would enable an individual to adopt and adequately fill a rather broad spectrum of roles within a modern society. In addition, their existence would increase the probability that he would be predisposed to adapt to new role demands, have the capabilities to independently assess his position in a highly pluralistic society, and to achieve adequate role performance with sufficient personal adjustment. Thus, the socialization function of higher education in a modern, learning society can increasingly be seen as one of socialization to competence.

Socialization, Social Structure, and Competence

Inkeles (1966a) has proposed an approach for investigating the relationship between social structure and socialization to competence. Inkeles defines *competence* as

> the ability effectively to attain and perform in three sets of statuses: those which one's society will normally assign one, those in the repertoire of [the] social system one may appropriately aspire to, and those which one might reasonably invent or elaborate for oneself. . . . [it includes] an individual's capacity to move to new statuses and to elaborate new roles . . . . In our society this means, above all, the ability to work at gainful and reasonably remunerative employment, to meet the competition of those who would undo us while yet observing the rules for such competition set down by society, to manage one's own affairs, to achieve some significant and effective participation in community and political life, and to establish and maintain a reasonably stable home and family life [pp. 265, 280].

Such a notion of competence emphasizes the result of previous socialization, but the concepts of competence and socialization are linked through the social structure.

Socialization

The bulk of research on socialization has been concerned with the effects of familial experiences on individual development. Such phenomena as child-rearing practices, family structure, parental values, home environment, etc., have been used to examine childhood socialization (Gottlieb, 1961; Inkeles, 1966a; Shibutani, 1961). In a recent review, Clausen (1968b) observes that although socialization is increasingly being used to denote role learning at any age, it traditionally has been a generic concept that

> embraces child-rearing, education, enculturation, role learning, occupational preparation, preparation for marriage and parenthood and, indeed, all social learning that is relevant to one's group memberships and life transitions [p. 14].

This pervasive use of the concept has led Clausen and others to note that socialization has been used to refer to an area of interest more than to any sharply defined process. These practices make the specification of clear conceptual boundaries for the term difficult. However, a distinction can be made between socialization and maturation if *socialization* is seen to entail learning and *maturation* as the "unfolding of the potentialities of the organism which occurs more or less automatically except in the face of marked deprivation [Clausen, 1968a, p. 5]."

Our investigation will rely upon Inkeles for the substance of the concept of socialization. Thus, *socialization* will refer to the process whereby

> individuals acquire the personal system properties—the knowledge, skills, attitudes, values, needs and motivations, cognitive, affective and conative patterns—which shape their adaptation to the physical and sociocultural setting in which they live [Inkeles, 1969a, p. 615].

The Personal and Social Systems

In speaking of the *personal system,* Inkeles and Levinson (1963) refer to the totality of the stable attributes which characterize an individual. The notion of a "social system" connotes an emphasis on interaction and interdependence of social phenomena. By means of such an approach, separate social facts can be studied as parts of wholes, and individual actors and actions in terms of patterns of interaction. Parsons (1951) brings these thoughts together when he defines a *social system* as "a mode of organization of action elements relative to the persistence of ordered processes of change of the interactive patterns of a plurality of individual actors [p. 24]."

Inkeles has presented a rather elaborate accounting scheme for the personal system. His approach is explicitly proposed as a practical model of personality for use where discussion is centered on interaction between the personal and social systems. The elements of the personal system as seen by Inkeles are reviewed in Table 1.

Unfortunately, a formal accounting scheme for the social system which would parallel that of Inkeles for the personal system is not available. However, there are analytical schemes which can be used to study specific social systems. For example, Inkeles and Levinson (1963) present a four-part schema for the systemic study of an organization. The schema includes: (a) ecological properties such as physical characteristics, resources, and size; (b) cultural properties such as traditions, values, and goals; (c) structural properties which include the division of labor and

TABLE 1

An Accounting Scheme for Personality Study[a]

Psychomotor System	Temperament Aptitudes Skills
Idea System	Information Opinions and Attitudes
Motivational System	Values Motives and Needs
Relational System	Orientation to Authority Figures Orientation to Intimates and Peers Orientation to Collectivities
Self-System	Conceptions of Self Modes of Defense Modes of Moral Functioning
Modes of Functioning	Cognitive Modes Affective Modes Conative Modes

[a]Source: Inkeles, 1966a, p. 267.

authority structure; and, finally, (d) social process characteristics, such as the actual workings of the organization, the degree of formality, and the emotional climate. Other dimensions of a social system can also be elaborated, including economic and political characteristics, systems of stratification, modes of social control, patterns of deviance, institutional complexes, the nature of role prescriptions, distribution of authority, the sanction system, and the degree of consensus and conflict concerning goals (Rosen & Bates, 1967).

The basic assumption in Inkeles' approach is that personality characteristics have an important influence upon the acceptance and performance of various roles, and that this influence is regular and systematic. In the most general sense *roles* can be viewed as consisting of systems of expectations which exist in the social world surrounding the occupant of a position (expectations regarding behavior toward people in other positions and expectations a person in a given position perceives as applicable to his own behavior) and the specific behavior of a person in a position when he interacts with someone of another position (Deutsch & Krauss, 1965).

Traditionally, sociologists have explained satisfactory role performance as a function of the system of sanctions and rewards that are at the disposal of society in order that the expectations of society are fulfilled. Inkeles' approach, however, is more psychological. He asserts that personality characteristics play an important part in recruitment to roles and performance in them, since individual characteristics predispose persons to favor one or another role and also affect the quality of role performance.

Social Structure and Socialization to Competence

The central fact which ties the personal and social systems together is that effective socialization is a precondition for organized social life (Inkeles, 1969a). The sociologist interested in social structure attempts to define, clarify, and explain the causes and consequences of sets of institutional arrangements. Since all patterns of social organization are made up by actions of individuals, the personal system becomes the major intermediate mechanism between different segments of social structure.

Following the suggested approach to the study of socialization to competence proposed by Inkeles (1966a) for a particular stratum of society, this study will explore socialization to competence for people with a college education, hereafter referred to as the "technical" stratum. The approach will be to: (a) list demands required by a modern society on individuals within the technical stratum, (b) specify the requisite personality qualities these demands require, and (c) investigate the socialization patterns vis-a-vis the structure of higher education which are presumed to promote these "socially demanded" personality dispositions.

Typically, a college graduate could expect to fill occupational roles ranging from managers and proprietors to executives and professionals. In these various occupations the substantive concern of the individual may vary but generally there are many similarities. The occupational roles of college graduates seem to be at a level involving administration, complex problem solving and decision making where creativity, innovation, and personal adjustment are necessary and highly valued.

Requisite Personality Characteristics

We have briefly alluded to personality characteristics which might facilitate competent role performance in these occupational roles. However, further explication of these personality characteristics is in order.

Much speculation has occurred concerning the personality characteristics required of individuals within the technical stratum of a modern, "learning" society. For example, Lerner (1958) points to the importance of the need for empathy and in describing the "mobile person" he notes that both independence from traditional patterns and autonomy of thought are necessary for competence.

Similarly, Lundberg (1963) discusses what he calls the "man of thought." In a complicated society the ability to make decisions in a complex context is prerequisite for maximum personal development. Lundberg also states that the awareness of an individual to personal and occupational alternatives is more likely if the person is flexible and open.

Inkeles (1966b, 1969b) empirically attempts to verify the existence of personality characteristics which would typify "modern man." The development of personality characteristics typical of modern man is seen to be a matter of degree, and as such technical stratum individuals can be viewed as having these characteristics to a higher degree. Such characteristics include: (a) an openness to new experience, (b) independence from traditional and hierarchical authority, and (c) full participation in one's social world.

The importance of autonomy in achieving one's potential has been noted by Jahoda (1959), Maslow (1962), and Rogers (1951). Autonomy includes the notions of "flexible, objective thinking and an openness of attitude which facilitates awareness of and adaptability to the environment [Trent & Medsker, 1968]." Creativity has been intimately related to autonomy in the works of Barron (1961), Crutchfield (1963), Gough (1961), Helson (1961), MacKinnon (1961), and Sanford (1966).

As Trent and Medsker (1968) observed, autonomy has been related to intellectual awareness in a manner similar to that which has been used in relating an authoritarian personality to nonintellectuality. Trent and Medsker (1968) conclude,

> the autonomous individual is capable of the objective, open, and flexible thinking which characterize intellectuality, and the authoritarian individual is distinguished by the highly opinionated, closed thinking which is the mark of nonintellectuality [p. 11].

In summary the personality characteristics necessary for competence in technical stratum occupational roles of a learning society would include:

- tolerance for ambiguities
- creativity
- an open, receptive mind
- critical thinking ability
- flexibility
- freedom from authoritarianism and opinionated thinking
- recognition of achievement via independence
- ability to think abstractly and reflectively
- ability to assimilate new information in a logical manner.

Effects of Higher Education as Socialization to Competence

The bulk of evidence currently available in the literature concerning the effects of college indicates that students do change during the college experience. Much of the research has been directed at specific substantive areas of student attitudes, opinions, beliefs, or behavior; but a notable portion deals with a more general level of personality change. Those studies which do deal with the personality characteristics outlined previously may be viewed as dealing with those personal system characteristics which can be associated with competence.

Perhaps a major impetus for much contemporary concern with the effects of college education was the study done by Jacob (1956) and the subsequent discussions by Riesman (1958) and Barton (1959).

Comprehensive reviews of the literature on college effects done by Freedman (1960), Lehmann and Dressel (1963), Newcomb and Feldman (1968), and Webster, Freedman, and Heist (1962) exhibit a consensus that college

student personality characteristics do change. Attitudes toward public issues become more liberal and a greater sensitivity and appreciation of aesthetic activity develops (Berdie, 1968; Eddy, 1959; Elton, 1969; Elton & Rose, 1968; Feldman & Newcomb, 1969; Hodgkins, 1964; and Pace, 1941).

One of the most recent and perhaps most comprehensive studies of changes occurring at the individual level as a result of college attendance is that of Trent and Medsker (1968). In a longitudinal study beginning with over 10,000 high school graduates, the investigators found that generally speaking during college, students become more critical in their thinking, more tolerant, more flexible, and less prejudiced in their judgments. These findings are supported by the work of many researchers, particularly: Allwood (1964), Freedman (1960, 1967), Goldsen (1960), Katz et al. (1968), Lehmann and Payne (1963), Newcomb (1943), Newcomb et al. (1967), Webster (1958).

The evidence seems conclusive that the college experience develops in the technical stratum of individuals those personal system characteristics indicative of what we have identified as competence in a modern, learning society.

Approaches to the Study of College Students' Interaction with Their Environment

Most investigators of the collegiate experience would agree that changes in personality occur in students during the college years. Whether these changes are best attributable to "maturation" or "socialization" is far more uncertain, but there is some evidence, particularly that of Trent and Medsker (1968), to the effect that it is the college experience per se which makes the difference. For the time being, let us accept the premise that the college experience can produce changes in personality and consider what it is about that experience which can produce such change.

In most past research personality changes of the type described above have been assumed to result from a process of interaction between the student and elements of his collegiate "environment." Very often such an assumption is not made explicit, as investigators frequently rely upon variables which are simply suggestive of such interactions, rather than tapping the interactions directly. The typical approach has been to identify social-psychological aspects of the student's environment while in college which are indicative of conditions that can foster certain interactions. A second general strategy used by past researchers has been the identification of individual student characteristics which would predispose him to participate in specific forms of interaction. These individual characteristics have then been used as proxy variables for the interaction patterns thought most likely to produce personality change.

Formal studies which have attempted to explore the impact of college on student personality using these approaches can be classified into three general groups: (a) the "subcultural" approach, (b) the "subjective environment" approach, and (c) the "residual" approach. Although assignment of any particular study to one of these groups may be difficult due to overlap, generally studies seem to correspond to the categories listed.

The Subcultural Approach

By far the approach which has been used most frequently in studies of college effects is one which emphasizes the student subculture. Stemming from such notions as that of W. I. Thomas that "it is the culture of the group that limits the power of the mind to meet crisis and to adjust," contemporary investigators have argued that

> the groups to which a person belongs set the limits, provide the alternatives, and define the meanings to be attributed to threatening as well as nonthreatening situations. . . . it is a person's socially relevant groups that train the individual for legitimate and proper modes of adaptation [Mechanic, 1962, p. 7].

For students in general and particularly for high school students the peer group is thought to be the socially relevant group. Coleman (1961), Gordon (1957), Havighurst and Taba (1949), Hollingshead (1949), and others reasoned that peer subculture plays a predominant role in students' lives. How-

ever, as Turner (1964) pointed out, the youth culture has been the subject of impressionistic observation rather than controlled investigation and "the content of youth culture and kinds of existing hierarchies are still largely unknown."

The studies of student subcultures of college students seem to follow the general pattern of, first, identifying dimensions of thought, attitude, or behavior along which students might vary, and, second, arriving at various subcultures by developing categories on these dimensions. Perhaps the best known of these typologies was offered by Clark (1962). He classified students along two dimensions: involvement with ideas and identifying with their college (see Figure 1).

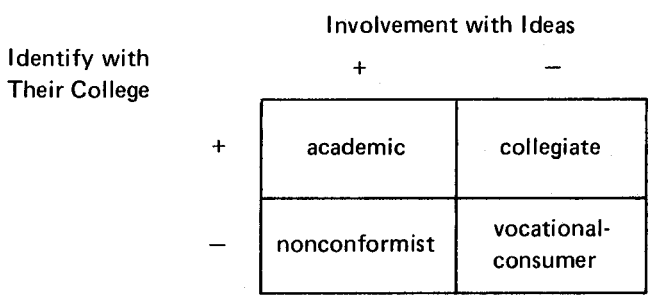

Fig. 1. Typology of student subcultures. Source: Clark (1962), p. 210.

The "collegiate" subculture is characterized by football, fraternities, dates, and campus fun. The "vocational-consumer" subculture is almost solely interested in job training. Serious students who identify with intellectual concerns are placed in the "academic" subculture. And finally, the "nonconformists" are seen as alienated, involved with ideas of the adult society and as using off-campus groups as points of reference.

In a similar manner Hodgkins (1964) arrived at four narrative descriptions of subcultures which were differentiated on the basis of the emphasis placed upon three general developmental aims of higher education—the academic (intellectual), the social, and the vocational. Viewing the academic environment as a distinctive sociocultural system Gottlieb and Hodgkins (1963) demonstrated that students who fit these varying narrative descriptions undergo different forms of attitude change.

Thistlethwaite and Wheeler (1966) have employed the idea of student subculture in the area of aspirations, while Goldsen (1960) utilizing the notion of subgroups investigated issues ranging from goals of education to dating patterns. Riesman (1961) suggests that peer group subcultures play an important role in the process of change during the college experience. Newcomb (1961) has attempted to draw upon the various studies of student peer groups in providing a taxonomy for peer group formation and conditions of peer group influence.

Bolton and Kammeyer (1967) take a rather strict position when they define subculture as

> a normative value system held by some group of persons who are in persisting interaction, who transmit the norms and values to newcomers by some communicational process and who exercise some sort of social control to ensure conformity to the norms. Furthermore, the normative system of such a group must differ from the normative value system of the larger, dominant society [p. 125].

Utilizing this definition they suggest the concept of subculture appears to be often misused in the study of college student peer groups. Alternative concepts such as "social type" (Klapp, 1962) and "role orientation" (Bolton & Kammeyer, 1967) have been used to denote the same general phenomenon referred to by the term "subculture."

The Subjective Environment Approach

The second approach for specifying environmental factors for successful socialization constitutes what can be called the "subjective environment" approach. These attempts at specifying the functional aspects of college environments of students rely upon the students' subjective reports of their college environments.

Among the most notable work conducted with this type of orientation is that of Pace (1964) and Stern (1963). Utilizing the notion of environmental press and congruence of this press with individual needs, the "college characteristics analysis" was first developed. In conjunction with their work two other measures involving environmental press have been devised—the Activities Index (AI) and the College Characteristics Index (CCI). In essence, the individual, through his college experiences, describes in terms of environmental press his mental picture of his college

environment. Through this scheme Pace and Stern have classified environmental emphasis and utilized "college press" as a major independent variable in arriving at a variety of conclusions. (See Stern, 1963, for a summary of research findings.) This work suggests there are two major factors which account for most of the differences among college environments—intellectual and social climates.

Another psychologically oriented attempt to classify college students' environments was done by Pervin (1967). Based on the semantic differential, he has devised TAPE—Transactional Analysis of Personality and Environment. With this instrument various concepts concerning self and college can be rated. Pervin found considerable variability in scale rating across the 20 colleges studied on each concept and in the pattern of ratings across the six concepts of: my college, myself, students, faculty, administration, and ideal college. However, to date, use of the instrument has been limited to studying satisfaction with college. In general, discrepancies between student perceptions of themselves and of their college were found to be related to dissatisfaction with college.

Eddy (1959) has shown that the student's expectancy of the institution can have an influence on the impact of that college on student character. And Eckert (1943) has shown that pressure on students to be interested in current affairs produced increased interest in current events. Thistlethwaite (1959), utilizing the "college press" approach, has demonstrated that the college environment is an important determinant of students' motivation to seek advanced intellectual training. Finally, in a review of many studies, Plant (1963) concludes that changes in attitudes do occur among college students; and he summarizes the impact of various phenomena.

The Residual Approach

The third category of attempts to define the functional aspects of college environments has no common element to bind the studies together. Some could be placed in the "subjective environment" approach and some have elements of the "subcultural" approach. However, they do not have the consistency of the previously mentioned studies.

The work of Astin and Holland (1961) can serve as an example of attempts to assess subjectively the college as a student's environment. The Environmental Assessment Technique (EAT) is based on the assumption that environments are transmitted by people. Further, since the college peer group is the student's major personal contact, it follows that a chief portion of the student's environment is determined by the characteristics of his fellow students; however, characteristics of the college as an institution are also included. Consequently, the EAT is defined in terms of: average intelligence of the students, size of the college, plus six personal orientations—realistic, scientific, social, conventional, enterprising, and artistic.

In a related work Astin (1962), with a sample of 335 institutions, performed a factor analysis of 33 major attributes of colleges. Included in these attributes were such factors as type of control, religious affiliation, faculty and student characteristics, and student "environment." The six principal dimensions along which institutions appeared to differ were identified as: affluence (wealth), size, type of control, masculinity/femininity, realistic (technical) emphasis, and homogeneity. Among these six, affluence accounted for the largest proportion of the total variation.

Empirical investigations utilizing the EAT and the latter factor analysis have shown some interesting results. Astin (1963) and Nichols (1964) have shown that colleges differ in their influence on such student characteristics as achievement, ability patterns, and career choices; but the effects of the college are small compared to differences which are attributable to the characteristics of the students at the time of college admission (Nichols, 1967). Nichols also found that college students become more aware of their own impulses and less dependent. However, only about 5% of the total variation seems to be attributable to characteristics of the college, such as the type of degrees which are granted.

Astin's most recent major attempt to characterize colleges as student environments has taken a slightly different approach. In what he himself describes as a "shot-gun" method, placing an emphasis on behavior as opposed to perceptions (as in the CCI) or personal characteristics (as in the EAT), he has developed an Inventory of College

Activities (ICA) which includes such items as the amount of time spent studying and the frequency of intellectual arguments. Astin (1968) states that

> our goal in designing the ICA was to identify as many environmental stimuli as possible that could be observed by undergraduate students and reported in a questionnaire. We tried to cover four broad categories of stimuli: the peer environment, the classroom environment, the administrative environment, and the physical environment [p. 9].

Other scattered attempts at specifying the educationally salient aspects of the college student's environment range from the very vague, such as Jacob's (1956) fleeting reference to the "climate" at certain "special" colleges, to the very specific, such as Learned and Woods' (1938) finding that students who went to colleges where the average ability was high performed significantly better on comprehensive achievement tests than did students of comparable ability who went to colleges where average ability was low. Also included in this category might be such studies as Newcomb's Bennington College studies where the local community was found to be salient for changes in political attitudes. Mechanic's (1962) viewing of the student's environment as a communication system and the consequent importance of physical location and potential for interaction with other students and faculty might also be classified in the approach.

The Structural Approach

Noticeably lacking in the above studies is an explicit emphasis on structural or organizational characteristics of colleges and universities in explaining the impact of varying institutional environments on college students, although our review does show that the impact of college on students is generally viewed as socialization rather than merely as maturation. In addition the personality characteristics developed as a result of the college experience coincide with those specified as being requisite to competence in a learning society. Because of the importance of structure to socialization (as previously discussed) it seems appropriate that greater attention be drawn to the structure of institutions of higher education and its importance to their impact on students.

We know of no studies of the impact of colleges on students which have utilized a comprehensive structural approach. However, there are studies which have utilized structural variables in part of their analysis (Astin & Holland, 1961; Rogoff, 1957).

In a recent study by Scott and El-Essal (1969) student protest was studied in relationship to structural and analytic variables. Size of school, quality of school, size of the community in which the institution is located, and the complexity of the institution were utilized. Similarly, Trent and Medsker (1968) utilize type of control in comparing changes in "social maturity."

Parsons and Platt (1968) have characterized academic institutions by developing a scale of differentiation. The Scale of Institutional Differentiation (SID) is intended as an index of the degree of internal differentiation found in a particular college as a social system. The scale is composed of three indices: size, quality, and research orientation (Parsons & Platt, 1968). To arrive at size each full-time faculty member in the arts and sciences sectors of the institution was counted as one, part-time as one-half, and professional faculty was omitted. Quality was defined by three sub-indices: general and educational income per student, the proportion of PhD holders on the faculty, and the student/faculty ratio. Research orientation was also derived from three sub-indices: the percentage of the arts and sciences student body that are graduate students, the monetary amount of grants received by an institution per faculty member, and the number of periodicals in the library per faculty member. The SID appears to be a particularly promising device for measuring such structural phenomena as allocation of academic role functions and teaching goals and styles.

Frequently academic "quality" has been utilized in attempting to explicate the stratification system of colleges as social systems. Traditionally academic quality has been defined in either of two ways. One method defines quality in terms of an index in which a set of indicators (generally of organizational input) are assumed to adequately portray quality. The second method relies upon subjective evaluations (generally of organizational output) by judges who are considered authorities.

Knapp and Greenbaum (1953) assessed academic quality of undergraduate colleges and universities on the basis of their production of

scholars and rated the institutions accordingly. Lazarsfeld and Thielens (1958) acknowledged the futility of attempting a general definition of academic quality and resorted to operationally assigning a quality rating to each college, utilizing six indicators to measure quality. The most notable attempts of institutional rankings have been performed by Brown (1965) and Astin (1965). Astin employed 13 separate indicators in attempting to arrive at meaningful assessment of student environments associated with various colleges. Some of the resulting factors are utilized to create "a reasonably accurate measure of prestige." Brown utilized the following eight indicators to arrive at a final ranking of institutions into six classes:

1. Percentage of the total faculty with a PhD
2. Average salary and fringe benefits per faculty member
3. Percentage of students continuing on to graduate school
4. Percentage of students at the graduate level
5. Number of volumes in library per full-time student
6. Total number of full-time faculty members
7. Faculty-student ratio
8. Educational and general income per full-time student.

Although these illustrations demonstrate that structural features of institutions of higher education have been considered in past research, they represent only a small minority of studies and suggest that a thorough structural analysis of the impact of higher education on the development of competence in a learning society is likely to prove fruitful.

Design of the Study

The goal of this report is to develop an accounting scheme for the structural analysis of the social systems of institutions of higher education which would parallel that presented by Inkeles for the personality system. We will then examine changes in the personality system reflecting competence in a learning society which can be attributed to the influence of the social structure of institutions of higher education.

An Accounting Scheme for College Structure

Ideally, a study of the relationship between the personal system and the structural properties of higher education would fully specify, utilizing Inkeles' scheme of the personal system (see Table 1), all of the personality attributes in all of the dimensions of the personal system which would be requisite to competence for the college-educated stratum of society. In addition, a similar accounting scheme for the structure of institutions of higher education would be developed and each salient dimension within that scheme would be explicated and related theoretically to the personal system. Measurement devised for each accounting scheme would then be developed and administered to a random sample of students in a random sample of institutions of higher education using a matched longitudinal design. Extensive descriptive and multivariate analysis then could be carried out controlling for the previous socialization experiences of the students. For pragmatic reasons we have had to adopt a more limited approach, but the general procedures outlined will be used.

Table 2 illustrates our proposed accounting scheme for the study of the structure of institutions of higher education. The left side of the table presents various classifications by which structural characteristics of colleges and universities can be delimited and compared or contrasted. At the right of the table are examples of the types of structural relationships which can be placed in the various categories. For example, the authority system of colleges and universities can be compared with

TABLE 2

An Accounting Scheme for the Study of the Structure of Institutions of Higher Education

Structural dimension	Example
Authority System	Degree of Bureaucratization Collegial versus Authoritarian Decision Making Legitimacy of Power Relationships
Reward System	Nature of Rewards Mechanisms for Dispersement
Sanction System	Nature of Sanctions Mechanisms of Dispersal
Goal System	Diversity of Goals Existence of Goals Consensus on Goals
Personnel System	Demographic Characteristics Degree of Training
Environmental Exchange System	Type of Control Source of Funding Relationship to College Community Relationship to Other Institutions
Ecological System	Size Surroundings Physical Facilities
Interaction System	Time and Energy Allocations for Various Interactions

respect to the extent to which important decisions within the organization are made on a collegial basis or through administrative authority. The goal system of the organization can be differentiated on the basis of the diversity of goals (e.g., the number of degree granting departments), and/or the consensus of goals within the organization.

Research Hypotheses

In order to conduct a preliminary test of the utility of such an accounting scheme to the explanation of changes of personality during college the following hypothesis is offered. We propose *that personality changes experienced by college students will be a function of the social structure of the colleges which they attend.* We will call this Hypothesis One.

However, there is a considerable body of past research which suggests that personality change during college may simply be a function of the precollegiate socialization to which college students have been exposed. Such socialization can be viewed as attributable largely to the social settings of family, school, and church. Experiences within each of these three alternative socializing agencies theoretically can create preconditions for personality changes which will take place later, and can also influence the types of college structures which adolescents later encounter.

Table 3 presents a similar accounting scheme for the structural analysis of precollegiate socialization background. Emphasizing the three social institutions just noted which can play a predominant role in precollegiate socialization, the accounting scheme presents dimensions of each social institution which can be used to characterize that institution, as well as examples corresponding to each dimension.

Since there are possible confounding effects to precollegiate socialization with socialization in college, it is important to test the assumption that precollegiate socialization experiences are related to personality change while in college. If this assumption holds, we propose to further test the hypothesis *that personality change experienced by college students will be a function of the college social structure, after controlling for the possible extraneous effects of precollegiate socialization experiences.* We will call this Hypothesis Two.

At this point in the development of our analytic framework it may be helpful to represent these two hypotheses using several Venn-diagrams, a geometric form of set notation. Portrayed in Figure 2 are four alternative models of the possible relationship between college structure variables, precollegiate socialization background variables, and personality change. The large outer circles represent the total variance across a predefined population of students on some appropriate measure of personality change (V_p). The inner circle, labeled V_b, represents the proportion of V_p which is attributable to precollegiate socialization, and the inner circle, V_c, the portion of V_p attributable to college structure.

TABLE 3

An Accounting Scheme for the Structural Analysis of Precollegiate Socialization Background

Social institution	Structural dimension	Example
FAMILY	Authority Structure	Exercise of Power
	Kinship Structure	Extended vs. Nuclear
	Value Structure	Attitudes and Beliefs
	Knowledge Structure	Educational Attainments
	Economic Structure	Socioeconomic Status
	Ecological Structure	Siblings
	Affective Structure	Love Relationships
	Reward & Sanction System	Socialization Practices
SCHOOL	Authority System	Degree of Bureaucratization
	Reward & Sanction System	Nature of Rewards
	Goal Structure	Consensus of Goals
	Personnel System	Teacher Preparation
	Environmental Exchange	Source of Support
	Ecological System	Student Enrollment
	Interaction System	Daily Activities
RELIGION	Belief System	Degree of Mysticism
	Value System	Attitudes
	Differentiation of Activity	Youth Groups

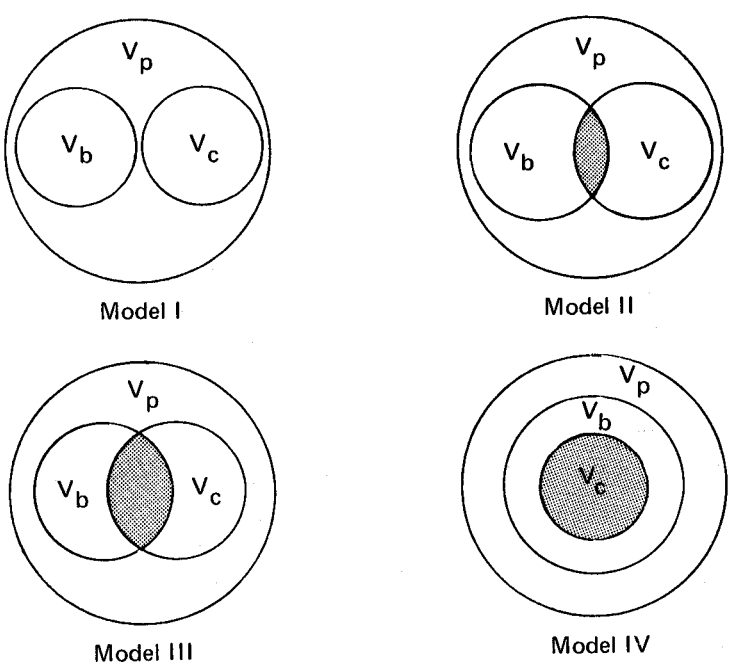

Fig. 2. Four alternative models for the relationship of college structure (V_c), precollegiate background (V_b) and personality change (V_p).

Notice in Figure 2 that in all four alternative models we have portrayed the "union" of V_b and V_c (i.e., the area bounded by either V_b *or* V_c) to be less than V_p. Although the theoretical framework proposed in the present discussion introduces only V_b and V_c as possible explanations of V_p, factors outside of this framework also potentially influence personality change.

Hypothesis One specifically deals with the issue of the magnitude of V_c. It is proposed that V_c will be non-zero.

These four alternative models are particularly relevant to an understanding of Hypothesis Two. Notice that in Model I, V_c and V_b do not intersect (i.e., overlap) suggesting a conception of precollegiate socialization and college structure as statistically independent of each other. Such a model is offered exclusively for illustrative purposes for it is not very realistic given the extensive literature which has shown that family background and choice of college are often highly correlated (Astin, 1965). Models II, III, and IV are more realistic and reflect an "intersection" between V_b and V_c. In Model II this overlap is rather minor, in Model III major, and in Model IV total. Hypothesis Two is specifically addressed to the issue of whether the appropriate model is Model IV or one more like II or III. It predicts that the proportion of variation in personality change attributable to college structure is not simply a subset of that attributable to precollegiate socialization.

Ideal Research Design

In an ideal research design for testing these two hypotheses we would want to randomly select students who were enrolled full time from randomly selected institutions of higher education. As early as possible in the student's college career the competence level of each student, as previously defined, would be determined. At this point information from the respondents would be combined with data from familial, school, church, college, and other official sources to determine (a) the precollegiate socialization background of the individuals with reference to those factors which would effect the further development of competence and, (b) the social structure of the institutions of higher education. During the students' collegiate experience measures of the extent to which they were exposed to the college or university as a socialization agent would be applied so that the extent of exposure could be determined. Finally at the end of their college attendance, whatever the cause of termination, the competence level of each student would again be measured.

With this research design, a full test of the accounting scheme which has previously been presented could be achieved.

Exploratory Research Design

Prior to a full test of the analytic framework developed here, we conducted research of a preliminary nature. The ideal research design would be costly to implement in terms of personnel and financial resources, and due to the longitudinal nature of the suggested design a number of years would be required for the full test. However, a useful preliminary test of the hypotheses can be carried out utilizing data from an existing longitudinal study.

To conduct such a test of the hypotheses, a secondary analysis was performed on a portion of the data from the nationwide study *Beyond High School* (Trent & Medsker, 1968). Through cooperation with the Center for Research and Development in Higher Education in Berkeley, California, a portion of the Trent-Medsker data was obtained concerning those 3,927 students from this study who enrolled full time in higher education after high school. This information included data on the students' background, including high school and community information; longitudinally measured personality characteristics; and information as to the students' participation in higher education.

The Available Sample

The Trent-Medsker sample was drawn originally to investigate relationships between college attendance and the type of college available in the community. Community characteristics were obtained using the *Market Guide* of the Editor and Publisher Company (1957) and documents of the U.S. Bureau of the Census (1952, 1957). Sixteen communities were selected which were roughly comparable (with the exception of one metropolitan area for contrast purposes) according to the following criteria:

1. *Population.* For the 15 "basic" communities the population range according to the 1950 census was 22,467 to 115,911, with a median of 40,517. The population of the metropolitan community was 775,357.

2. *Percentage engaged in white-collar occupations.* The percentage of the population engaged in white-collar occupations ranged from 31 to 50%, with a median of 44%. In the metropolitan community, the percentage was 53.

3. *Percentage of population engaged in manufacturing.* The range in the percentages of the population engaged in manufacturing was 6.9 to 56.2, with a median of 34.3. In the metropolitan community, the percentage of those engaged in manufacturing was 16.9.

4. *Percentage of the population engaged in trade.* The percentage of the population engaged in trade, primarily in sales and retail, ranged from 15.1 to 34.5, with a median of 21.6. In the metropolitan community, 25.5% of the population was engaged in trade.

5. *Type of principal industries.* The median number of types of principal industries for the 15 communities was 5, with a range of 4 through 9. The one large metropolitan community had 8 such industries.

6. *Median salary.* The median salary for all the communities, based on the median within each city, was $3,335. The median salary in the communities ranged from $2,600 to $4,374, including the metropolitan community.

7. *Median grade of education completed by those 25 years or over.* The median grade level of education completed by those 25 years or over for all of these communities combined was 10 years; the range of grades completed for this group among the communities was between 9.2 and 11.5 years. In the case of the metropolitan community, the median grade was 11.7.

8. *Ethnicity.* The percentage of foreign-born white, both male and female, ranged from 1 to 15, with a median of 4. The metropolitan community had the largest percentage of foreign-born white, namely 16%. In two communities no Negro population was reported. The range of the Negro population in the remaining communities extended from 2 to 8%, with the median at 4%. Six percent of the population was reported Negro in the metropolitan community (Trent & Medsker, 1968, pp. 273-274).

The communities and their characteristics are given in Table 4. The sample was composed of the entire senior class of 1959 in public and private secondary schools (where private enrollment was appreciable) in all of the communities except the largest one (San Francisco). In the latter, seniors were surveyed in three high schools representing a demographic cross section as determined by the school superintendent.

Data concerning the students' high schools were obtained from questionnaires to school principals in the spring of 1959 and the fall of 1962. Data on high school achievement and measured intelligence were gleaned from official records. Through survey questionnaires, data concerning student background factors, school activities, and personality characteristics were collected in the spring of 1959 at the various high schools and again in the spring of 1963. The follow-up instruments were administered by officials in the more than 50 colleges which enrolled 10 or more of the sample and in other cases response was obtained by mail. Additional information was obtained from postcard questions and from officials at the various institutions of higher education.

A total of 2,404 students who entered higher education full time in the fall of 1959 were studied longitudinally. A total of 683 institutions of higher education were attended by these students. A majority of the students, 69.2%, attended only one college during the 4-year period. The number of sampled students at a given institution of higher education varied from 1 to 252.

Research Variables

Dependent variable. Ideally in testing Hypotheses One and Two the dependent variable should encompass all of the elements of personality which are descriptive of competence in a learning society. An explication of such characteristics, utilizing

TABLE 4

Characteristics of Participating Communities
(Trent & Medsker, 1968, p. 275)

Community	Type of local college	Number of participating high schools	Population	Percent white-collar	Percent manufacturing	Percent trade	Number of types of principal industries	Median salary	Median grade completed	Percent foreign-born white	Percent Negro
Altoona, Pa.	Extension center	2	77,177	35	11.0	21.5	8	$2,907	9.5	5	0
Bakersfield, Cal.	Junior college	3	34,784	33	6.9	27.6	4	4,374	11.5	6	4
Danville, Ill.	Junior college	1	37,863	44	24.6	24.6	5	3,292	9.2	2	8
Eau Claire, Wis.	State college	2	36,058	44	34.3	23.6	5	3,670	10.8	4	0
Freeport, Ill.[a]	None	1	22,467	46	25.0[a]	—[a]	3	3,064	9.4	4	3
Hutchinson, Kan.	Junior college	1	33,575	47	16.5	30.9	7	3,147	11.0	2	3
Joplin, Mo.	Junior college	1	38,711	50	16.0	34.5	5	2,600	9.9	1	2
Kalamazoo, Mich.	State college	4	57,704	44	39.1	19.8	4	3,593	10.7	7	4
Loraine, Ohio	None	1	51,202	31	56.2	15.1	4	3,681	9.5	15	5
Muncie, Ind.	State college	3	58,479	37	44.4	20.3	4	3,335	10.0	1	8
Port Huron, Mich.[b]	Junior college	1	35,725	44	34.7	21.6	4	3,472	10.1	10	3
Racine, Wis.	Extension center	4	71,193	39	55.2	16.7	5	4,051	9.5	12	4
San Francisco, Cal.	Variety of colleges	3	775,357	53	16.9	25.5	8	3,923	11.7	16	6
South Bend, Ind.	Extension center	5	115,911	47	50.8	18.0	5	4,349	10.1	8	7
Springfield, Mo.	State college	3	66,731	49	13.9	30.4	9	2,819	10.6	1	3
Zanesville, Ohio	Extension center	2	40,517	44	40.2	22.8	4	3,064	9.2	2	6

[a]No information could be found regarding the percentage of the community population engaged in trade; manufacturing was determined on a country-wide basis.

[b]Information on types of principal industries was available for this community only on the basis of classification of industries employed by *The Editor and Publisher Market Guide* (1957).

Inkeles' accounting scheme as a guide, has been discussed.

The dependent variable for the present test of the proposed hypotheses is much more modest and focuses on the development of social skills as measured by the Social Maturity (SM) scale of the Omnibus Personality Inventory (OPI).[2] The OPI was developed at the Center for the Study of Higher Education at the University of California (Berkeley) to measure certain areas of ego-functioning for the purpose of providing

a meaningful, differentiating description of students and a means of assessing change rather than a device or instrument for testing a specific theory of personality. The approach to assessment of human behavior through several related domains was planned and developed as a meaningful way of studying students in a variety of learning contexts [Heist & Yonge, 1968, p. 3].

In spite of its name the scale measures more than simply "maturation" for it incorporates many personality characteristics which earlier we have

[2]The OPI instrument contains 385 true-false items relating to students' opinions, attitudes, and feelings on a variety of subjects. Validation data consist primarily of correlations with other personality measures including: Allport, Vernon, and Lindzey Study of Values; Strong Vocational Interest Blank; Guilford-Zimmerman Temperament Survey; Opinion, Attitude, and Interest Survey; Myers-Briggs Type Indicator; Kuder Preference Record; California Psychological Inventory; Edwards Personal Preference Schedule; Activities Index; and the Minnesota Multiphasic Personality Inventory (Heist & Yonge, 1968).

Reliability figures computed by the Kuder-Richardson Formula 21 and the corrected split-half method estimate the internal consistency of various OPI scales ranging from .67 to .89. The majority of the test-retest reliability coefficients are above .85 (Heist & Yonge, 1968).

In addition the OPI has had extensive validation through its use in the study of effects of colleges on students. For example: Beach (1966, 1967); Elton (1969); Elton and Rose (1968); Flacks (1963); Heist (1960); Katz (1968); Korn (1967); McConnell et al. (in press); Snyder (1967); Stewart (1964); Trent (1964, 1967); Trent and Medsker (1968); and Tyler (1963) have made use of the OPI in their research.

associated with competence in a learning society. A high score on SM would indicate that an individual has a tolerance for ambiguity; an open, receptive mind; flexibility; autonomy; and freedom from authoritarianism. An extensive discussion of the Social Maturity scale of the OPI has been offered by Trent and Medsker (1968, p. 278).

Scores from the OPI were available for the sample to be investigated in the present research from testing in 1959 and retesting in 1963. A measure of change in social maturity could be determined by subtracting the SM score in 1959 from the score obtained in 1963. Alternatives to this technique have been offered by Lord (1956, 1958) and Nichols (1967) and, in addition, Harris (1963) offers a compendium of thoughts on the matter. Much of these discussions is concerned with improving the estimation of "true" change scores for individuals. However, since we are not primarily interested in the "true" magnitude of the change for particular individuals, but rather in the relative magnitude of change occurring within groups of students under varying conditions of socialization, simple gain scores seem adequate for our purpose.

Precollegiate socialization background variables. Prior to entry into an institution of higher education the individual student's primary socialization agent was his family. Socialization experiences can be seen as functions of the family's economic, political, and ecological structure; its place in the society's stratification system; and the presence and salience of role models (Inkeles, 1969).

The major early socialization agent outside of the family is, of course, the school. An important factor in school socialization is the importance of measured ability in terms of the kinds of opportunities and experiences with which the student is confronted (Hodgkins & Herriott, 1970; Schwebel, 1968). In addition, the conjunction of socialization within the family, the community, and other organizations such as the church leads to alternative modes of socialization within the school setting.

The most perfect representation of an individual's precollegiate socialization background would be the individual's entire precollegiate socialization history. However, an adequate model for precollegiate socialization background can be achieved if proxy variables are available for the experiences which occur within the major socialization agencies—the family, the church, and the school.

The precollegiate socialization background variables which follow constitute a model for socialization experiences prior to entrance into higher education. Variables which are proxy for community, family, and idiosyncratic factors are represented in the model. The following variables are included:

B_1 = S's sex
B_2 = S's father's occupation
B_3 = S's religion
B_4 = S's hometown population
B_5 = S's SCAT score or equivalent measure of cognitive ability
B_6 = Student enrollment of S's high school
B_7 = S's high school class rank.

The student's sex is proxy for the intricate socialization patterns that vary because of the ascribed sex role. The expectations, the attitudes and abilities, and many other socialization experiences are differential in our society purely on a sexual basis. The student's family socialization can perhaps be best represented by determining the family's position in the stratification system. Father's occupation has been shown to be an effective proxy for a vast array of phenomena which differ depending upon the place of an individual's family in the stratification system. Ranging from the purely physical such as the adequacy of health care to the inculcation of political attitudes, the effects of stratification upon the individual are great (Caplow, 1964; Kahl, 1957). In addition, religious affiliation can be seen as proxy for variations in world view that affect the socialization goals and outcomes of the family (Rhodes & Nam, 1970).

The community in which the student is raised has particular salience for the type of socialization experiences that the student undergoes. The particular agencies and resources that are available and utilized during the student's precollegiate socialization experiences are quite divergent depending upon the community. One indicator of the environment of the community in which the student is socialized is its population. The resources, the potential experiences, the social

agencies, the pace of life and expectations regarding behavior will vary depending upon the population of the student's hometown (Duncan & Reiss, 1956; Haller & Wolff, 1965; Schnore, 1966).

The remaining three background variables are proxy for school socialization. Measures of cognitive ability determine to a large extent not only the socialization goals of the school but the ability of the student to accept varying socialization processes. The findings of Barker and Gump (1964) provide important evidence that high school enrollment has important consequences for the behavior and experiences of students. High school size can be seen as proxy for such factors as the variety of behavioral settings in the school, the degree of differentiation in the curriculum and the scope of extracurricular behavior.

Finally, the degree to which the individual student has achieved the objectives of a cognitive nature which the school socialization experiences are designed to promote can be represented by class rank. Since the student is rewarded primarily through grading for meeting socialization demands, consistent high grades, which would result in a higher class rank, would represent a consistency in meeting socialization expectations of the school.

In summary, Table 5 shows how precollegiate socialization background variables within the Trent-Medsker data can be viewed as proxies for particular elements within the accounting scheme

TABLE 5

Elements within the Accounting Scheme for the Structural Analysis of Precollegiate Socialization Background Matched with Background Variables Which Can Be Viewed as Reflective of Those Elements

Social institution	Structure	Variable
FAMILY	Authority Structure	B_1 S's Sex
	Kinship Structure	———
	Value Structure	B_1 S's Sex
		B_2 S's Father's Occupation
	Knowledge Structure	B_2 S's Father's Occupation
	Economic Structure	B_2 S's Father's Occupation
	Ecological Structure	B_2 S's Father's Occupation
		B_4 S's Hometown Population
	Affective Structure	B_1 S's Sex
	Reward & Sanction System	B_1 S's Sex
SCHOOL	Authority System	———
	Reward & Sanction System	B_7 S's High School Class Rank
	Goal Structure	B_7 S's High School Class Rank
	Personnel System	B_6 Student Enrollment
	Environmental Exchange	B_4 S's Hometown Population
	Ecological System	B_4 S's Hometown Population
		B_6 Student Enrollment
	Interaction System	B_6 Student Enrollment
RELIGION	Belief System	B_3 S's Religion
	Value System	B_3 S's Religion
	Differentiation of Activity	———

presented for the structural analysis of precollegiate socialization background (Table 3). For example, B_2, father's occupation, can be seen as proxy for the economic, ecological, knowledge, and value structure of the family because it can be used as a measure of the socioeconomic position of the family.

Operationalization of the above variables is as follows. The respondent's sex, father's occupation, and religion were determined by the following items from the "High School Senior Questionnaire" which was administered at the participating high schools in the spring of 1959.

B_1 = S's sex: Sex 1___ Male 2___ Female

B_2 = S's father's occupation: What is your father's occupation? What does he do? *Be as specific as you can.* TELL US EXACTLY WHAT HE DOES AND THE KIND OF PLACE WHERE HE WORKS. For example, "sells clothes in a department store." "Operates lathe in a machine shop." "Is an office manager in an insurance office." (If he is dead, say what his occupation was.)

B_3 = S's religion: What is your religion? (Answer only if you wish.)
___ Protestant (Denomination _____)
___ Roman Catholic
___ Jewish
___ Other (Write in _____)
___ None

High school class rank (B_7) and SCAT scores (B_5) were obtained from official school records. Aptitude scores were available from all the 37 participating high schools, although the scores represented 18 forms of 11 different tests administered at various times between the ninth and twelfth grades. The method of equating test scores in order to arrive at a common measure which would indicate the relative aptitudes of the respondents may be found in Trent and Medsker (1968, p. 276). Since the range of SCAT scores falling within each decile as a result of this procedure compared favorably with the range of scores on the national norms as reported in the manual, the derived scores are seen as a reasonable approximation.

The enrollment of S's high school (B_6) was obtained by the "High School Information Sheet" which was completed by the high school principal in the summer of 1959. The item was,

How many students were enrolled in the tenth, eleventh, and twelfth grades (combined) in the school year of 1958-59?
___ 50-99
___ 100-249
___ 250-499
___ 500-749
___ 750-999
___ 1,000-1,499
___ 1,500-1,999
___ 2,000 or more

Finally, S's hometown population (B_4) was obtained from records at the Center for Research and Development in Higher Education. This information was obtained originally from Rand McNally's *1958 Road and Reference Atlas.*

College structure variables. This research proposes to make a preliminary test of the adequacy of the accounting scheme for the study of the structure of institutions of higher education which was presented in Table 2. The ideal test of the scheme would be to obtain measures of variables which would be proxy for each of the systems which can be used to differentiate institutions of higher education. Upon the full explication of the various systems, multivariate analyses could be carried out to determine the predictive powers of the scheme with respect to the production of competence in a learning society.

The present test of the scheme will be conducted with a more modest model utilizing variables which were accessible from the Trent-Medsker data or obtainable through standard reference volumes. Each of the proposed college variables is to some degree a proxy for characteristics which would be descriptive of the various systems in the accounting scheme for the study of the structure of institutions of higher education. The college variables which will be utilized for this preliminary test of the scheme are:

C_1 = Academic quality of the college or university
C_2 = Undergraduate enrollment of the college or university
C_3 = Type of organization of the college or university
C_4 = Type of control of the college or university
C_5 = Population of the college community
C_6 = Intensity of collegiate socialization setting.

These variables represent an initial attempt to explicate indicators for the proposed accounting

scheme for the study of the structure of institutions of higher education. Academic quality (C_1) can be seen as proxy for characteristics of four of the systems that compose the scheme—the reward system, the personnel system, the ecological system, and the environmental exchange system.

With increased academic quality comes increased prestige. This prestige represents reward in terms of the recognition and social deference given to the students and faculty of institutions of high quality. In addition, monetary rewards accompany prestige in terms of increased visibility of faculty and the selection process which is utilized by prospective employers of college graduates. Quality reflects characteristics of the personnel system since the degree of professional training and the relative availability of faculty personnel to student personnel are components of quality. In addition, the quality of student personnel that the college or university attracts will vary with academic quality.

The ecological system is reflected in the measure of academic quality in physical plant and amount of funding per student. Finally, the environmental exchange system is represented via the fact that colleges and universities are very aware of their place in the stratification system of higher education, and quality will be a reflection of the location of any given institution within that stratification system. In addition, any number of benefits will accrue to an institution of higher academic quality through interchange with alumni, business, and government.

The undergraduate enrollment (C_2) can be seen as proxy for three of the systems within the proposed scheme. The most obvious connection, of course, is between enrollment and the personnel system. In addition to being purely descriptive of the personnel system, enrollment will also be proxy for the differences in the types of relationships and interaction between faculty and student, the general climate of interaction and phenomena such as previously described with respect to high school size. Enrollment is also proxy for features of the ecological system. It is reflective of such features as the number of buildings, the density of personnel, difficulty of obtaining isolation, and a number of more subtle ecological features.

Type of college or university (C_3) is particularly salient for the goal system but certain features of the interaction system, the personnel system, and the environmental exchange system can also be represented by the type of institution. The diversity of goals can be particularly distinguished when differentiating between a university and a college. In addition, if type of college also includes the further distinction between denominational and nondenominational institutions, the nature of the goal structure is further revealed. The most ready example of how type of institution can be proxy for the interaction system is the fact that major universities have a different personnel structure since, in addition to undergraduates and faculty, there are graduate students. This addition of personnel is reflective of differences in allocating energy in terms of undergraduate teaching, for example.

The personnel system is further reflected in type of institution via the fact that major universities traditionally attract a more professionally trained faculty and also possess personnel for research which colleges do not. Furthermore, for denominational institutions the degree of religiosity may be somewhat reflected in type of institution. This is illustrated by the small denominational college staffed by clergy.

Type of institution can also be reflective of the environmental exchange system. A particular example would be the kinds of environmental exchanges between state colleges or public universities and government agencies. This exchange would not only be in the realm of policy but also finance and exchanges with specific governmental agencies for other types of services.

Type of control (C_4) is closely related to type of institution in terms of being proxy for characteristics of systems within the accounting scheme. The authority system is reflected in terms of the governing bodies and types of authority structures that are present with variations in control. Public institutions usually have a control board that is political in nature whereas nondenominational private schools are more closely representative of alumni. Religiously controlled schools, of course, have an increased emphasis on religious and clerical matters and personnel. Reflection of the environmental exchange system somewhat overlaps the preceding discussion because with the variations in support and control come variations in the nature and source of exchange between the institution and its environment. For example, the relationship

of the institution to governmental agencies would vary greatly depending upon the nature of control of the college or university.

Population of the college community (C_5) is particularly related to the ecological system in that the size of the community in which the institution is located is reflective of a particular aspect of the ecological setting of the college or university. It is reasonable to expect the relationship between the college or university and its surroundings will vary with population. Institutions in a city of over a million people will have different relationships with their surroundings than do institutions in towns of 10,000. In addition to the relationship of the institution to its surroundings, the potential for varying relationships between the personnel of the college or university and the surrounding community differs with increased population.

Finally, the remaining college variable, intensity (C_6), is particularly reflective of the interaction system. Intensity refers to the extent to which there are competing social structures that lie outside of the socialization environment of the college or university to which the student is exposed. Intensity would be extremely high, for example, within a social setting that could be considered a "total" institution (Goffman, 1959); whereas in a situation where an individual was only haphazardly exposed to a socialization agent, the intensity of exposure would be low.

In summary, Table 6 shows how the college variables available within the Trent-Medsker data and other reference sources can be viewed as proxies for particular systems within the accounting scheme offered in Table 2 for the study of the structure of institutions of higher education. For example, the authority system is reflected in college variables 3 and 4, type of institution and type of control of the institution. The personnel system is reflected by C_1, academic quality; C_2, undergraduate enrollment; C_3, type of institution; and C_6, intensity.

To operationalize the college variables for this preliminary test of the accounting scheme for the structure of institutions of higher education the following procedures were used.

Although ideally one would like to measure the quality of a college by its product, the graduate, at the current stage of development of data collection in this area it would be a monumental undertaking

TABLE 6

Systems within the Accounting Scheme for the Study of the Structure of Institutions of Higher Education Matched with College Structure Variables That Can Be Viewed as Reflective of Those Systems

Systems	College variables
Authority System	C_3 Type
	C_4 Control
Reward System	C_1 Quality
Sanction System	———
Goal System	C_3 Type
Interaction System	C_2 Enrollment
	C_3 Type
Personnel System	C_1 Quality
	C_2 Enrollment
	C_3 Type
	C_6 Intensity
Environmental Exchange System	C_1 Quality
	C_3 Type
	C_4 Control
	C_6 Intensity
Ecological System	C_1 Quality
	C_2 Enrollment
	C_5 College Community Population

to obtain a measure which would reliably give us this information for 683 institutions. For the time being, a more traditional notion of the quality of educational institutions will have to be used in order to arrive at a measure of the stratification system of institutions of higher education. For purposes of the present research an index, which enables an investigator to go to any adequate library and objectively rate the academic quality of almost any undergraduate college or university at various points in time, will be used.

Naturally some sacrifices and compromises have to be made in building an index solely from information currently available in a library; but it is felt that the ultimate generality of such an index will be an advantage that will far outweigh any disadvantage incurred from the loss of sensitivity to idiosyncratic features of an institution. This is especially true in research designs such as the

present one where there is a need to consider as many as 683 colleges.

A thorough search of the literature in this area resulted in the identification of numerous indicators of academic quality that could be incorporated into such an index (Pavalko & Ullrich, 1970). Six of these indicators were eventually selected for the index. These six seemed to be supported by considerable consensus in the literature with regard to their validity. They also utilize information which can be obtained from two standard reference volumes—Cass and Birnbaum (1966) and Cartter (1964). The six indicators include:

Faculty salaries
Selectivity
Number of volumes in the library
Percentage of doctorates on faculty
Ratio of library books to students
Ratio of students to faculty.

The rationale for inclusion and exclusion of various indicators follows.

Faculty salaries are of obvious importance in the capacity of a college or university to attract high caliber academic personnel. It seems reasonable to assume that colleges and universities which pay high faculty salaries will have, in general, higher caliber academic personnel than those that pay low salaries. Therefore, these institutions tend to be of higher academic quality as a result of the higher caliber of faculty.

Selectivity was included in the index from a measure developed by Cass and Birnbaum and is based upon information such as the percentage of applicants accepted by the college, the average test scores of the recent freshman classes, and other related data which measure the scholastic potential of the student body. As Cass and Birnbaum (1966) put it,

> this index is a crucial measure of the academic quality of a college because, as current research on higher education indicates, an institution of higher learning can never be much better than its student body—and is not likely to be much worse [p. xvi].

Both the size of the library and the ratio of library books to the number of students have attained wide acceptance as indicators of academic quality. Lazarsfeld and Thielens (1958) acknowledged this when they stated,

> the absolute size of the library is a valid indicator of quality since library books are in principle available to all students and the sheer number of books suggests the breadth of scholarship possible. At the same time, the larger the ratio of books to students, the more accessible are library materials to each individual [p. 411].

Proportion of doctorates on the faculty and student/faculty ratio are also widely accepted indicators of academic quality. Lazarsfeld and Thielens used proportion of PhDs and Jencks and Riesman (1968) call attention to the validity of student/faculty ratio as an indicator of institutional quality. Information concerning both of these indicators is readily accessible; therefore, both indicators are included in the index.

Aptitude level is included in the index since Cass and Birnbaum used it as one of the selectivity criteria. It is unfortunate that per student expenditure could not be included in the index because it is still another widely accepted indicator of academic quality. However, this indicator did not meet the accessibility requirement of the index and is therefore excluded. The size of the student body was discarded as an indicator of quality because of lack of supporting evidence for its validity. Finally, the number of course offerings was discarded as an indicator because it did not fulfill the accessibility requirement.

The quality scale was operationalized using the following procedures. Faculty salaries were scored utilizing the AAUP salary rating (AAUP, 1964) for the average salary rating of a given institution. Ratings of A and B were assigned a value of 4, C a value of 3, D a value of 2, and E, F, and G a value of 1. For those institutions which were not rated, Appendix Table C was used in order to assign the modal rating for institutions of a given type, by type of control and geographic region.

Selectivity of a college was determined using the selectivity rating of Cass and Birnbaum (1964). The most selective schools were assigned a value of 4 and the least selective schools a value of 1, with intermediate values of 3 and 2. If the selectivity rating was unavailable, the percentage of the applicants accepted by the institution was utilized as a substitute measure of selectivity. Assuming that Cass and Birnbaum had rated the very selective schools due to their prestige, it follows that those schools not rated would be of a lower

selectivity. Therefore, if a school accepted more than 50% of its applicants, it was rated as 1, and if the school admitted less than 50% of the applicants, it was rated as 2. Percentage of applicants accepted was obtained either from Cass and Birnbaum (1964), Cartter (1964), or *The College Blue Book* (1965).

The size of the library was determined by data from Cass and Birnbaum (1964), Cartter (1964), or *The College Blue Book* (1965), or the college catalog. For the "quality scale" the number of volumes in the library was divided into quarters and assigned values as follows:

4 = 321,000-5,000,000 volumes
3 = 121,000-320,000
2 = 61,000-120,000
1 = 60,000 or less.

Total number of full-time undergraduates, number of full-time faculty members, and number of faculty members with doctorates were obtained from the same sources. For purposes of constructing the scale percentage of faculty holding doctorates, ratio of library books per full-time undergraduate student, and ratio of full-time students to number of faculty members were divided into quarters and assigned the following values:

Percent of faculty with doctorate:
4 = 50-99%
3 = 36-49
2 = 25-35
1 = 7-24

Books per student:
4 = 111-999 books/student
3 = 67-110
2 = 46-66
1 = 5-45

Students per faculty member:
4 = 1-9 students/faculty member
3 = 10-12
2 = 13-15
1 = 16-28.

The resultant scale of quality was attained by summing the six scale values and ranged from a high quality rating of 24 to low rating of 6.

Population of the college community was determined either from the population for the community in which the institution was located as reported by Cass and Birnbaum (1964), or from the 1960 Census.

The Research Sample

For this preliminary test the population was defined as those students who entered a regular 4-year college or university on a full-time basis upon graduation from high school and who attended only one such institution over a 4-year period.

The original Trent-Medsker longitudinal sample available for this research consisted of 2,404 students who had entered higher education full time in the fall of 1959. Of the original 2,404 students, 681 had gone to two institutions of higher education, 107 had gone to three, and 2 had gone to four schools. Of the remaining 1,614 students who had attended only one institution of higher education, 362 attended a school which was not a regular 4-year college or university (for example, many attended junior colleges). Therefore, the sample available for analysis consisted of 1,252 students who had entered a regular 4-year college or university on a full-time basis directly upon graduation from high school and who attended only one such institution over a 4-year period. Missing data necessitated deleting 56 cases from the sample so that the actual analyses were carried out on a sample of 1,196 students.

Design for Analyses

Two variables, in addition to those noted above, are central to both the theoretical framework of this research and the design for analyses of the data. They are duration of exposure to collegiate socialization (D) and original score on the SM scale (SM_o). In the ideal analysis, the data would be partitioned on each of these variables and cross-classified to create first- and second-order subsamples. The data would be partitioned on duration of exposure because of the theoretical importance of duration of exposure to socialization agencies and changes in personality. Partitioning on SM_o is essentially an empirical step necessary due to the ceiling effect of the SM scale. The ceiling

effect of any scale prevents an individual who originally scored high to show as much gain as an individual who had originally scored low. In addition, it can be argued that a given gain at the high end of a scale such as SM could have a different meaning conceptually than the same degree of gain at the low end of the scale.

Regression analyses involving large numbers of independent variables for small samples have been shown to be unstable in nature (Coleman, 1964). Since formal statistical techniques will be used to test the two hypotheses, the type of partitioning described previously would likely result in small sample size for some of the subsamples and thus unstable estimates of population statistics; hence, the total sample will be used. However, a procedure for overcoming these problems will be introduced in a later section to elaborate the formal tests of hypotheses and to enhance our understanding of the data.

Hypothesis One stated that student personality changes are due to the social structures of the colleges the students attend. In order to test Hypothesis One, a regression equation which represents the change in social maturity as a function of the college variables will be developed.[3] Upon the calculation of the regression equation, the multiple correlation coefficient (R) will be determined between the dependent variable and the "best" weighted sum of the independent variables.

An analysis of variance will then be conducted to determine the statistical significance of the multiple correlation coefficient. Support for this hypothesis will be claimed if the R is statistically significant at the .05 level.

In order to carry out the regression analysis it is necessary to create dummy (i.e., binary) variables for those variables below the interval level. Dummy variables were created where necessary following the method described by Draper and Smith (1966). For example, for C_3, type of college, a dummy variable was created for "state college" by assigning to each student a value of "1" if he attended a state college and a value of "0" if he did not attend a state college. In each case where dummy variables were necessary, one category of the original variable was designated the "0 cell" and not entered into the regression equation.

Next we desire to test the assumption that precollege socialization is related to student personality change in college. We plan to test this by constructing a regression equation which represents the change in social maturity as a function of the precollegiate socialization background variables. Upon calculation of this regression equation, the R for the "best" weighted sum of the independent variables will be calculated.[4] An

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[3]The regression equation for testing the first hypothesis is,

$$SM_g = a + bC_1 + cC_2 + dC_3^{sc} + eC_3^{dc} + fC_3^{ndc} + gC_3^{pu} + hC_3^{pdu} + iC_4^{pub} + jC_4^{pro} + kC_4^{cat} + lC_5 + mC_6 .$$

Where:
- SM_g = change in social maturity scale
- a, b, c, . . . m = regression coefficients
- C_1 = quality
- C_2 = enrollment
- C_3^{sc} = dummy for state college
- C_3^{dc} = dummy for denominational college
- C_3^{ndc} = dummy for nondenominational college
- C_3^{pu} = dummy for public university
- C_3^{pdu} = dummy for private denominational university
- $[C_3^{ndu}]$ = "O cell"—nondenominational private universities (not in equation)
- C_4^{pub} = dummy for public control
- C_4^{pro} = dummy for Protestant control
- C_4^{cat} = dummy for Catholic control
- $[C_4^{pri}]$ = "O cell"—private control (not in equation)
- C_5 = population of college community
- C_6 = intensity of collegiate socialization setting

[4]The statistical model utilizing only precollegiate socialization background variables can be represented by the regression equation:

$$SM_g = a + bB_1 + cB_2 + dB_3^{pro} + eB_3^{cat} + fB_3^{jew} + gB_4 + hB_5 + iB_6 + jB_7 .$$

Where:
- SM_g = change in social maturity scale
- a, b, c, . . . j = regression coefficients
- B_1 = femaleness
- B_2 = socioeconomic status as measured by father's occupation
- B_3^{pro} = dummy for Protestant religious affiliation
- B_3^{cat} = dummy for Catholic religious affiliation

[continued]

analysis of variance will be carried out to ascertain the statistical significance of the R and if it is significant at the .05 level of probability, support for this assumption will be claimed.

Hypothesis Two holds that student personality change is a function of the college social structure after controlling for precollege socialization. The test of Hypothesis Two requires a slightly more complex statistical procedure. We shall compute the multiple correlation coefficient for the college structure and precollegiate background variables together and compare it to the multiple correlation coefficient for only the precollegiate background variables. In this way, the total predictive ability of an analytical model utilizing only precollegiate socialization background variables can be compared to that of a model utilizing college structure variables in addition to precollegiate socialization variables.

To make this comparison, the multiple correlation coefficient produced from the regression equation involving only precollegiate socialization background variables will be compared to a multiple correlation coefficient produced from a regression equation involving college structure variables as well as the precollegiate variables.[5] The F test will be utilized to determine the statistical significance of the difference between these two multiple correlation coefficients (Baggaley, 1964). Support for the hypothesis will be claimed if the R for the background and college variables is significantly greater statistically at the .05 level than the R for the background variables only.

However, as noted by Feldman (1970), Nichols (1967), Stanley (1967), and Werts and Watley (1968), a statistical model of this type tends to underestimate the effects of the collegiate experience, for it assigns to the precollegiate variables *all* of the variance in personality change which they share with collegiate variables. Unfortunately, statistical models which can unambiguously separate the effects of precollegiate and collegiate experiences within a modified longitudinal design of the type used by Trent and Medsker in collecting their original data are not currently available. However, since the statistical model which we will use is clearly a conservative one, given our theoretical interests, we are far more likely to accept the null hypothesis associated with Hypothesis Two in error than we are to reject it in error. Thus, we can have considerable assurance that any support which we can claim for Hypothesis Two using this model is extremely likely to be substantiated by any subsequent research with a longitudinal design covering the period from birth to completion of college.

Results

Formal Test of the Hypotheses

Hypothesis One. A regression analysis was conducted on SM_g for the total sample utilizing the college structure variables as independent variables. Support for Hypothesis One is shown by this regression analysis. A multiple correlation coefficient (R_C) of .1614, which is statistically significant at the .01 level, suggests that the degree of personality change can be seen as a function of the college structure variables.

Assumption. The regression analysis involving only precollegiate socialization background variables produced an R_B of .1861, which is statisti-

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B_3^{jew} = dummy for Jewish religious affiliation

$[B_3^{oth}]$ = "O cell"—other and no religious affiliation, (not in equation)

B_4 = population of S's hometown

B_5 = SCAT or equivalent measure of cognitive ability

B_6 = student enrollment of S's high school

B_7 = S's high school class rank

[5]The regression equation which will be utilized to determine the predictive power of the model containing both precollegiate socialization background variables and college structure variables can be represented by:

$$SM_g = a + bB_1 + cB_2 + dB_3^{pro} + dB_3^{cat} + fB_3^{jew} + gB_4 + hB_5 + iB_6 + jB_7 + kC_1 + lC_2 + mC_3^{sc} + nC_3^{dc} + oC_3^{ndc} + pC_3^{pu} + qC_3^{pdu} + rC_4^{pub} + sC_4^{pro} + tC_4^{cat} + uC_5 + vC_6$$

cally significant at the .001 level. Therefore, support for the assumption is claimed.

Hypothesis Two. A regression equation for both the college structure variables and precollegiate socialization background variables was constructed and this regression equation for the total sample produced an R_{B+C} of .2412. This multiple correlation coefficient is significant at the .01 level.

To test Hypothesis Two, the difference between R_{B+C} and R_B was calculated and the statistical significance of the difference computed. For the total sample, the difference between the two coefficients is equal to .0551,[6] thus supporting Hypothesis Two. Clearly, we can increase the total explained variance in student personality change by utilizing an analytic model that contains college structure variables as well as precollegiate socialization background variables.

Discussion and Evaluation of the Results

It is useful to make a distinction between statistical significance and theoretical significance, and then reinterpret our findings in light of their significance for the theoretical framework which has guided this research. Given our objective, it seems appropriate to go beyond the formal tests of significance to determine what kinds of added information we can glean from the data.

As noted in the design of the study, duration of exposure to collegiate socialization (D) and original SM score (SM_o) are important variables in our research design, for each can possibly suppress (i.e., attenuate) the true relationships between both precollegiate socialization and college structure with personality change. In order to control for some of the possible suppressing effects of these variables upon the relationships of primary interest, the hypotheses and assumptions will be reconsidered within first- and second-order subsamples that can be created by partitioning and cross-classifying the research sample on these two variables simultaneously.

Two first-order subsamples in terms of SM_o have been created by dichotomizing this variable at the median. Five first-order duration subsamples were created by categorizing the number of years a student was exposed to college, i.e., the number of years of enrollment before termination of his college career. In this latter case, the first subsample is those students who were enrolled 1 year or less. Duration of exposure for the second subsample is greater than 1 year but less than or equal to 2 years. Duration of greater than 2 years but less than or equal to 3 years composes the third subsample.

The fourth- and fifth-duration subsamples are those students who stayed in college for more than 3 years but did not receive a bachelor's degree by the end of the 4th year and those students of similar duration who did receive a bachelor's degree. It is assumed that for those students who did stay in college longer than 3 years a meaningful distinction can be made as to the degree of exposure utilizing the granting or not granting of a degree. It follows that, on the average, if an individual student was fully exposed to the socialization program, he would be certified as having satisfied the requirements of the socialization experiences. However, in general an individual who was not as completely exposed to the socialization experiences for those years would not be certified as having met the requirements of the socialization agent. Therefore, the granting of a degree can be proxy for a further refinement in measuring the degree of exposure to the socialization agent.

Ten second-order subsamples were obtained by cross-classifying the two categories of SM_o and the five categories of D. Table 7 portrays the results of this refinement to our research design, summarizing the total sample, the 7 first-order subsamples, the 10 second-order subsamples, and their associated number of data cases.

Because of the instability of the regression analyses carried out with large numbers of indepen-

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[6] To calculate the statistical significance of this difference, the following formula is used (Baggaley, 1964, p. 200):

$$F = \frac{(R^2_{B+C} - R^2_B)\,(\text{SS} - \text{No. of B variables} - \text{No. of C variables} - 1)}{(\text{No. of B+C variables} - \text{No. of B variables}) - R^2_{B+C}}$$

Computation for this F test is

$$F = \frac{(.058 - .035)\,(1196 - 10 - 24 - 1)}{(24 - 10) - .058} = \frac{26.703}{13.942} = 1.92.$$

Referring to the typical "F-table," we find that an F as large as 1.92 with the given degrees of freedom has a chance probability of less than .05. SS = Sample Size.

dent variables on such small samples as are reported in Table 7, a procedure for estimating the "true" multiple correlation coefficient for small samples was desirable. The typical procedures for correcting R for degrees of freedom seemed inadequate; its estimate is based solely upon the particular subsample in which it is computed. Therefore, we chose a procedure for pooling degrees of freedom similar to that used by Selvin (1960) to assess the consistency of results in a study of the effects of leadership.

TABLE 7

Frequency Distribution of First- and Second-Order Subsamples Formed by Categorizing and Cross-Classifying Original Social Maturity Score (SM_o) and Duration of Exposure to College Structure (D)

Duration (D) of exposure to collegiate socialization, in years	Original SM		Total
	Low	*High*	
$D < 1$	95[a]	61[a]	156[b]
$1 < D \leqslant 2$	66[a]	63[a]	129[b]
$2 < D \leqslant 3$	41[a]	29[a]	70[b]
$3 < D \leqslant 4$ no degree	152[a]	121[a]	273[b]
$3 < D \leqslant 4$ degree	280[a]	288[a]	568[b]
$0 < D \leqslant 4$	634[b]	562[b]	1196[c]

a = second-order subsample
b = first-order subsample
c = total sample

To arrive at an estimate of the "true" multiple correlation coefficient within subsamples of our data, "pooled" multiple correlation coefficients were determined. The pooled Rs were calculated by computing the average of the multiple correlation coefficients within either the first- or second-order subsamples. To arrive at the pooled R for first-order subsamples, the arithmetic average of the Rs for each category of D was calculated within each category of SM_o.

To arrive at an estimate of the "true" multiple correlation coefficient for a *typical* second-order subsample, where theoretically we expect to explain the greatest degree of variation, a "grand average" of the Rs for the 10 second-order subsamples was computed. This "grand average" will be utilized to estimate the significance of our theoretical framework.

Hypothesis One. Table 8 presents the results of the subsample analyses for the relationship of the college structure variables with personality change. There it can be seen that whereas the R for the total sample is .16, the Rs for the first-order subsamples range from .13 to .44. Similarly, the Rs for the second-order subsamples range from .14 to .63.

Table 9 compares, for the total sample and the relevant subsamples, the original Rs with those obtained from the pooling process described previously. Of particular interest is the "grand average"

TABLE 8

Multiple Correlation Coefficients for College Structure Variables on Change in Social Maturity for First- and Second-Order Subsamples and the Total Sample

Duration (D) of exposure to collegiate socialization, in years	Original SM		Total
	Low	*High*	
$D \leqslant 1$ year	.40 (95)	.49 (61)	.30 (156)
$1 < D \leqslant 2$ years	.63 (66)	.34 (63)	.42 (129)
$2 < D \leqslant 3$ years	.50 (41)	.58 (29)	.44 (70)
$3 < D \leqslant 4$ no degree	.14 (152)	.29 (121)	.13 (273)
$3 < D \leqslant 4$ degree	.22 (280)	.28 (288)	.20 (568)
$0 < D \leqslant 4$ years	.19 (634)	.25 (562)	.16 (1196)

Note: Number in parentheses = sample or subsample sizes.

TABLE 9

Pooled Multiple Correlation Coefficients Compared to First-Order Subsample and Total Sample Multiple Correlation Coefficients for $C_{1\text{-}6}$ on SM_g

Subsample designation	Original Rs	Pooled Rs
Low Original SM	.19	.38
High Original SM	.25	.39
$D \leqslant 1$	.30	.44
$1 < D \leqslant 2$	.42	.49
$2 < D \leqslant 3$	.44	.54
$3 < D \leqslant 4$ no degree	.13	.21
$3 < D \leqslant 4$ degree	.20	.25
First-Order SM Subsamples	—	.21
First-Order Duration Subsamples	—	.30
Total Sample	.16	—
All Second-Order Subsamples—Grand Average	—	.39

R computed across the 10 second-order subsamples. This coefficient of .389 is considerably larger than the R of .1614 based upon the total sample and used for the formal statistical test of Hypothesis One. As expected, when controlling for SM_o and D, the explanatory power of an analytical model containing only college structure variables is increased. Thus, 14.9% (the square of .39) of the variation of change in social maturity can be explained by a model containing only college structure variables within a typical second-order cell, assuming our estimate of the "true" multiple correlation coefficient is accurate.

These measures of six admittedly unrefined indicators of social structure explain a significant amount of the total variation in change of social maturity.

Assumption. By utilizing a procedure identical to the one above, the assumption can be shown to be theoretically significant to our research model. From multiple correlation coefficients in Tables A and B of the appendix, the grand average for $B_{1, 2, \ldots 7}$ on SM_g can be seen to be .38, considerably larger than the .1861 used to formally test the assumption. Squaring the grand average gives an estimate of the true amount of variance explained in a typical second-order cell utilizing an analytic model containing only background variables. Squaring .38 gives an estimate of 14.6% of the variance which can be attributed to a model containing only background variables.

Hypothesis Two. In order to contrast the explanatory model containing both background and college variables with the models containing *only* background or college variables, multiple correlation coefficients from Table C in the appendix can be used to compute the grand average of R_{B+C} for a typical second-order cell. Table D in the appendix shows that a grand average of .51 is computed for the multiple correlation coefficient involving both background and college variables. Squaring this estimate of the true multiple correlation gives a figure of .258, which can be interpreted that 25.8% of the variation in change in social maturity can be attributed to a model containing both precollegiate socialization background variables and college structure variables.

To estimate the "true" manner in which V_c and V_b overlap, it is necessary to compute for each second-order cell the difference between the amount of variation explained by a model containing both background and college variables and (a) the amount of variation explained by a model containing only background variables, and (b) the amount of variation explained by a model containing only college variables. Tables F and I in the appendix give the calculation of these differences for the first- and second-order subsamples and the total sample.

From these differences, estimates of the true difference for a typical second-order subsample can be established through the pooling process. Tables H and J of the appendix show this pooling process. The grand average for $R^2_{B+C} - R^2_B$ is .113, and the grand average for $R^2_{B+C} - R^2_C$ is .117. The difference of .113 represents $V_{b+c} - V_b$ or, in other words, the amount of explained variation in V_c which is not within the intersection of V_b and V_c but is within the union of V_c and V_b. Likewise, the difference of .117 represents $V_{b+c} - V_c$ which is the amount of explained variation in V_b which is

not in the intersection of V_b and V_c but is within their union.

Figure 3 is a Venn-diagram representing our estimate of the true overlap of V_b and V_c. Drawn to scale, Figure 3 shows that 11.3% of the explained variation in social maturity is encompassed by the part of V_c which is not overlapping with V_b; on the other hand, 11.7% of the explained variation in change in social maturity is encompassed by the part of V_b that does not overlap with V_c. The intersection of V_b and V_c comprises 2.8% of the explained variation in change in social maturity.

This diagram shows that the theoretical model which we have proposed has merit when studying the effects of higher education on student personality. The fact that V_c is not a subset of V_b demonstrates that changes in personality occurring during the college experience are not likely to be merely changes that occur because of precollegiate socialization. Indeed, the overlap of 2.8% suggests, as we have previously stated, that precollegiate background does affect the type of collegiate setting to which students matriculate; but that once within the collegiate socialization setting, socialization outcomes of the college experience vary independently with the structure of the institutions of higher education.

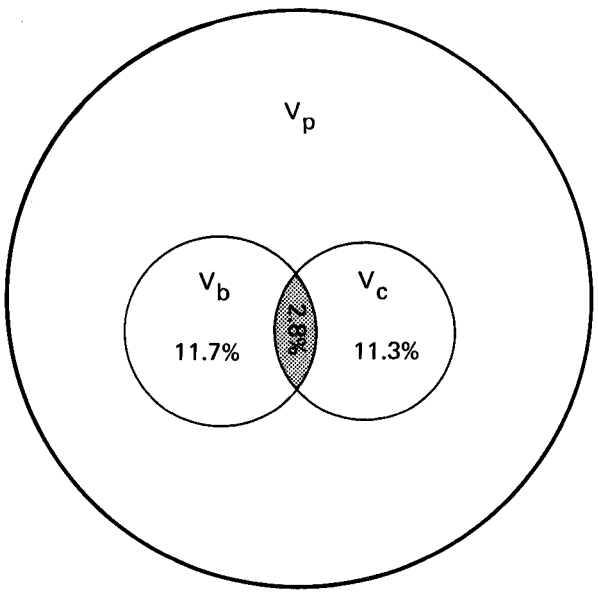

Fig. 3. The amount of total variation in personality change attributable to a model containing both background and college variables so that their intersection is apparent.

Conclusions

Limitations

Research concerned with the structure of institutions of higher education and socialization to competence based on our theoretical framework would have been free of limitations to the extent that the ideal research design presented earlier under Design of the Study had been followed. The steps in such an "ideal design" would include:

1. Randomly selected students from randomly selected colleges and universities.
2. Students measured for competence at entrance to higher education.
3. Complete knowledge of the students' precollegiate socialization background.
4. The social structure of the institutions of higher education would be completely explicated.
5. The intensity and salience of various elements of the structure of said institutions for individual students would be determined.
6. Upon termination of their collegiate career, students' competence would again be measured.

In order to make explicit the limitations of this study, the design used here may be contrasted to the ideal design proposed in Design of the Study.

Due to the fact that secondary analysis was utilized for this preliminary test of the theoretical framework, step one (random selection of students and institutions of higher education) of the ideal design was not followed. The original purpose of

the Trent-Medsker sample was to study the relationship between the type of higher education institutions available in a city and entrance of students in those cities to higher education. Because of the nonrandom selection of the students and institutions of higher education, the generalizability of these research findings is limited. However, since the cities selected did vary a great deal, especially with respect to geographic location, it seems reasonable to assume that the students studied in this preliminary test represent a large section of students who do enter higher education. Although no formal generalization to such a population is possible, there seems to be little need to reject these findings because of the nonrandom sample.

Items 2 and 6 of the ideal research design are concerned with the measurement of competence in a learning society as we have defined it. If one allows the assumption that varying personality predisposes individuals to varying behavior, the chief potential limitation in measuring competence in the present study is the extent to which the SM scale correctly represents the accounting scheme for the study of personality.

By comparing the systems within the accounting scheme for the study of personality with personality attributes which the Social Maturity scale measures, an assessment of how completely SM represents the personality system can be made. Table 10 shows such a comparison. With the exception of "tolerance for ambiguity" which might be considered as representing temperament in the "Psychomotor System," the SM scale represents only the cognitive mode of the "Modes of Functioning." This representation appears to be quite adequate for a preliminary study of the type conducted here, but it is obvious that a full

TABLE 10

Systems within the Accounting Scheme for Personality Study Matched with Personality Traits Measured by the SM Scale That Can Be Viewed as Reflective of Those Systems

Psychomotor System:	Temperament	Tolerance for Ambiguity
	Aptitudes	———
	Skills	———
Idea System:	Information	———
	Opinions and Attitudes	———
Motivational System:	Values	———
	Motives and Needs	———
Relational System:	Authority Figures	———
	Intimates and Peers	———
	Collectivities	———
Self-System:	Conceptions of Self	———
	Modes of Defense	———
	Modes of Moral Functioning	———
Modes of Functioning:	Cognitive Modes	Open, Receptive Mind
		Flexibility
		Autonomy
		Nonauthoritarianism
	Affective Modes	———
	Conative Modes	———

representation of the personality system will require a consideration of many more facets of the student's personality.

At present, there does not appear to be either a single psychological test, or a battery of such tests which can give a comprehensive view of the many subsystems of the personality system. Furthermore, if such an instrument were available it would likely report the personality system in some manner other than a limited number of summary scores. There is insufficient methodology for analyzing a series of scores thus adding to the difficulty of such a measure. It is suggested that perhaps one way of overcoming these difficulties would be to develop a scale to more directly represent competence, perhaps in terms of social learning. Such a scale could provide a summary score that would be amenable to present techniques of data analysis.

In order to fully measure the students' precollegiate socialization backgound, representation of each of the major systems to which the students are exposed (i.e., the familial system, the educational system, and the religious system) would have to be more fully explicated than was done in this preliminary test. Although the background variables which were utilized did represent each of the three systems to some degree, there are obvious weak points in the representation of each of the systems.

Along similar lines, Table 6 showed the manner in which the college variables used in this research represent various systems within the accounting scheme for the structure of institutions of higher education. Even though each of the systems, with the exception of the sanction system, is represented by at least one proxy college variable, it is apparent that the indicators of college structure which were utilized in this research are very global in nature. Such global indicators as the percentage of doctorates on the faculty or undergraduate enrollment are readily accessible and thus are very tempting. However, to gain a more accurate and descriptive picture of the structure of institutions of higher education, more refined measures of structure will be needed.

Some examples of the type of variables that might be considered as more refined indicators of the structure of institutions of higher education are found in Table 2. For example, representing the Authority System, such indices as the degree of bureaucratization within the administrative framework of the college or university, the degree to which decision making is on a collegial basis, and the legitimacy which is given to authority figures by various segments of the university population should be considered. Measures of such variables would offer a much greater refinement than do those indicators which were used in the present research. Judging from the fact that our theoretical framework was supported, using what are obviously unrefined measures of structure, any added refinement in the representation of the structure of institutions of higher education should greatly improve the explanatory power of the theoretical framework which we proposed.

It is interesting to speculate as to the relative strengths of the analytical model representing precollegiate socialization background and the analytical model of college structure. If one considers widespread usage of an indicator as indicative of the validity and reliability of that indicator, it appears obvious that the indicators utilized in the precollegiate model offer a better representation of precollegiate background than do the indicators of college structure. If we have represented precollegiate background more successfully than college structure, it is reasonable to assume that if college structure were more adequately measured, i.e., if better proxies were used, the amount of variance explained by college structure would likely increase. If this is the case, we could expect the total amount of variation explained by college structure to be much greater than the variation explained by precollegiate background, instead of approximately the same, as we have found in this research.

A further limitation of this research can be discussed in terms of the degree to which the individual student is located within the structural matrix of his particular college or university. Within any social institution as complex and diversified as today's colleges and universities, there is "room" for various individuals within the same institution to move within and between different structural elements of the institution. For example, a student deeply involved in student government is likely to develop relationships with the authority system that differ from those of a student who comes to the campus only for formal

classes. Likewise, student contact with the personnel system would vary depending upon his grade level and major area of study. This being the case, individuals can be differentially exposed to various elements of the structure of the institution and various elements of the structure can have differential salience for different individual students.

Our attempt to locate the individual student within the structural matrix of the institution utilized simply the duration of his exposure to the collegiate setting. However, this represents only an initial attempt to locate the individual within the structural matrix of the socializing agency. More refined measures of exposure to various structural elements within the college or university, perhaps by means of time and motion studies or student log books, is needed along with a mechanism for determining the salience to the individual of this differential exposure.

An initial attempt was made in this study to determine the salience of the collegiate socialization setting. Whether or not a student attended a college in his hometown is admittedly an unrefined measure of such phenomena. Improvements along this dimension might be made by attempting to determine the degree to which a student identifies his "socializers" as a reference group and whether or not he possesses other reference groups which would be supportive of or detract from the goals of socialization to competence.

With the development of more refined measures to locate the individual within the matrix of his socializing institution a more refined method of data analysis could be adopted. Viewing such phenomena as extent of exposure and intensity of exposure as control variables which could modify the relationship between structure and the development of competence, these and other important control variables (for example, in this research the student's initial level of competence) could be entered into the regression equations utilized to determine the relationship between structure and competence. In this way, a more systematic approach to the possible suppressing effects of such control variables could be implemented.

We have given a description of a much more refined research design than has been utilized in this research. However, we do not feel that in a preliminary test of a theoretical framework the limitations which have been enumerated are crippling in nature. Of course, as with any preliminary test, the results can best be viewed as a guide for future research. Furthermore, it seems reasonable to consider this preliminary test in light of its strong points. The Trent-Medsker data offered many advantages because of their longitudinal nature and each of the elements within the ideal proposed was considered and developed to some degree.

Implications

The development of our theoretical framework and subsequent preliminary test of that framework have implications for two important areas of concern. The first is the study of higher education and in particular the study of the impact of higher education on students. The second is a more central issue to the discipline of sociology. That is the applicability of the theoretical framework to the study of other socializing agencies and the effects of these agencies on their "clients." Specifically, these other agencies could include the schools, prisons, mental hospitals, and the military.

The review of the literature on the impact of college on students which was provided in the sections titled "Socialization, Social Structure, and Competence" and "Approaches to the Study of College Student Interaction with the Environment" left little room for doubt that students do grow in a direction consistent with competence in a learning society. However, much less agreement exists as to whether or not the college experience, per se, contributes to this growth or whether the selection processes of entrance into institutions of higher education merely provide a "place" for development, which has already been started, to reach fruition.

By providing a more comprehensive theoretical framework than is present in previous research, this study permitted an interpretation of data and results in a much more meaningful way than has been possible in previous work. Our study offers strong support for the hypothesis of an independent contribution of the impact of colleges and universities on the development of competence, after extraneous effects of precollegiate socialization background have been accounted for. The implications for this approach in the study of other kinds of effects of college are quite vast. The

theoretical framework provides a guide for the study of the impact of higher education in many realms of student behavior. One example of topical interest at this point in time would be the study of the radical student. Much more could be learned concerning the significance of the social structure of institutions of higher education to the development of radical behavior by utilizing the theoretical framework provided herein.

The theoretical model developed in this study is not limited to studying the effects of higher education on students. The framework is readily applicable, with minor alterations, to any social institution which is concerned with changing people. "People-changing institutions" include the schools at all levels, prisons, mental hospitals, and the part of the military where training is most prominent.

Within each of these social institutions exist goals oriented toward the modification of individuals. This modification may be minor as in the case of the military or very drastic as in the case of mental hospitals and prisons.

The fact that people-changing institutions are so prevalent in our society leads to a natural curiosity on the part of the social scientist; but in addition, the fact that large numbers of people are either employed by or pass through such institutions makes knowledge of their outcomes important more generally. Since many of the outcomes of people-changing institutions are integrally related to particular value positions, understanding their effect takes on added significance.

Consider prisons as an example of a people-changing institution. The value position implicit in the sanctioning of individuals for unlawful behavior is central to the institution's existence. It seems obvious that at least in theory penal institutions wish to rehabilitate rather than to merely confine. The theoretical model presented in this inquiry could be altered so that the development of habilitative behavior would be the focus for the structural analysis of penal institutions. Pre-penal socialization background could be determined in much the same manner as precollegiate background was determined in this study. Of course, because of the fact that prisoners would likely be older than college students, their background would be more extensive. However, our theoretical model would be readily applicable to the study of such matters.

In conclusion, the applicability of the theoretical model developed in this research appears to have wide utility for the study of all types of people-changing institutions. The structural analysis of the impact of such social institutions has importance for value positions, policy matters, administrative decisions, and for the expansion of the understanding of such institutions by social scientists.

Appendix

TABLE A

Multiple Correlation Coefficients for Precollegiate Socialization Background Variables on Change in Social Maturity for First- and Second-Order Subsamples and the Total Sample

Duration (D) of exposure to collegiate socialization, in years	Original SM		Subtotal/ total
	Low	*High*	
$D \leqslant 1$ year	.30	.50	.30
	(95)	(61)	(156)
$1 < D \leqslant 2$ years	.43	.43	.33
	(66)	(63)	(129)
$2 < D \leqslant 3$ years	.45	.79	.48
	(41)	(29)	(70)
$3 < D \leqslant 4$ no degree	.25	.21	.15
	(152)	(121)	(273)
$3 < D \leqslant 4$ degree	.29	.19	.22
	(280)	(288)	(568)
$0 < D \leqslant 4$ years	.23	.20	.19
	(634)	(562)	(1196)

Note: Numbers in parentheses = sample or subsample sizes.

TABLE B

Pooled Multiple Correlation Coefficients Compared to First-Order and Total Sample Multiple Correlation Coefficients for $B_{1\text{-}7}$ on SM_g

Subsample designation	Original Rs	Pooled Rs
Low Original SM	.23	.34
High Original SM	.20	.42
$D \leqslant 1$	.30	.40
$1 < D \leqslant 2$	.33	.43
$2 < D \leqslant 3$	.48	.62
$3 < D \leqslant 4$ no degree	.15	.23
$3 < D \leqslant 4$ degree	.22	.24
First-Order SM Subsamples	—	.22
First-Order Duration Subsamples	—	.30
Total Sample	.19	—
All Second-Order Subsamples—Grand Average	—	.38

TABLE C

Multiple Correlation Coefficients for Precollegiate Socialization Background Variables plus College Structure Variables on Change in Social Maturity for First- and Second-Order Subsamples and the Total Sample

Duration (D) of exposure to collegiate socialization, in years	Original SM *Low*	Original SM *High*	Subtotal/ total
$D \leqslant 1$ year	.45 (95)	.63 (61)	.41 (156)
$1 < D \leqslant 2$ years	.70 (66)	.54 (63)	.49 (129)
$2 < D \leqslant 3$ years	.56 (41)	.86 (29)	.56 (70)
$3 < D \leqslant 4$ no degree	.30 (152)	.37 (121)	.18 (273)
$3 < D \leqslant 4$ degree	.35 (280)	.34 (288)	.30 (568)
$0 < D \leqslant 4$ years	.28 (634)	.30 (562)	.24 (1196)

Note: Numbers in parentheses = sample or subsample sizes.

TABLE D

Pooled R_{B+C} Compared to Original First-Order Subsamples and Total Sample R_{B+C}

Subsample designation	Original Rs	Pooled Rs
Low Original SM	.28	.47
High Original SM	.30	.55
$D \leqslant 1$	.41	.52
$1 < D \leqslant 2$	.49	.55
$2 < D \leqslant 3$	.56	.70
$3 < D \leqslant 4$ no degree	.18	.33
$3 < D \leqslant 4$ degree	.30	.34
First-Order SM Subsamples	—	.29
First-Order Duration Subsamples	—	.39
Total Sample	.24	—
All Second-Order Subsamples—Grand Average	—	.51

TABLE E

Differences Between the Multiple Correlation Coefficients for Both Background and College Variables on Change in Social Maturity and the Multiple Correlation Coefficients for Only Background Variables on Change in Social Maturity for First- and Second-Order Subsamples and the Total Sample

Duration (D) of exposure to collegiate socialization, in years	Original SM		Subtotal/ total
	Low	*High*	
$D \leqslant 1$ year	.15	.13	.10
$1 < D \leqslant 2$ years	.27	.11	.16
$2 < D \leqslant 3$ years	.11	.07	.08
$3 < D \leqslant 4$ no degree	.05	.16	.04
$3 < D \leqslant 4$ degree	.06	.15	.08
$0 < D \leqslant 4$ years	.04	.10	.06

TABLE F

$R^2_{B+C} - R^2_B$ for First- and Second-Order Subsamples and the Total Sample

Duration (D) of exposure to collegiate socialization, in years	Original SM		Subtotal/ total
	Low	*High*	
$D \leqslant 1$	.11	.14	.07
$1 < D \leqslant 2$	.30	.11	.13
$2 < D \leqslant 3$	.11	.11	.08
$3 < D \leqslant 4$ no degree	.03	.09	.01
$3 < D \leqslant 4$ degree	.04	.08	.04
$0 < D \leqslant 4$	.03	.05	.02

TABLE G

Pooled Differences Between R_{B+C} and R_B Compared to First-Order Subsamples and Total Sample Differences

Subsample designation	Original differences	Pooled differences
Low Original SM	.04	.13
High Original SM	.10	.10
$D \leqslant 1$	.10	.14
$1 < D \leqslant 2$	.16	.19
$2 < D \leqslant 3$	.08	.14
$3 < D \leqslant 4$ no degree	.04	.10
$3 < D \leqslant 4$ degree	.08	.10
First-Order SM Subsamples	—	.07
First-Order Duration Subsamples	—	.09
Total Sample	.06	—
All Second-Order Subsamples—Grand Average	—	.13

TABLE H

Pooled $R^2_{B+C} - R^2_B$ for First- and Second-Order Subsamples and the Total Sample Compared to Original Differences

Subsample designation	Original	Pooled
Low Original SM	.03	.12
High Original SM	.05	.11
$D \leqslant 1$	.07	.13
$1 < D \leqslant 2$	.13	.21
$2 < D \leqslant 3$	.08	.11
$3 < D \leqslant 4$ no degree	.01	.05
$3 < D \leqslant 4$ degree	.04	.05
First-Order SM Subsamples	—	.03
First-Order Duration Subsamples	—	.07
Total Sample	.02	—
All Second-Order Subsamples—Grand Average	—	.11

TABLE I

$R^2_{B+C} - R^2_C$ for First- and Second-Order Subsamples and the Total Sample

Duration (D) of exposure to collegiate socialization, in years	Original SM		Subtotal/ total
	Low	*High*	
$D \leqslant 1$	.05	.17	.08
$1 < D \leqslant 2$	.09	.18	.07
$2 < D \leqslant 3$	.06	.40	.12
$3 < D \leqslant 4$ no degree	.07	.05	.02
$3 < D \leqslant 4$ degree	.07	.04	.05
$0 < D \leqslant 4$	.04	.03	.03

TABLE J

Pooled $R^2_{B+C} - R^2_C$ for First- and Second-Order Subsamples and the Total Sample Compared to Original Differences

Subsample designation	Original	Pooled
Low Original SM	.04	.07
High Original SM	.03	.17
$D \leqslant 1$	.08	.11
$1 < D \leqslant 2$	.07	.14
$2 < D \leqslant 3$	.12	.23
$3 < D \leqslant 4$ no degree	.02	.06
$3 < D \leqslant 4$ degree	.05	.05
First-Order SM Subsamples	—	.04
First-Order Duration Subsamples	—	.07
Total Sample	.03	—
All Second-Order Subsamples—Grand Average	—	.12

References

AAUP. The economic status of the profession, 1963-4. *AAUP Bulletin,* Summer 1964, 139-184.

Allwood, M. S. (Ed.). *The new generation: Studies in the attitudes and behavior of contemporary American students.* Mt. Pleasant, Iowa: Iowa Wesleyan College: The New Prairie, 1964.

Anderson, A. The modernization of education. In M. Weiner (Ed.), *Modernization: The dynamics of growth.* New York: Basic Books, 1966.

Astin, A. W. An empirical characterization of higher educational institutions. *Journal of Educational Psychology,* 1962, **53,** 224-235.

Astin, A. W. Differential college effects on the motivation of talented students to obtain the PhD. *Journal of Educational Psychology,* 1963, **54,** 63-71.

Astin, A. W. Personal and environmental factors associated with college dropouts among high aptitude students. *Journal of Educational Psychology,* 1964, **55,** 219-227.

Astin, A. W. *Who goes where to college?* Chicago: Science Research Associates, 1965.

Astin, A. W. *The college environment.* Washington, D.C.: American Council on Education, 1968.

Astin, A. W., & Holland, J. L. The environmental assessment technique: A way to measure college environments. *Journal of Educational Psychology,* 1961, **52,** 308-316.

Baggaley, A. R. *Intermediate correlational methods.* New York: Wiley, 1964.

Barker, R. G., & Gump, P. V. *Big school, small school.* Stanford, Calif.: Stanford University Press, 1964.

Barron, F. Creative vision and expression in writing and painting. In D. W. MacKinnon (Ed.), *Conference on "The creative person."* Berkeley: University of California, University Extension, Liberal Arts Department, 1961.

Barton, A. H. *Studying the effects of college education: A methodological examination of "Changing values in college."* New Haven, Conn.: Hazen Foundation, 1959.

Beach, L. R. Personality change in the church-related liberal arts college. *Psychological Reports,* 1966, **19,** 1257-1258.

Beach, L. R. Study of personality in the church-related liberal arts college. *Journal of College Student Personnel,* 1967, **8,** 105-108.

Berdie, R. F. Personality changes from high school entrance to college matriculation. *Journal of Counseling Psychology,* 1968, **15,** 376-380.

Bolton, C. D., & Kammeyer, K. C. W. *The university student.* New Haven, Conn.: College & University Press, 1967.

Brim, O. G., Jr. Adult socialization. In J. A. Clausen (Ed.), *Socialization and society.* Boston: Little, Brown & Co., 1968.

Brown, D. G. *Academic labor markets.* A report to the office of Manpower, Automation & Training, U.S. Department of Labor, September 1965.

Caplow, T. *The sociology of work.* New York: McGraw-Hill, 1964.

Cartter, A. M. (Ed.) *American universities and colleges.* Washington, D.C.: American Council on Education, 1964.

Cass, J., & Birnbaum, M. *Comparative guide to American colleges.* New York: Doubleday, 1964.

Cass, J., & Birnbaum, M. *Comparative guide to American colleges.* New York: Doubleday, 1966.

Clark, B. R. *Educating the expert society.* San Francisco: Chandler, 1962.

Clausen, J. A. (Ed.). *Socialization and society.* Boston: Little, Brown & Co., 1968. (a)

Clausen, J. A. Recent developments in socialization theory and research. *Annals of the American Academy of Political and Social Sciences,* 1968, **377,** 139-155. (b)

Coleman, J. S. *The adolescent society: The social life of the teenager and its impact on education.* New York: Free Press, 1961.

Coleman, J. S. *Introduction to mathematical sociology.* New York: Free Press, 1964.

The college blue book. Yonkers, N.Y.: C. E. Burckel, 1965.

Crutchfield, R. S. Independent thought in a conformist world. In S. Larber & R. H. L. Wilson (Eds.), *Conflict and Creativity.* New York: McGraw-Hill, 1963.

Deutsch, M., & Krauss, R. M. *Theories in social psychology.* New York: Basic Books, 1965.

Draper, N. R., & Smith, H. *Applied regression analysis.* New York: Wiley, 1966.

Duncan, O. D., & Reiss, A. J., Jr. *Social characteristics of urban and rural communities.* New York: Wiley, 1956.

Durkheim, E. *The division of labor in society.* New York: MacMillan, 1933.

Eckert, R. *Outcome of general education.* Minneapolis: University of Minnesota, 1943.

Eddy, E. D., Jr. The college influences on student character. *Journal of the National Association of Women Deans and Counselors,* 1959, **22,** 183-186.

Editor & Publisher Co. *Editor & publisher 1958 market guide.* New York: Author, 1957.

Eisenstadt, S. N. *From generation to generation.* New York: Free Press, 1958.

Elton, C. F. Patterns of change in personality test scores. *Journal of Counseling Psychology,* 1969, **16,** 95-99.

Elton, C. F., & Rose, H. A. The face of change. *Journal of Counseling Psychology,* 1968, **15,** 372-375.

Feldman, K. A. Research strategies in studying college impact. *ACT Research Report No. 34,* Iowa City, Iowa: The American College Testing Program, 1970.

Feldman, K. A., & Newcomb, T. M. *The impact of college on students.* San Francisco: Jossey-Bass, 1969.

Flacks, R. Adaptations of deviants in a college community. Unpublished doctoral dissertation, University of Michigan, 1963.

Freedman, M. B. *Impact of college.* Washington, D.C.: U.S. Department of Health, Education, and Welfare, Office of Education, 1960.

Freedman, M. B. *The college experience.* San Francisco: Jossey-Bass, 1967.

Goffman, E. *The presentation of self in everyday life.* Garden City, N. Y.: Doubleday, 1959.

Goldsen, R. K., Rosenbert, M., Williams, R. M., & Suchman, E. A. *What college students think.* Princeton, N.J.: D. Van Nostrand, 1960.

Gordon, C. W. *The social system of the high school.* New York: Free Press, 1957.

Goslin, D. A. *The school in contemporary society.* Chicago: Scott-Foresman, 1965.

Gottlieb, D. Processes of socialization in American graduate schools. *Social Forces,* 1961, **40,** 124-131.

Gottlieb, D., & Hodgkins, B. J. College student subcultures: Their structure and characteristics in relation to student attitude change. *School Review,* 1963, **71,** 266-289.

Gough, H. G. Techniques for identifying the creative research scientist. In D. W. MacKinnon (Ed.), *Conference on "The creative person."* Berkeley: University of California Extension, Liberal Arts Department, 1961.

Haller, A. O., & Wolff, E. W. A note on "Personality orientations of farm, village, and urban boys." *Rural Sociology,* 1965, **30,** 338-340.

Harris, C. W. (Ed.). *Problems in measuring change.* Madison, Wisc.: University of Wisconsin Press, 1963.

Havighurst, R. J., & Taba, H. *Adolescent character and personality.* New York: Wiley, 1949.

Heist, P. A. Diversity in college student characteristics. *Journal of Educational Sociology,* 1960, **33,** 279-291.

Heist, P. A., & Yonge, G. D. *Omnibus personality inventory manual.* New York: The Psychological Corporation, 1968.

Helson, R. Creativity, sex, and mathematics. In D. W. MacKinnon (Ed.), *Conference on "The creative person."* Berkeley: University of California Extension, Liberal Arts Department, 1961.

Herriott, R. E., & Hodgkins, B. J. *Environment and education: A sociological analysis* (title tentative). Englewood Cliffs, N.J.: Prentice Hall, in press.

Hodgkins, B. J. Student subcultures—An analysis of their origins and affects on student attitude and value change in higher education. Unpublished doctoral dissertation, Michigan State University, 1964.

Hodgkins, B. J., & Herriott, R. E. Age-grade structure, goals, and compliance in the school: An organizational analysis. *Sociology of Education,* 1970, **42,** 36-42.

Hollingshead, A. B. *Elmtown's youth: The impact of social classes on adolescents.* New York: Wiley, 1949.

Inkeles, A. Sociology and psychology. In S. Koch (Ed.), *Psychology: A study of a science, Vol. VI.* New York: McGraw-Hill, 1963.

Inkeles, A. Social structure and the socialization of competence. *Harvard Educational Review,* 1966, **36,** 265-283. (a)

Inkeles, A. The modernization of man. In M. Weiner (Ed.), *Modernization: The dynamics of growth.* New York: Basic Books, 1966. (b)

Inkeles, A. Social structure and socialization. In D. A. Goslin (Ed.), *Handbook of socialization theory and research.* Chicago: Rand McNally, 1969. (a)

Inkeles, A. Making men modern: On the causes and consequences of individual change in six developing countries. *American Journal of Sociology,* 1969, **75,** 208-225. (b)

Inkeles, A., & Levinson, D. J. The personal system and the sociocultural system in large-scale organizations. *Sociometry,* 1963, **26,** 217-229.

Jacob, P. E. *Changing values in college: An exploratory study of the impact of general education in social sciences on the values of American students.* New Haven, Conn.: Hazen Foundation, 1956.

Jacob, P. E. *Changing values in college: An exploratory study of the impact of college teaching.* New York: Harper & Row, 1957.

Jahoda, M. *Current concepts of mental health.* New York: Basic Books, 1959.

Jencks, C., & Riesman, D. *The academic revolution.* Garden City, N.Y.: Doubleday, 1968.

Kahl, J. A. *The American class structure.* New York: Holt, Rinehart & Winston, 1957.

Katz, J. et al. *No time for youth.* San Francisco: Jossey-Bass, 1968.

Klapp, O. E. *Heroes, villains and fools:The changing American character.* Englewood Cliffs, N.J.: Prentice-Hall, 1962.

Knapp, R. H., & Greenbaum, J. J. *The younger American scholar; His collegiate origins.* Chicago: University of Chicago Press, 1953.

Korn, H. A. Personality scale changes from the freshman to the senior year. In J. Katz (Ed.), *Growth and constraint in college students: A study of the varieties of psychological development.* Washington, D.C.: U.S. Department of Health, Education, and Welfare, 1967.

Lazarsfeld, P. F., & Thielens, W., Jr. *The academic mind.* Glencoe, Ill.: Free Press, 1958.

Learned, W. S., & Wood, B. D. *The student and his knowledge.* New York: Carnegie Foundation, 1938.

Lehmann, I. J., & Dressel, P. L. *Changes in critical thinking ability, attitudes, and values associated with college attendance.* U.S. Office of Education Cooperative Research Project No. 1646. East Lansing, Mich.: Michigan State University, 1963.

Lehmann, I. J., & Payne, I. K. An exploration of attitude and value changes of college freshmen. *Personnel and Guidance Journal,* 1963, **41,** 403-408.

Lerner, D. *The passing of traditional society.* Glencoe, Ill.: Free Press, 1958.

Lord, F. M. The measurement of growth. *Educational and Psychological Measurement,* 1956, **16,** 421-437.

Lord, F. M. Further problems in the measurement of growth. *Educational and Psychological Measurement,* 1958, **18,** 437-451.

Lundberg, F. *The coming world transformation.* Garden City, N.Y.: Doubleday, 1963.

Mack, R. W. *Transforming America: Patterns of social change.* New York: Random House, 1967.

MacKinnon, D. W. Creativity in architects. In D. W. MacKinnon (Ed.), *Conference on "The creative person."* Berkeley: University of California Extension, Liberal Arts Department, 1961.

Mannheim, K. *Man and society in an age of reconstruction.* New York: Harcourt, Brace & Co., 1940.

Maslow, A. H. *Toward a psychology of being.* Princeton, N.J.: Van Nostrand, 1962.

Mayhew, L. B. *Colleges today and tomorrow.* San Francisco: Jossey-Bass, 1969.

McConnell, T. R. et al. *Student development during the college years,* in press.

Mechanic, D. *Students under stress.* New York: Free Press, 1962.

Moore, O. K., & Anderson, A. R. Some principles for the design of clarifying educational environments. In D. A. Goslin (Ed.), *Handbook of socialization theory and research.* Chicago: Rand McNally, 1969.

Moore, W. E. *The impact of industry.* Englewood Cliffs, N.J.: Prentice-Hall, 1965.

Newcomb, T. M. *Personality and social change.* New York: Dryden Press,1943.

Newcomb, T. M. The general nature of peer group influence. In T. M. Newcomb & E. K. Wilson (Eds.), *The study of college peer groups: Problems and prospects for research.* Washington, D.C.: Social Science Research Council, 1961.

Newcomb, T. M. et al. *Persistence and change: Bennington College and its students after twenty-five years.* New York: Wiley, 1967.

Newcomb, T. M., & Feldman, K. A. *The impact of colleges upon their students.* A report to the Carnegie Foundation, 1968.

Nichols, R. C. Effects of various college characteristics on student aptitude test scores. *Journal of Educational Psychology,* 1964, **55,** 45-54.

Nichols, R. C. Personality change and the college. *American Educational Research Journal,* 1967, **4,** 173-190.

Pace, C. R. *They went to college.* Minneapolis: University of Minnesota Press, 1941.

Pace, C. R. Five college environments. *College Board Review,* 1960, **41,** 24-28.

Pace, C. R. *The influence of academic and student subcultures in college and university environments.* Los Angeles: University of California, 1964.

Palley, D. B. The aims of American colleges and universities. An honors thesis for the Department of Social Relations at Harvard College, 1968.

Parsons, T. *The social system.* New York: Free Press, 1951.

Parsons, T., & Platt, G. M. *The American academic profession: A pilot study.* Cambridge, Mass.: Harvard University Lithograph, 1968.

Parsons, T., & Platt, G. M. Higher education, changing socialization, and contemporary student dissent. In M. W. Riley et al. (Eds.), *A sociology of age stratification.* New York: Russell Sage Foundation, in press.

Pavalko, R. M., & Ullrich, A. E. Factors related to quality of schools attended by teachers. *Journal of Teacher Education,* 1970, **21,** 498-503.

Pervin, L. A. A twenty-college study of student X college interaction using TAPE (transactional analysis of personality and environment): Rationale, reliability, and validity. *Journal of Educational Psychology,* 1967, **58,** 290-302.

Plant, W. T. *Personality changes associated with a college environment.* U.S. Office of Education, Cooperative Research Branch Project 348 (SAE 7666), 1963.

Rand McNally. *1958 Road and reference atlas.*

Rhodes, A. L., & Nam, C. B. The religious context of educational expectations. *American Sociological Review,* 1970, **35,** 253-267.

Riesman, D. The "Jacob report." *American Sociological Review,* 1958, **23,** 732-738.

Riesman, D. Changing colleges and changing students. *National Catholic Education Association Bulletin,* 1961, **58,** 104-115.

Rogers, C. R. *Client centered therapy.* Boston: Houghton Mifflin, 1951.

Rogoff, N. *Board member colleges: A comparative analysis.* New York: Bureau of Applied Social Research, Columbia University, 1957.

Rosen, B. C., & Bates, A. P. The structure of socialization in graduate school. *Sociological Inquiry,* 1967, **37,** 71-84.

Sanford, N. *Self and society.* New York: Atherton Press, 1966.

Schnore, L. F. The rural-urban variable: An urbanite's perspective. *Rural Sociology,* 1966, **31,** 246-261.

Schwebel, M. *Who can be educated?* New York: Grove Press, 1968.

Scott, J. W., & El-Assal, M. Multiversity, university size, university quality and student protest: An empirical study. *American Sociological Review,* 1969, **34,** 702-709.

Selvin, H. C. *The effects of leadership.* New York: Free Press, 1960.

Shibutani, T. *Society and personality.* Englewood Cliffs, N.J.: Prentice-Hall, 1961.

Sirjamaki, J. Education as a social institution. In D. A. Hansen & J. E. Gerstl (Eds.), *On education—sociological perspectives.* New York: Wiley, 1967.

Snyder, B. R. How creative students fare in science. In P. Heist (Ed.), *Education for creativity: A modern myth?* Berkeley, Calif.: Center for Research and Development in Higher Education, 1967.

Stanley, J. C. A design for comparing the impact of different colleges. *American Educational Research Journal,* 1967, **4,** 217-228.

Stern, G. G. Characteristics of the intellectual climate in college environments. *Harvard Educational Review,* 1963, **33,** 5-41.

Stewart L. H. Change in personality test scores during college. *Journal of Counseling Psychology,* 1964, **11,** 211-219.

Thistlethwaite, D. L. College press and student achievement. *Journal of Educational Psychology,* 1959, **50,** 183-191.

Thistlethwaite, D. L., & Wheeler, N. Effects of teacher and peer subcultures upon student aspirations. *Journal of Educational Psychology,* 1966, **57,** 35-47.

Trent, J. W. The development of intellectual disposition within Catholic colleges. Unpublished doctoral dissertation, University of California, Berkeley, 1964.

Trent, J. W. *Catholics in college; Religious commitment and the intellectual life.* Chicago: University of Chicago Press, 1967.

Trent, J. W., & Medsker, L. L. *Beyond high school.* San Francisco: Jossey-Bass, 1968.

Turner, R. H. *The social context of ambition.* San Francisco: Chandler, 1964.

Tyler, F. T. *A four-year study of personality traits and values of a group of National Merit Scholars and Certificate of Merit recipients.* Center for the Study of Higher Education, University of California, Berkeley, 1963.

U.S. Bureau of the Census. *A report on the 17th decennial census of the United States population.* Washington, D.C.: U.S. Government Printing Office, 1952.

U.S. Bureau of the Census. *County and city data book: A statistical abstract supplement,* 1956. Washington, D.C.: U.S. Government Printing Office, 1957.

Webster, H. Changes in attitudes during college. *Journal of Educational Psychology,* 1958, **49,** 109-117.

Webster, H., Freedman, M. B., & Heist, P. A. Personality changes in college students. In N. Sanford (Ed.), *The American college.* New York: Wiley, 1962.

Werts, C. E., & Watley, D. J. Analyzing college effects: Correlation vs. regression. *American Educational Research Journal,* 1968, **5,** 585-598.

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