

SOCIALIZATION AND SCHOOL INFLUENCES
ON COGNITIVE DEVELOPMENT

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I. Introduction

It is difficult to reconcile the research in developmental psychology in recent decades with the idealistic scientific requirements for the construction of theories. According^{in the} _^, scientific progress should place increasing emphasis on explication, precise specification, and the integration of theoretical systems of statements into one objective domain: i.e., "(a) general laws and principles that serve as axioms or assumptions, (b) other laws which are deducible from the general axioms, and (c) coordinating definitions relating theoretical terms to observational sentences" (Baltes and Willis 1977, p. 129f). The opposite is in fact the case: the present state of developmental psychology is characterized by distinct or competing theories for the same phenomenal domains and by many attempts to use the fundamental assumptions of each theory for the description and explanation of the most diverse developmental phenomena. The history and the current state of the development of theories in psychology can best be characterized by a "non-statement view," a view according to which different theories present diverse approaches to problem-solving which do not necessarily relate to one another (Herfmann 1976). An example of this is provided by the theoretical definitions and research-strategical implications of the two key concepts of this chapter: development and socialization.

Flavell, for example, defines development, in accordance with many advocates of a descriptive-normative and cognitive tradition, as "a biological growth process that leads to childhood change, their inevitability, magnitude, directionality, within specious uniformity, and irreversibility" (1970, p. 248). This view may seem appropriate for a nomothetic description of massive quantitative and qualitative changes within childhood; its problems and limitations become apparent, however, when shifting from the descriptive to an explanative level. Flavell himself gives a convincing argument when he claims for the explanation of rule-like cognitive developmental sequences: "(a) First see if the sequence is explainable by item structure (logical) considerations alone, and if so, accept this as the best explanation of the sequence; (b) if not, see, if a plausible environment-structure explanation can be found, and if so, accept it at least professionally; (c) if not, assume ... very tentatively that our species may simply be biologically programmed through evolution to develop those particular cognitive items in the particular order" (1972, p.346). If developmental psychology is not to be reduced to merely answering the question 'what develops?' and to some speculative tentative explanations of the 'third view', any psychological definition of development must include the intra- and interindividual variation of behavioral changes as hypothetical results of different learning opportunities and processes. This, however, is only true of definitions of the term 'socialization'. Influenced by psychoanalytic, culture-anthropological and learning-theoretical approaches, socialization is mostly understood as "a broad term for the whole process by which an individual develops, through transaction with other people, his specific pattern of socially relevant behavior and experience" (Zigler & Child 1969, p. 474).

The concepts development and socialization are not only results of different traditions of research, but also an expression of different perspectives from which one can scientifically view and analyze the ontogeny of behavior. The concept of development emphasizes the universality and inward directedness of these processes, the construction of formal psychic structure through the action of the self-developing individual and the invariant sequence of irreversible changes. (On the other hand) The concept of socialization underscores the variability and specificity of human development, the significance of external conditions and forces for this process, and the role which is played by learning processes. As Bronfenbrenner remarked fifteen years ago: "It is precisely the convergence of these two theoretical developments which constitutes major challenge and promise for the future of research in developmental psychology" (1963, p. 538).

Even today, however, such an integrated theory formation is still a scientific program rather than a description of the reality of psychological research. Nonetheless, a number of convergent tendencies in the two traditions can be observed. Thus, analyses of inter- and intra-individual developmental differences, studies in comparative culture, and training studies have contributed to the fact that Piaget's theory of human intellectual development no longer appears to be a *monolithic* block of statements describing the universally valid rules according to which all individuals build their cognitive structure. In contrast, more attention is now being paid to the possibility of experiences which are available in a certain environment, the resulting social programming of learning activities of young people which takes

place through age-specific developmental tasks, and variable individual strategies of information processing. (Aebli 1977). This liberalization of the Piaget model favors the transference of several key concepts to socio-cognitive learning theories of motivation development, the acquisition of social competence and moral development.

As with Piaget, the activity of the individual is central to the concept of development in Soviet psychology. Leontjev (1964) emphasizes that although the child is born into a humanly-created objective world, its development can be described not as a process of adaptation to the conditions of this environment, but rather as a process of assimilation. "The process of assimilation takes place in the course of the child's intellectual activity; here it encounters the objects and phenomena of its environment in which the achievements of humanity are concretized. Such an activity does not begin by itself; rather it arises from practical and verbal contact with others." (p. 3/1). The direct relationship between development and upbringing thus postulated has been analyzed by Galperin (1969). According to him, the formation of an intellectual operation is completely determined by the system of the demands placed ^{on} it and by the system of the individual presuppositions and the didactic methods for their transmission. The acquisition of a well-defined action or operation under precisely determined conditions is therefore the most important apparatus for its theoretical reconstruction; hence, psychological explanation and pedagogical control of development processes theoretically coincide (cf. Belmont and Butterfield 1977).

Taking into consideration the assumptions of Piaget and Soviet

psychology, Oerter, Dreher, and Dreher (1977) have recently developed a model of cognitive socialization. Here they differentiate between "objective structure" (in the sense of society's historical stage of development, i.e. its characteristic partial structures, nature, culture and economy, as well as their reciprocal influences and interpenetration) and "subjective structure" (which is determinable not only by a formal system of general ordering concepts, such as identity, stability, and time, and by information-processing operations such as classifying, forming principles, establishing hierarchies, and evaluating, etc., but is also and primarily defined by characteristics of the objective structure). Basic to the model is the assumption of an isomorphism between parts of the subjective and objective structures. Seen from the point of view of developmental psychology, this means that the developmental tendency of the subjective structure is determined by socialization pressure from the respective society, whereby socialization is not meant to imply a total adaptation and uniformization, but rather must be understood as a "balance between adaptation and self-assertion (with the emphasis varying according to historical and development-specific influences" (op. cit, p. 17).

Within the framework of this approach a controlling function which mediates between objective and subjective structure is attributed to the agents of socialization, such as the family and the school. That is, they select goals and contents and they emphatically convey their own particular structure and provide for the acquisition of values, knowledge and action strategies through the creation of learning possibilities, the definition of requirements and standards of evaluation,

the provision of learning aids, and the partial control of learning through feedback and reinforcement.

Schools and school-like institutions play an important role in such and similar models of cognitive socialization, since the development and the socialization of intellectual abilities cannot be separated analytically. An integration of the theoretical elements of developmental, social, and pedagogical psychology is therefore necessary for the theoretical reconstruction of the developmental process. Ferguson (1954, 1956), Gagné (1968), Aebli (1963, 1977) and others have pointed to the significance of learning and transferal for the acquisition and modification of abilities, but the degree of empirical confirmation of such theoretical hypotheses has been very limited up to now. This is possibly connected with the fact that in recent decades pedagogical psychology has been primarily concerned with the analysis of independent variables of school learning and their effects on relatively general and a-theoretically defined achievements in school, whereas developmental psychology has concentrated on the modifications of individual abilities and skills, without devoting a corresponding degree of attention to specific developmental conditions and mechanisms. Thus, we currently have at our disposal a large number of individual results and mini-theories as to which conditions of instruction and schools influence the acquisition of knowledge; there are also a large number of studies on the development of cognitive features before, during, and after the school years; and we are familiar with a series of broad speculative assertions on the significance of school for cognitive socialization. What is lacking are medium-range theories for the connection of these different systems of

theoretical statements.

These theoretical and empirical deficiencies also explain the discrepancies between the large number of descriptions of tasks and the small number of investigations on the effects of school. The relationship between primary and secondary socialization is also addressed here. Whereas primary socialization is understood as the directed development and shaping of basal competencies and judgments through "significant others" (usually parents) in early childhood, Berger and Luckmann (1969) define secondary socialization as the "internalization of institutional sub-worlds or sub-worlds based on institutionalization" which builds upon this primary socialization (p. 148). In contrast to the closed nature and wholeness of the child's living space during primary socialization, these sub-worlds represent partial segments of realities with specific cognitive, normative and affective components. This definition includes, among other things, the following developmental tasks: the acquisition of the elementary cultural techniques of reading, writing, and arithmetic as well as certain aspects of the knowledge of the world which have been accumulated in a culture; the systematic development of algorithms and heuristic strategies for the absorption and processing of information; the overcoming of a strongly egocentric view of the world in favor of decentralized or socio-centralized possibilities of thought and action and the construction of mobile structures of (concrete and formal) operative schemata which is connected with this; the internalization of social frames of reference and standards for the child's judgment and evaluations of ~~its~~ own behavior or the behavior of others, i.e., the results of their actions; the explicit confrontation

with manifold learning- and problem-situations which ^{should} lead to an improvement of work techniques, self-guided learning, and meta-cognition; the expansion and differentiation of values, norms, motivations, and interests; the shaping and stabilization of realistic self-images; the practice of various roles and the competencies required to facilitate and to ease the transition into adulthood.

It is a controversial issue whether and to what extent the school systems of different countries fulfill this task. This is partially dependent on the fact that the socialization effects of schools are generally difficult to analyze and determine and display great inter-individual and inter-institutional differences. In order to describe and explain the processes of cognitive socialization in schools, it is also necessary to understand the stable and the variable institutional conditions of schools in their ecological, normative, social, and didactic aspects. It is also necessary to take into account the differential eagerness to learn and learning abilities of students which can be realized and modified at a particular point of time.

Here it is not sufficient to concentrate solely on the contribution of schools to the cognitive socialization of individual students. Rather, research into socialization must also take into account the dual function of this process both for the individual and for society. Thus, for example, in developed, industrialized countries, schools are assigned important tasks for the reproduction of societal relationships and for the facilitation of social change. "The economic and vocational specialization in modern societies depends upon an accumulation of technical knowledge, whose transmission transcends the forces of each

family and requires a phase of learning and assimilation whose length is normally in direct proportion to the degree of specialization" (Eisenstadt, 1966, p. 165). As a societal institution, the school is thus closely connected to cultural and economic progress. H. J. Daheim (1961, 1970) was able to demonstrate, for example, that the connections between various vocational positions and the degree of education has grown stronger in the last fifty years. Building upon this result, he formulated a series of hypotheses on the systematic relationships among technological development, education, choice of vocation, and professional position. Accordingly, the more complexly developed the technologies in a society are, i.e., the greater the degree of specialized knowledge assessed for professional qualification is, (a) the more the schools are oriented towards universalistic performance criteria; (b) the more the schools take over from the parents the preliminary selection for professional positions; (c) the more strongly school learning determines professional interests and goals; and (d) the more pronounced the direct influence of the school^{is} on professional possibilities and preferences.

Even if it has since become evident that, in comparison to social background (with its attendant competencies and aspirations), American and western European schools have a limited scope as 'apparatuses for the distribution of opportunities' or as 'generators of social mobility' (Jencks, 1972), the important social functions of schools are, however, nevertheless unquestioned. These functions manifest themselves in various ways:

- Qualifications:

The transmission of abilities, skills, knowledge, and interests enabling the assumption and exercise of job activities demanded by the economic system.

- Selection and Allocation:

Because the schools are not only responsible for transmitting qualifying competencies, but also for evaluating the accomplishments of students, for limiting and determining the choice of type of school (its duration and the requirements for completion), they are considered to be independent of (or even in opposition to) outside empirical checks. As such, schools are considered to be a relatively objective and prognostically valid decision-making body for a system of hierarchically ordered differential selections, for advancement opportunities, and for the distribution of qualifications.

- Integration:

Through the transmission of norms, meanings, and patterns of interpretation, the schools make a fundamental contribution to the legitimization, recognition and respect for existing values and social conditions.

How these functions are to be fulfilled formally and with regard to their contents, apparently depends on industrial development, the social order, and the specific relationship between school and employment systems in the respective country. If schools do not accomplish these tasks, or if they do so inadequately, then the subsequent difficulties for the continued existence, survival capacity, and development of a social system are predicted in sociological theories. These difficulties can take the form of economic crises (inadequate or uneconomical supply of qualified workers for the employment system), of allocation crises (once the selection for and the distribution of jobs are no longer governed by school qualifications, then the examinations and scores no longer hold their prognostic informative value and are often replaced by other, less 'neutral' criteria

and mechanisms for selection). Difficulties may also arise in the form of identity or motivation crises which occur when the loyalty of the masses necessary for social integration and identity as well as the typical motivation models for societal goals are questioned.

These relationships between schools and the social system should be viewed as reciprocal. Through its effectiveness in socialization, the school influences not only social development but is also strongly determined, in turn, by the conditions of its societal framework. Thus, the organization of every school system reflects dominant ideological convictions and goals of a particular society, i.e., of specific groups within the society. In addition to this, the social, political, economic, and cultural ^{situation} makes a lasting influence on the expectations, decisions and actions of the students, parents, and teachers. This is exemplified through reaction patterns to economic depressions or to an increase in unemployment. If we wish to avoid over-generalized scientific statements, then our research on school socialization must not only focus on inter-individual and inter-institutional differences for a particular cross-section of time, but must also take into account the differences among cohorts in relation to social change [&] in general - and especially to the long-term changes in the school system. Thus, theories for the description and explanation of cognitive socialization through the schools should also include rules for the connection between conceptually represented universal trends in cognitive development and school conditions specific to cohorts, society, and subpopulations, such as stable, intra-individual as well as inter-individual variable characteristics of the students. With regard to this criterion, we presently only have fragmented theories, which vary in the scope of their application; this range is, in fact, in itself often difficult to estimate. The following chapter must orient itself accordingly;

the bulk of this presentation will rest on literature written in German.

While the following section (II) deals with some possibilities for significant influences on and modifications in cognitive abilities under school and school-like conditions, the third section (III) is devoted to theoretical and empirical investigations in which the various socialization effects of different systems of features and variables are analyzed within and among different schools.

II. INFLUENCES OF SCHOOL ON COGNITIVE DEVELOPMENT

When we consider that on a world-wide basis billions of dollars are spent on the construction and maintenance of schools every year, that in recent decades the period of compulsory education has been substantially lengthened in many nations, and that children and young adults spend a large portion of their time in a school environment, it becomes apparent that we know astonishingly little about the influences of school on the development of children and young adults. The result recently established by Good, Biddle and Brophy for the United States also holds true on the whole for the nations of Europe: "Do schools or teachers make a difference? No definite answer exists because little research has been directed on the question in a comprehensive way" (1975, p. 3). Most politicians, pedagogues, parents, and tax-payers apparently proceed from the scientifically untested assumption that schools have the effects that they are supposed to have and that the desired effectiveness is higher in pedagogically well-conducted classes than in poorly organized ones. The basis for this conviction could be that in highly developed industrialized countries students receive between 12,000 and 20,000 hours of instruction; that the systematic, massive, and on-going learning possibilities and learning experiences connected with this instruction could not be without an influence on cognitive development; and that the benefits of school for the individual and society are obviously manifested in the high correlation between level of education and income (Husén 1969; Neidhardt 1970; for the US: Welch 1974, Tinto 1977). The Coleman report, which conducted an investigation of 645,000 students and 60,000 teachers

impede, impair, compensate for, or substitute for the effectiveness of instruction.

The significance of these groups of variables for the internal and external validity of investigations on the effects of school has been shown in past years in the controversial findings on the influence of pre-school education on cognitive development. Here the similarity and, in part, the correspondence of the research situation in the United States and in Western Europe is striking (cf., for the USA: Bronfenbrenner 1974; Passow 1974; Miller and Dyer 1975; Lazar et al. 1977; for Western Europe: Bennwitz and Weinert 1972; Council of Europe 1972, 1975; Schmalohr 1975; Schmalohr et al. 1974; Bund-Länder-Kommission für Bildungsforschung 1976; Winkelmann et al. 1977; Rauh 1979). The differences among the pre-school programs and/or the research relating to these concern the following points.

Definition of the independent variables: attendance or non-attendance of a pre-school institution; duration of pre-school education; type of pre-school institution; type of pre-school program (highly structured vs. less structured; compensatory vs. complementary); various qualitative dimensions of pre-school education (e.g., location and type of facilities; availability and accessibility of work-, learning- and play- materials; teacher-pupil ratio; curricula; characteristics of the teachers; expectations and behavioral traits of the teachers; didactic competence of the teachers).

Definition of the population sample: age, regional origin, social background, consideration of psychological characteristics, such as

in 4,000 public schools in the United States, has thus been all the more shocking for its conclusion that "schools bring little influence to bear on a child's achievement that is independent of his background and general social context" (1966, p. 325). Similarly, Jencks and his colleagues summarize the results of their study: "Our research suggests, however, that the character of a school's output depends largely on a single input, namely, the characteristics of the entering children, everything else--the school's budget, its policies, the characteristics of the teachers--is either secondary or completely irrelevant" (1972, p. 256).

The methods, the results, and the interpretations of Coleman's and Jenck's investigations have been repeatedly criticized and called into question (Mosteller and Moynihan 1972; Luecke and McGinn 1975). Aside from that, their skeptical findings on the effectiveness of socialization of school appear to contradict not only common experience, but also the results of other research (Shaycroft 1967; Ingenkamp 1967; Vernon 1969; Wiley and Harnischfeger 1974; Harnquist 1975). If we compare the theoretical background and the methodical procedures of the various studies, considerable differences and problems appear, as we might expect (Herriott and Muse 1973; Pedhazur 1975; Doyle 1978). They relate to the conceptualization and operationalization of learning conditions in schools as independent variables, the effects on the part of students as dependent variables, the hypothetical processes for the explanation of the connection between both groups of variables and the context variables, i.e., the living- and learning-conditions of students outside of school which, differentially or on the whole, can facilitate,

learning hierarchies (cf. Eigler 1978).

If investigations of pre-school (or, more generally, studies on the effectiveness of socialization of schools) lack a precise formulation of the object of their inquiry, a planning of tests strictly related to it, the availability of appropriate measuring instruments and statistical methods of analysis (which must also take into account the non-linear relationship among the variables) and sufficient information on the conceptualization and operationalization of these variables, then the range of the validity of the results of the investigation cannot be properly estimated, contradictions among various studies cannot be cleared up, and substantial theoretical progress will not be possible. One could object that these are trivial issues which can be found in most test books of psychological methodology. However, the situation is all the more serious, because the above deficiencies in research on developmental-psychological socialization represent an exact description of the current state of research. In recent decades this has led both in the United States and in Europe to the fact that, despite intensive efforts, our theoretical knowledge on pre-school education has grown less than our store of both all too general and all too specific statements. This is true above all when we do not limit the inquiry to the problems of explaining to what extent the variances in performance and ability of children is reduced by preschool or school and to what extent the relative position of students within their age group can be changed in the short-run or long-run, but ^{when we} also ask which intra-individual changes are achieved in narrowly-defined sub-populations by means of educational advancement or which appear to be at least theoretically and technologically

stage of cognitive development, etc.

Definition of the context variables: without consideration of context variables; supplementary economic, psychological or didactic programs in underprivileged families; different forms for the inclusion of parents, brothers and sisters, and peers into pre-school education; cooperation with teachers of the primary school; forms for the continuation of the pre-school program within the primary school.

Definition of the program objectives: short-range, middle-range and long-range objectives in the areas of school achievements, intellectual development, work competencies; physical dexterity; social competencies; combined objectives (cf. Zigler and Trickett 1978).

Definition of the dependent variables: conceptualization and measurement of goal-specific and non-goal-specific effects through the comprehension of differences and/or changes in characteristics in circumscribed achievements, skills, IQ or primary intellectual abilities, cognitive operations (mostly with the help of tasks of the Piaget type), cognitive strategies, individual manifestations of motivation, expectations and aspiration levels, attitudes to work and work techniques, attitudes to teachers and to school, social competencies.

Definition of hypothetical learning processes: confirmation and comprehension of learning through learning goals, learning effects, specific learning tasks, open learning situations, cognitive operations and strategies which are used spontaneously by students or which are provoked; these also include by-products of the learning process such as the measurement of learning assumptions, progress in learning, and attainment of learning goals, which is defined within the framework of

(on the whole or in certain areas). Piaget has written in this regard: "Acceleration is certainly plausible, but first we must find out whether it is desirable or harmful. . . . Perhaps, certain slowness is useful in developing the capacity to assimilate new concepts. . . . Blindly to accelerate the learning of conservation concepts could be even worse than doing nothing" (1970, p. 31).

Facilitation and furtherance of cognitive development. If one proceeds like Kohlberg from the theoretical assumption that cognitive development is a universal, non-manipulable succession of qualitatively different pre-operative and operative stages, and that the probability of the transition from one stage to the next dramatically decreases immediately after and very long after the last transformation of stages, and if one postulates as the goal of education the attainment of the highest possible cognitive niveau, then school is assigned the function of stimulating, facilitating, and supporting the change of stages appropriate to such development. This occurs not so much through direct instruction as through indirect forms of instruction (methods of discussion, school atmosphere, etc.). Typical of this conception are several newly-developed curricula for moral development (Kohlberg and Turiel 1971; Kohlberg and Mayer 1972; Kohlberg, Wasserman and Richardson 1975).

The steering of cognitive development. If one considers and ^{an}alyzes the store of knowledge and the intellectual achievements of a non-sorted random sample of adults, it becomes clear how large the discrepancies between these and Piaget's ideal types of developmental norms actually are. These discrepancies are not only explainable on the basis of inter-

possible.

The last question not only raises new methodical problems of idiographically and nomothetically based measurements of change, but also points to the close connection between theories of child development and prevalent socialization research at a given time. More or less central tasks and a more or less central significance for cognitive development must be attributed to school according to whether the relationship between universal development and the desired advancement of education is tacitly assumed or explicitly conceptualized. An instructive example here is provided by comparisons of theoretical models in which development is postulated as (a) a condition, (b) a result, or (c) a goal of education (Weinert 1979). Accordingly, entirely different functions are attributed to school:

Concretization of cognitive development with regard to contents.

According to this position, the task of school lies essentially in the transmission of knowledge. The goal of school learning is thus, according to Piaget (1972), for example, the extension of already formed cognitive structures to new contents, without an advancement of cognitive development in the sense of the building of structures.

Acceleration of cognitive development. Whereas the sequential succession of structural transformations is viewed as invariant with regard to population- and individual-specific differences in experience and with regard to the pedagogical attempts at influencing it, an acceleration of cognitive development can be effected by the dominance of culturally prescribed developmental tasks and by the curricula of certain schools

section 2, it is essentially limited to the investigation of the didactic conditions and the possibilities for improvement of the transmission of scholastic achievements. Traditional developmental psychology can likewise ignore such problems, because the systematic analysis of necessary and/or sufficient developmental conditions and the theoretical foundations of the practical possibility for the furtherance of the desired cognitive changes connected with these conditions is so greatly neglected in favor of the question of "What develops?"

Thus, in the following pages we can simply report on a few relatively isolated attempts to influence cognitive development under experimental and/or school conditions. Here problems of the transmission of knowledge, the furtherance of thought, and the influence of judgment systems shall stand in the foreground.

A. The transmission of knowledge.

The transmission of knowledge belongs to the classical and undisputed tasks of school; it is even seen by many to be school's most important contribution to the cognitive socialization of the student. In all countries what is to be learned when and by whom is therefore more or less strictly determined through teaching plans, curricula, textbooks and achievement tests and made compulsory. At the same time, however, the question as to how well schools actually fulfill this function has been posed again and again. If we disregard the many vague and superficial assertions on the presumed effectiveness of socialization and the feared deficiencies of socialization of school, then there are four distinct questions which must be distinguished in order to clarify these doubts

individual differences in intellectual learning abilities, but also by the lacking methodicality and continuity of the furtherance of cognitive development (Plemons, Willis and Baltes 1978). In the course of life, school and school-like episodes therefore play an essential role in the building of cognitive competences and in the formation of cognitive deficiencies. This view is in keeping both with the theoretical learning approach of Gagne (1968) as well as with Aebli's model of cognitive development (1977): "While the spontaneous and undirected activity of the child therefore leads to the building of a large number of fragmentary cognitive elements and their temporary, highly incomplete integration in a naive conception of the world, systematic learning, if all goes well, guides the building of cognitive structures which comprise many hierarchical levels and which are integrated to a high degree, transparent, and mobile" (p. 161).

But under what circumstances does cognitive development under the influence of systematic pedagogical furtherance proceed successfully? Is there an optimal balance here between vertical and horizontal transfer (Flavell and Wohlwill 1969)? Should transmission strategies be stage-specific or non-stage-specific (Kuhn 1974; Brainerd 1977)? What advantage does the transference of findings from short-term training experiments to long-term measures for advancement in school promise? Finally, what is the connection between the building of structures of knowledge in terms of contents and formal structures of thought?

These are questions which currently cannot yet receive scientifically satisfactory answers. This is without significance for conventional pedagogical psychology, because, as we shall document in detail in

assessed by the "market" (trade school teachers, employers, supervisors) and people effected, and on the actual short- and long-term results of school instruction (arrived at both by teacher ratings as well as with the help of objective achievement tests at graduation and several years thereafter). In mathematics, for example, progressive improvements in achievement resulted for several types of arithmetic (mental arithmetic, calculation of percentages); in others, however, there were marked losses in skill (e.g. fractions). Husen and Boalt trace this back to various vocational knowledge requirements and to individually different frequencies in the application of the material learned.

Performance differences among different school classes and students.

The IEA studies show substantial variances in achievement not only among the participating countries, but also within these countries. Individual investigations confirm that even with controlled or parallel initial assumptions on the part of the students average performance differences are demonstrable among the members of various schools and school classes and that these differences can hypothetically be causally associated with characteristics of instruction. Thus, for example, on the basis of a study conducted over a period of time, Krapp (1973) obtained the result that performance differences at the end of the first year of school are certainly most strongly determined by the students' cognitive learning assumptions, but that in addition variable factors of school and home life are of substantial (and approximately the same) significance. Kemmler (1967, 1976) reached similar results on the basis of an investigation extended over several years. Treiber ~~et al~~ (1979) also presents findings on differences in performance and learning processes which are dependent on

by means of empirical research.

The acquisition and the short-term retention of isolated subject matter for learning. In countless studies in pedagogical psychology, the acquisition of knowledge in various fields of learning has been examined with regard to differing student populations, variable teaching methods, and different criteria of knowledge, understanding, application, and transfer. Their results do not allow us to draw admissible and reliable conclusions for the long-term effectiveness of school for the transmission of knowledge (Dunkin and Biddle 1974). At present the results of such research allow us merely formulate a large number of competing hypotheses on the role that principles and methods of instruction play in the explanation of long-term differences in scholastic achievement.

Long-term retention of scholastic knowledge. The few pertinent investigations here show the expected strong decline in scholastic achievement and knowledge as a function of time, but at the same time, however, also show substantial intra- and inter-individual differences in retention. These differences are dependent in part on the original learning conditions, on possibilities for the interim activation or practice of the material learned, on the subjective significance of the contents of the material, and on the context position of that which was learned (Falk 1962). A number of Swedish investigations, summarily reported by Husén and Boalt (1968) are particularly interesting in this connection. These studies not only extend to the determination of curricular objectives, but also to the shaping of instruction with regard to actual contents, the demand for knowledge and skills as

each composed of four classes, with a higher or lower increase in learning (=difference in the z-transformed mean values between the final and initial examinations). The results for n=159 students are shown in illustration 1a. Here the average courses in learning processes in groups 1, 2, 4, and 5 are overshadowed by the (intra-group constant) regression effect. Nevertheless, we must note that the courses of learning processes of students with poor initial performances (group 1) clearly improve in performance-effective classes; those of students with high initial performances (group 5), on the other hand, decline less sharply. Even in the mid-range (thus without a confounding by the regression effect), the superiority of classes oriented towards marked learning increases is clearly shown. This is also evident in illustration 1b in the divergence (scissoring) of the average courses of learning processes of both class types.

For the time being it is an unresolved problem as to how the differences in performance levels and/or performance variance among classes can be theoretically correlated with specific traits of teaching and learning behavior. An approach to its solution is offered by: parallel sequential analyses of the course that instruction takes and the performance progress of the students over longer periods of time (Treiber ~~et al.~~, 1979); learning-path analyses (Kleiter and Petermann 1977); comparisons of school performance in which the transmission, mastery, availability, and application of previous knowledge is controlled (Simons et al. 1975); construction and validation of instruction units according to the mastery-learning model (Eigler and Straka 1978). The conclusions which can be deduced from such experiments as to the explainability of

school class.

1943 students from 79 *fifth . grade* classes worked a mathematics achievement test at intervals of three months. In addition, background data on general intelligence as well as family background was collected by means of questionnaires and test instruments. A covariance analysis corrected the influence of these variables on individual post test achievements and estimated an adjusted mean value for each school class. Differences among the 79 classes ^{thus, better} ~~can be interpreted by means of~~ *these* as a consequence of their instruction ~~rather than as~~ uncorrected ^{mean} differences ~~in the mean value.~~

A subgroup of the 79 classes, namely 297 students from 13 classes, was observed for 12 months in regard to their cognitive performance development in mathematics. Here four performance measurements were collected through knowledge tests using similar items. This total random sample was stratified into five sub-groups according to their initial performance and general intelligence and courses of individual learning processes were described by means of the gradient of their regression equations. The courses of learning processes of the five student groups were then compared on the basis of further subgroups,

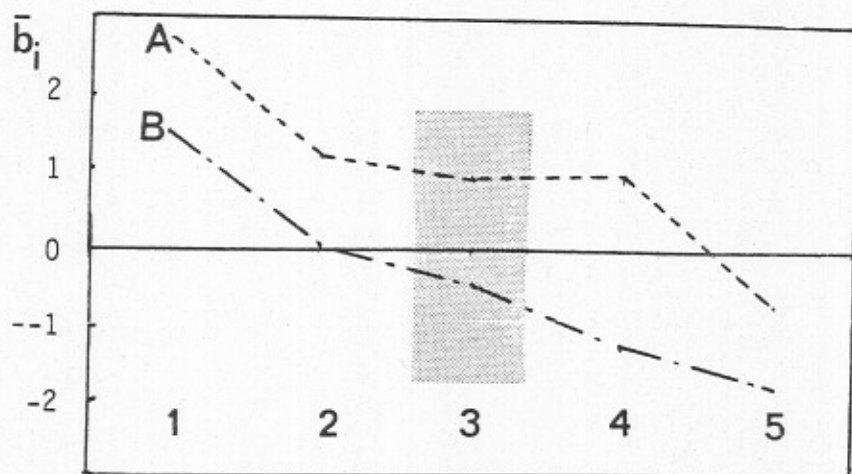


FIGURE 1a.

COMPARISON OF MEAN REGRESSION SLOPES (\bar{b}_i)
FOR INDIVIDUAL ACHIEVEMENT CHANGES AT FIVE STUDENT GROUPS
WITH DIFFERENT ENTRANCE PERFORMANCE LEVEL (1=low; 3=medium;
5=high) IN CLASSES WITH EITHER HIGH (A) OR LOW (B) PRETEST-
POSTTEST ACHIEVEMENT INCREMENTS

Source: TREIBER (1979)

L 79

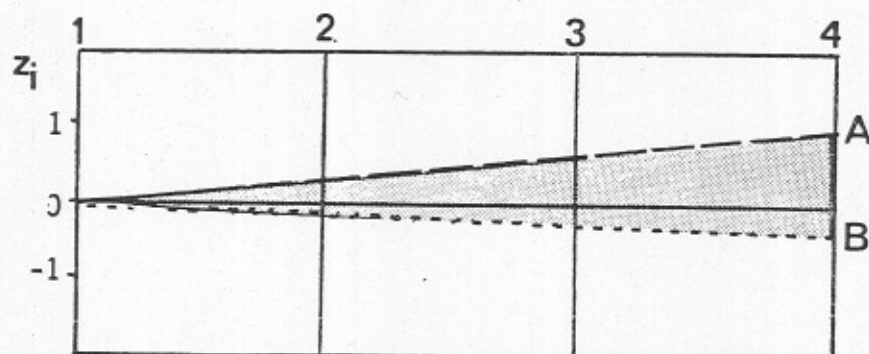


FIGURE 1b.

ESTIMATES OF MEAN REGRESSION SLOPES (z_i)
FOR INTRINDIVIDUAL CHANGES IN STANDARDIZED ACHIEVEMENT
OVER FOUR MEASUREMENT POINTS FOR STUDENTS WITH MEDIUM
ENTRANCE PERFORMANCE (Group 3) IN CLASSES WITH EITHER
HIGH (A) OR LOW (B) PRETEST-POSTTEST-ACHIEVEMENT INCREMENTS

SOURCE: TREIBER (1979)

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cumulative performance differences by means of sequences of different instruction episodes can lay claim to a certain plausibility although the theoretical relationships have not yet been sufficiently clarified.

Performance differences among various student cohorts as a consequence of historical changes in the environment, school and instruction. Performance differences among successive student cohorts have been repeatedly confirmed (Ingenkamp 1967; Flanagan 1976; Harnischfeger and Wiley 1976). For a long time a rise in the average age-typical scholastic performance value was noted. It has been only in recent years, primarily in the United States, that a decline in performance has been observed and has been a focus of strong public interest. But here too, there is a lack of a theoretically-founded and empirically verified explanation of cohort-specific performance differences as a consequence of changing features of school and instruction.

In cognitive theories of instruction and development (Piaget 1966; Ausubel 1968), knowledge (on the part of the student) is regarded not as the sum of realized scholastic learning objectives, but as a system of information-contents which are stored in long-term memory. Dörner (1976) speaks of an epistemic structure, by which he means the knowledge of the world which a man has at his disposal. He distinguishes this from the heuristic structure, which he understands as the individual system of searching-, planning- and construction-programs for the identification and solution of problem situations. "The distinction between epistemic structure and heuristic structure corresponds to Piaget's distinction between assimilation processes and accommodation processes in the

accomplishment of tasks. The epistemic structure for a certain domain of reality contains the individual's assimilation tools, whereas the heuristic structure contains his accommodation tools." (1976, p. 27).

In the past ten years a series of interesting models for the description and analysis of the knowledge structure have been developed (Kintsch 1974; Norman and Rumelhart 1975; Dörner 1976; Klahr and Siegler 1976; Klix 1977). Their usefulness for the organization and development of scholastic teaching and learning is obvious (Greeno 1976; Anderson 1977; Norman 1978; Aebli 1979; Kluwe 1979). Although up to now there have been only a few somewhat experimental instructional psychological studies based on these theoretical approaches and works are lacking in which the effects of school on students' knowledge structure are analyzed, we can nonetheless presume that models on the psychology of knowledge will achieve great pedagogical significance in the future. This is connected with the fact that the acquisition and the individual availability of domain-specific knowledge facilitates the future transmission, storage and application of knowledge (Ausubel 1968), improves memory performance in this area (Chi 1978), raises the probability and the quality of successful solutions of problems (Billings 1934) and improves metacognition (Chi 1978).

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the possibility that, despite parallel intelligence at the beginning of the experiment, factors which are unaccounted for may influence the decision about the duration of school attendance as well as the extent of changes in intelligence. Some studies clearly show uncontrolled statistical regression effects which are added to these factors. In his investigation, Husén (1951) provides an indication of the function of schools in the development of students' intelligence. He compared the test performance of (military) draftees to test scores which they had achieved 10 years earlier in the third grade. Based on the entire random sample, the IQs of those students who had finished secondary school increased by 11 points, as opposed to those who ended their school education at junior secondary school with 2.1 points. A correlation of .61 resulted between the test scores of the third grade class and the duration of school attendance. The correlation with the IQ scores of the second test was .80. Husén thus concludes, "that schooling incomparably has the greatest significance for the systematic change in IQ between ten and twenty years of age" (1951, p. 628). Hårnquist (1968) was able to support this interpretation because the standard deviations in IQs between 13 and 18 years of age increased in the random sample with the best final examination scores of around .41. The group with the poorest education sank by .91 standard deviations. An investigation conducted by Frey (1977) shows a correspondence between the type of education and the development of intelligence. He took students from the 1st, 2nd, 5th, 6th, and 7th grades who had either been taught new math (along with mathematical logic and above all set theory) or conventional mathematics (more strongly oriented towards arithmetic) and compared them with regard to their intelligence achievements. He found a significantly higher increase in intelligence among the first and second graders who had been taught according to the new conception of mathematics instruction. In addition, the intelligence profiles of the two groups

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demonstrated clear differences. Depending on the type of teaching program (language as opposed to natural science emphasis), differences in the development of abilities are also found in the study conducted by von Mueris (1970). Comparable results were finally obtained in experimentally controlled studies on the influences of intelligence training on the achievements in intelligence tests. Through a training program developed on the basis of T. G. Thurstone's materials (1950) involving 746 slow-learners taken from a special school for the educationally subnormal, Klauer (1969) ascertained demonstrable effects on niveau, profile, and the structure of intelligence achievements in this random sample. The influences were modified by the features of the children (age, for example) and by the type of learning material used. The recognizable influence of educational or related training programs on the intelligence achievements of students in European and American studies is not surprising. A comparison between the items used in the intelligence tests (mainly Primary Mental Ability Tests) and the contents of the educational or training programs usually produces an identifiable area of overlap and transference so that it is difficult to decide whether the individual studies are a result of trivial or non-trivial coaching effects; i.e., training effects which can be generalized to other sets of problems. This seems to be the case in the study conducted by Franzen and Merz (1976) on the influence of verbalizing on intelligence achievements.

2. Influence on the Development of Thought Operations

As early as 1935, in a publication on "Experiments on the Raising of Intelligence Levels," Otto Selz demonstrated how one can organize the school advancement of intelligence achievement in terms of a planned support of the development of thinking processes⁶⁵ using a method which is theoretically founded. In accordance with his own theory of ordered thought processes,

he attempted, step by step, to construct a system of specific and differentiable behavior patterns in order to gain insight, to establish applicable methods for solving problems, and to provide a set of ordering rules by means of which the students would be able to decide what strategies and operations are to be used for specific problems. Selz' methodical procedure included process analysis of necessary abilities, the planning of learning sequences, the formulation of a system of didactic principles (directed exploration learning, the explanation of thought operations and of progress in achievement), the actualization of the program in a framework of regular teaching and empirical checks of learning and transfer effects of training on precisely defined sets of problems. The establishment and application of rules for the completion of numerical sequences constructed according to some principle and the operations for the completion of sentences were also practiced. The results of the study not only indicate significant learning progress within a specific class of problems, they also show transfer effects to other classes of problem situations.

Among the German speaking countries, Lompscher et al was the first person after Selz to conduct an experiment on thought training which was equally thorough and realistic (cf. Lompscher 1975, 1976). Influenced by the theories on thought, development, and assimilation, put forth by the Russian psychologists, Rubenstein, Leontjev, and Galperin, Lompscher defines mental operations as "the (more or less) most fixed and generalized of mental acts" (1975, p.34). He characterizes ability as "the subjective degree of imprinting of mental operations or their specific concatenation." (op. cit., p. 35). Without laying claims to completeness, Lompscher distinguishes the following mental operations:

(1) Comprehension of the relationship between the part and the whole; (2) comprehension of the relationships between things and their properties; (3) differentiating, generalizing, and comparing; (4) ordering; (5) extrapolating; (6) generalizing; (7) classifying; (8) combining. Lompscher assumes that these operations are part of all thought processes and that there exist multiple and, in part, hierarchical relationships and ordered systems among these operations (on the classification of elementary mental operations cf. Newell and Simon 1972; Dörner, 1974). In addition, Lompscher takes account of a series of procedural qualities of mental activities which include mobility, methodicalness, exactness, self-sufficiency, activity, and anticipation. The objectives of the teaching experiments extended over a period of years that were conducted by Lompscher and colleagues has been the cultivation of mental operations and the improvement of procedural qualities in thought processes. The bracketing of operation and content is the theoretical basis on which these experiments are based. "If the development of mental abilities is to be influenced, then the essential condition for us to consider is the unity of the development of abilities and the content of instruction (unity of content and the development of mental activity). The development of ability cannot be induced or advanced through pedagogical measures which are lacking or indifferent in their content in terms of the conception of formal education. The assimilation of knowledge and methods systems fixed by the curriculum and ordered according to certain aspects is thus an indispensable condition for the development of students' mental abilities. At the same time, we still do not consider the development of ability as an automatically necessary result of the assimilation of knowledge. To develop abilities in an optimal manner requires that measures be carried out which

are especially geared to this objective. The point of departure for all considerations here is the guarantee that there is an active and intensive intellectual confrontation with the respective object of knowledge (1975, p. 114).

The development of mental operations, the transmission of procedural knowledge and directions for action, the organization of object-related actions, the systematic increase of the demands and the influence of individual procedural qualities of the mental activity are achieved as a result of careful planning and the realization of curriculum related instruction - especially in mathematics, grammar, and geography. Here the following principles are taken into account:

- "-- The instruction is to be designed such that certain mental operations are introduced sequentially and sometimes simultaneously, then practiced over a long period of time in different contexts. These operations are to be generalized on the basis of this foundation; the subject must be made aware of these so that they can be applied to specific related areas;
- the learning tasks must allow for the repeated triggering of specific mental operations and their repeated application to problems both of a similar and a different nature;
- the student is to gain procedural knowledge and directives for the solution of certain specific classes of tasks. Through the continuous application of this knowledge in the solution of problems, in proving, checking, and commenting on solution methods as well as modes of thinking, corresponding complex actions (operational sequences) are to be built up.

-- new mental demands are initially made on the level of practical, object-oriented action and then gradually shifted to higher levels of mental activities" (Lompscher 1975, p. 105).

The results of the three-year instructional experiment in primary schools are very encouraging. They not only show that it is possible - through the practice of mental operations for a specific area - to induce students to improve their thinking with the aid of learned operations in the same area using different tasks, but that it is also possible to bring about a general rise in mental achievement ability. The students in the experimental classes were superior to those from the control classes in the exact analysis of objects and situations, in methodical procedures, in achievements, in abstraction and generalization, in deductive reasoning, and in mental agility. Lompscher attributes the differences between the experimental groups to teaching behavior. In general, the investigations offer a fairly convincing proof for the possibility of facilitating thinking processes through instruction.

The procedural methods that evolved here are referred by von Dörner (1967) as elements of a comprehensive program for the improvement of problem solving abilities. The objective here is both the further development of the knowledge structure as well as the improvement of the heuristic structure. The modification of thinking performance by improving the knowledge structure includes exercises in the formation of complex structures (elements can be condensed into a new complex); and in the reduction of complex structures as well as exercises in the formation and analysis of abstractions.

In the development of the heuristic structure various types of training are differentiated: practice training (pure practice in the solution of individual problems), tactical training (here partial processes of

a complex thought procedure are learned and practiced), strategic training (general strategies in problem-solving are pointed out and practiced). Von Dörner views the combination of these types of training as particularly effective (super training). Putz-Osterloh (1974) tried to improve the achievements of students with logical problems through the application of various forms of training in the comparison of post-test achievements among three experimental groups - tactical, strategic, and super training as well as an untrained control group yielded a series of significant results. Strategic training and super training proved to be superior to tactical training or a lack of training in a number of features: people trained in this manner required less solving time, did not need to take as many steps in finding a solution, and used fewer illegal solutions to problems; they also planned specific steps of the solution with more thought. The fact that such combined measures for the advancement of thinking processes can also be successfully applied in schools is illustrated by the classic studies conducted by Wertheimer (1945) and Polya (1945) as well as the concept recently put forth by Parreren (1977) which systematically links algorithmic and heuristic methods. The theoretical and empirical approaches of Lompscher, von Dörner, Putz-Osterloh and others, are still lacking the following elements which are necessary for a broad pedagogical application: the consideration of the development process in the formation of concepts and for operative thinking processes (Rauh 1975; Suarez 1977), the adaptation of the training programs to individual student features (cf. Dunham and Bunderson 1969; Egan and Greeno 1973; Snow 1976), the diagnostic analysis of problem-specific thought and knowledge structures (Siegler 1976), and the transmission of remedial strategies for the stimulation of thought (Case 1975, 1978).

C. The Influence of Evaluation Systems

In his essay, "Cognitive Foundations in the Development of Achievement Motivation", Heckhausen comes to the conclusion that "generally after the age of nine, individual differences in attribution patterns for success or failure can be observed. Apparently, three conditions for cognitive development must be present: (a) the differentiation of the ability concept from the global concept of competence; (b) the causal schemata of compensation; and (c) the realistic processing of social comparison information for the estimation of one's own achievement ability." (1979; cf. p. in this vol.)

If one asks about the social effectiveness of schools on the development of such cognitive motivation characteristics, then one must distinguish between two aspects: the fundamental availability of the concepts, the standards and evaluation processes as well as the imprinting and application of these features by the individual student.

It is an uncontested fact that school plays an important role in the development of general and individual evaluation systems; it transmits a variety of experiences through diverse contacts with the environment and other people. It also offers a broad range of intra- and inter-individual opportunities for comparison and it provides various forms of feedback through the consequences of actions, i.e., through the reactions of various people and reference groups. Thus, school encourages conscious confrontation with demands, levels of aspiration, value standards, competencies, alternative actions and their consequences. Hence, it is not surprising that motivation indicators during the period of education only show moderate stability (Magan 1962) as opposed to McClelland's initial expectations (1958).

If one transfers the dimensions of environmental influences (which are identified by Trudewind (1975) as being responsible for the formation of achievement motivation) from the home to the school, then one can expect to find significant correspondencies among different schools and grades. On the other hand, one will also find considerable differences (1) in intellectual and achievement stimulus content, (2) achievement pressure, (3) and in the degree of cumulative experiences both successful and unsuccessful.

In a section study to be conducted over a period of years, Trudewind is presently investigating which environmental and social conditions in the home and at school co-vary in childhood motivation imprinting (Martin-Pellegrino and Trudewind 1977). The first results of this study show statistically significant correlations between children who attended kindergarten and characteristic values for achievement motivation at the beginning of school. Thus, children, who, for example, have not attended kindergarten, are more oriented to failure than children who did. The length of attendance only has a significant effect when attendance spans more than 50 months. These children indicated higher mean values in their anticipation of success and lower mean values for fear of failure than the rest of the children attending kindergarten.

A further single study from the research project already mentioned deals with the correlation between the demand for self-sufficiency exerted by the teachers and the achievement motivation as well as the anxiety of the children. It was demonstrated that the prematureness and the extent of the demands for the self regulation of learning performance on the part of the student stands in direct relationship to the degree of achievement motivation. This correlation is independent of the excellence of scholastic achievements. In contrast, the anticipation of success and a student's

own conception of his or her ability shows much stronger correlation with the level of scholastic achievements than with the extent of self-sufficiency training. The degree of anxiety towards tests, the tendency to avoid exertion, and the extent of disinterest in school, stand in a reciprocal relationship to the demand for self-sufficiency from the teacher and the level of scholastic achievements (Trudewind, Geppert and Börner 1978). The outcome of these results are in accordance with part of the results of an investigation conducted by Kifer (1975). In his study he compared children from the second, fourth, fifth, and eighth grades who, in all the previous years, had belonged either to the top or to the lowest 20 percent of their grade, so that the effects of success or failure over a period of years could be estimated. Dramatic differences were demonstrated in their conception of their own ability. While the scores of the successful students remained consistently higher throughout all grades, the students with achievement difficulties in the second grade indicated a relatively positive self-estimation; in higher grades the value sank monotonically and reached a very low level with the eighth grade. The studies conducted by Rheinberg and Enstrup (1977) as well as Krug and Peters (1977) provide a supplement to these findings. Their findings were in agreement that students who had attended a special school for slow learners were less anxious about tests and displayed a better conception of their own ability as compared to students with comparable intelligence who attended normal schools. They explain the difference as a reference group effect: an increase in experiences of failure and the constant perception of a low status within their social group leads to forms of reaction which one can describe as educated helplessness (Dweck and Reiser 1973), the tendency to avoid exertion (Jopt 1978), and a lack of personal responsibility for success and failure. The probability of such a

course of development increases if the demands of school are too high for many students - despite their efforts. If one views marks in school to be indicative of developmental norms, then it appears that the divergence between the average student achievement ability and the demands of instruction actually becomes greater in the course of education (Oerter and Mandl 1977).

Data from motivation modification programs also provide some conclusions as to the possibility of socialization through schools or ⁱⁿ school-like conditions. In contrast to the Harvard Training Program for students (Alschuler, Tabor and Mc Intyre 1974), Krug and Hanel (1976) proceeded in their programs from a conception of achievement motivation as a system for self-reinforcement. In a selected group of failure-oriented students taken from the 'Volksschule' with average intelligence and low achievement, they attempted in sixteen meetings (a more realistic level of challenge in comparison to the control group which wasn't handled) [to increase] the anticipation of success in achievement situations, to improve positive self-evaluation after successes, and to achieve desired changes in patterns of attribution after failures. The training program developed for this purpose included exercises in effective modes of behavior in the solving of problems, the introduction of techniques for self- observation and an introduction to techniques for ^{the} recounting and verbalizing of motivational cognitions and modes of behavior. The program also included learning through the use of the teacher as a model who demonstrated the activities in an exemplary fashion and who provided concrete elaborations for the relationships between level of challenge, attributing and self-reinforcement through the use of playful and educational tasks. Similar effects were achieved by King, Peters and Quinkert (1977) with the same motivational modification program for slow learners taken from the fifth and sixth grades. The stability of the effects were demonstrated six months

The study conducted by Fend, Knoerzer, Nagl, Specht and Văth-Szusdiara (1976^b) is more broadly based and also more difficult to interpret because of the exclusive use of questionnaires. In this study 3,750 ninth and tenth grade students from 'Gymnasien' (secondary schools), 'Realschulen' (junior high schools), 'Hauptschulen' (upper division of elementary schools), and 'Gesamtschulen' (comprehensive schools), as well as 404 teachers and 548 parents were asked, among other things, about: their orientation towards learning and achievement demands; their own concept of ability; their self-confidence and active interest in school as opposed to lack of enthusiasm. The results have lead us to conjecture that different types of shools strive for different socialization effects. The problems with a theoretical interpretation of such findings emphasize the necessity for future research studies to differentiate more strongly between the course of development of cognitive motivation variables which are universal, cohort specific, or characteristic of specific institutions. Such studies should also try to systematically relate (reconstructive) studies on the effects of school development to (constructive) training investigations on influence and opportunities for advancement. Until now we have had almost no studies of this type. In the following section we will therefore report on a large number of studies in educational psychology, whose contribution to the analysis of scholastic influences on cognitive development can only be indirectly deduced, as this was not the object of these investigations.

III. FIRST ATTEMPTS AT AN EXPLANATION OF COGNITIVE SOCIALIZATION THROUGH SCHOOL EDUCATION

A. Institution-related Theories Explaining Educational Socialization

1. Inter-system Comparisons of the Effects of Scholastic Qualification

Education Research ^{into} of school socialization has previously been centered around the attempt to describe and explain cognitive qualification and selection achievements among national education systems as well as within the bounds of individual systems on the level of school type, school district, and on the level of individual schools.

The most important theoretical developments and empirical results on this are presented below. An example which is most important for this primarily descriptive observation of educational systems is provided by the studies of the International Association for the Evaluation of Educational Achievement (IEA). These facilitate the analysis of distribution and differences in achievements among students, schools and school systems from twenty-two participating countries. The studies test achievement in six school subjects (math, reading comprehension, English, French, natural sciences, social studies, and knowledge of literature) by students at the ages of 10 and 14 and by students engaged in pre-university and post-secondary education. (cf. Husén 1967; Comber and Keeves 1973; Purves 1973; Thorndike 1973; Carroll 1975; Lewis and Massad 1975; Peaker 1975; Torney et al. 1975; Passow et al. 1976; Walker 1976). This analysis answers fundamental questions about cognitive influences related to the attendance of a specific school in a specific educational system.

TABLE 1.

SELECTED STRUCTURAL FEATURES IN NATIONAL SYSTEMS OF EDUCATION

Source: Comber & Keeves 1973: 57)

Data given in this table are for year 1969

	Australia	Belgium (Fl and Fr)	Chile	England	FRG	Finland	France	Hungary	India	Iran	Italy	Japan	Netherlands	New Zealand	Scotland	Sweden	Thailand	United States
Age of entry to compulsory education	6 ^d	6	7	5	6	7	6	6	6	6	6	6	7	6 ^d	5	7	8	6
Age at which compulsory education ends	15	14	14	15	15	16	16	14	11	11	14	15	15	15	15	16	12	16
Duration of compulsory education in years	9	8	7	10	9	9	10	8	5	5	8	9	8	9	10	9	7	10
Modal age of transfer from primary to secondary education	12	12	14	11	10-12 ^a	11	11-12	14	10-12	13-14	10-11	12	11	12-13	12	— ^b	14	12
Age of terminal secondary school group	17	18	20	19	18	18	18-19	17	17	17	18	17	20	17	17	19	19	18
Percentage of age group in school:																		
Population I	99	99	94	99	99	99	99	99	50	75	99	99	99	99	99	99	90	99
Population II	99	90	71	99	94	99	99	83	25	25	55	99	98	99	99	99	<80	99
Population IV	29	47	16	20	9 ^c	21	29	28	14	9	16	70	13	13 ^e	17 ^e	45	10	75

^a Some schools have an observation or guidance period associated with transfer from primary to secondary education.^b The distinction between primary and secondary education does not apply.^c This figure is for the *Gymnasia* only; there are many students of Population IV age in other schools such as higher technical schools.^d Six is legal age of entry but most children start school at five.^e This figure is for the terminal grade of the secondary school system, i.e. the grade which was sampled.

In both countries it is also possible to proceed to university from the previous grade.

In comparing the educational systems it was first determined which average ability levels are achieved at various ages and by which student quotas. In connection with the qualification aspect, which was established through the mean school achievement of a participating country, the following results were shown on the level of school system:

(1) In a comparison of the years 1950, 1960, and 1969, the relative number of children and young people being educated increased ^{both} relatively and absolutely. In the developing countries this was caused above all by the extension of mandatory school attendance in the primary and early secondary level grades. The rise in the industrial countries was due to a rise in non-mandatory attendance of students at secondary and post-secondary levels of education. Changes in the educational system here thus correlated with the quantitative and qualitative rise in the demand for qualification in the employment system. The following data was reported in the Science Study for 1969 (Comber and Keeves 1973, p. 57):

(Insert Table 4)

(2) With regard to the level of qualification achieved, the four developing countries (Chile, India, Iran, and Thailand) remained generally behind the industrial countries by around one standard deviation; whereby the difference between the highest mean value among the industrial nations and the mean scholastic achievement in the developing countries amounted to about two standard deviations.

(3) The highest and lowest mean achievement value differed by around one standard deviation in the group of industrial nations.

(4) Only the mean scholastic achievements from New Zealand and Japan ranged consistently in the upper half in all comparisons.

(5) It was not possible to ascertain more consistent differences in the inter-subject achievement profile for the group of industrial countries.

The selectivity of the educational systems was established in the IEA studies by the relative portion of secondary school students in the entire age group whose attendance was no longer mandatory. The results indicate that the scholastic selectivity in all industrialized IEA countries decreased when comparing the years 1950, 1960, and 1969. However, there were still significant international differences to be reported - a maximal difference on the pre-university level between the FRG (9 percent) and the USA (75 percent). It was shown that a more strict scholastic selection correlates with a higher achievement average for the educational system (science: -51, n=2; reading comprehension: -45, n=9) (VII, p. 207).

This does not mean however that a higher achievement average in an international comparison can only be achieved through higher educational selectivity. What is more, the Science Study indicates that:

- Even in countries where less than 25 percent of the 15-18 year-olds obtain a post-secondary or pre-university education, the mean achievement values vary significantly between 16.5 and 30.8 at a mean value of $\bar{x} = 22.0$ and a range of 16.6.
- There is only a small ^{correlation} ~~relationship~~ between the mean achievement of the best 1, 5, and 9 percent of a given year ^{for} this age group and the selectivity of the national education system (-.28, -.13, and -.12; Comber and Keeves 1973, p. 174).

Important features of the education and employment systems from the twenty-two participating countries as well as a large number of variables concerning students, home, school, and instruction, were collected in order to explain these differing qualification and selection achievements. This was done by questioning teachers, students, and school administrators. The most significant result was confirmed on the system level:

(1) In view of the small size of the random sample ($n_{\max} = 19$) and the difficult conditions for the analysis of international comparative studies, we must deny *any* direct relevancy in terms of explanation or action which might be offered by the IEA studies for educational research, planning, and policies.

(2) On the organization level, system differences in their social selectivity (retentivity, holding power) are instruments in attaining a concentration of higher cognitive abilities in a small group of educated elite. This occurs through the simultaneous neglect of available talent reserves and *through* premature ^{student} selection and the unequal allocation of instruction reserves.

(3) Some of the few instruction variables which stand in notable relation to out-put criteria of school systems result from the number of hours of instruction for a specific school subject (time to learn) and from the sum of the opportunities offered during instruction. This allows for the assimilation (opportunitiy to learn) of information, skills, and knowledge contents, which are included in the test requirements.

(4) Otherwise, the results point to the insignificance of quantitative in-put variables (at least on the system level) in industrial nations,

which, on an average level, do not differ very much with regard to these dimensions. Only in comparing industrial and developing countries with significant international disparities- even on elementary dimensions - (eg. length of mandatory school attendance, teacher-student ratio, teacher training and income) do the parameters of the educational system gain in significance. For the rest, the economic, social, and political conditions of the industrial countries have apparently become similar to extent that they can no longer consistently predict the specific qualification or selection achievements of their educational systems (Walker 1976, p. 280). These achievements probably result from the organization of educational teaching and learning processes on school and class level.

2. Intra-system Comparisons of Educational Qualification Aspects

Several IEA studies further include a series of intra-system comparisons of school achievement differences on the school level. These are worthy of note because they indicate the system specificity of type and the extent of educational influences on cognitive socialization processes and socialization effects. They show that:

(1) Schools differ considerably with respect to the cognitive achievement average achieved by their students for particular subjects. The degree of these differences is determined in part by the heterogeneous make-up of the national education systems. Sweden, for example, only allows minimal differences among its schools, whereas the FRG and Italy allow considerable disparity in types of schools. Another source of variance results from the disparities in social structures within the individual countries.

(2) The school which a student attends explains only a small portion of the differences in cognitive ability and knowledge among students in all of the IEA countries. Its significance only arises from the make-up of an educational system where the following two features stand in the foreground:

(Insert Table 2)

--- A uniformity achieved through central school organization limits the breadth of variation of possible school differences, thereby limiting the degree of variation in cognitive differences among students which can be explained by the attendance of a particular school. This is demonstrated in the example of Sweden: In the case of the fourteen year-olds from the Science Study (the only inter-school study comparison broken down according to IEA countries), this variance only amounts to around 4.5 percent with a mean value of 18.3 percent. In contrast, maximal importance is obtained by the educational differences in developing countries like India (cf. Thorndike 1973, p. 142), where they explain about 82 percent of the differences in student achievement.

--- The selectivity of an educational system raises the importance of family background as well as student abilities for age levels where school attendance is still mandatory. It reduces ~~that~~ influence on classes where attendance is no longer mandatory the more homogeneous composition of a small educational elite. On the other hand, the significance of school differences in selective education systems for age groups where school attendance is still mandatory is lower than in

TABLE 2

PERCENTAGE RATIOS OF THE VARIANCE BETWEEN-SCHOOLS
TO THE VARIANCE BETWEEN STUDENTS BY POPULATION AND SUBJECT

	10-year-olds		14-year-olds		Final year	
	All	Sweden	All	Sweden	All	Sweden
Science	26	13	26	08	25	50
Reading	24	13	31	09	25	35
Literature ^a			26	15	19	24
Mean	<u>25</u>	<u>13</u>	<u>28</u>	<u>11</u>	<u>23</u>	<u>36</u>

^a No ten-year olds

Source: Peaker 1975:120

TABLE 3a.

PERCENTAGE OF VARIANCE BETWEEN SCHOOLS ACCOUNTED FOR
BY BLOCKS OF VARIABLES IN THREE SUBJECTS

	Science	Reading	Literature
Block 1: Background	461	452	408
Block 2: School and program	049	067	048
Block 3: Instruction	139	075	133
Totals	649	594	588

Source: Compiled from Purves 1973:133,144; Walker 1976:130,132, 96,112;
Peaker 1976:124,126,122,123,125; Thorndike 1973:111,112;
Comber & Keeves 1973:208,217,229

TABLE 3b.

PERCENTAGE OF VARIANCE BETWEEN SCHOOLS ACCOUNTED FOR
BY BLOCKS OF VARIABLES AT THREE AGE LEVELS

	10-year-olds ^a	14-year-olds	Final year
Block 1: Background	423	541	362
Block 2: School and program	008	070	073
Block 3: Instruction	095	096	144
Totals	526	707	574

^a Science and Reading only

Source: Compiled from Purves 1973: 133, 144; Walker 1976: 130,132,96, 112;
Peaker 1976: 124, 122,123,125,126; Thorndike 1973: 111,112;
Comber & Keeves 1973: 208,217,229.

post-secondary courses of education.

(3) The reported inter-school differences within the national education systems of the individual IEA countries (which only explain up to about 15 percent of the individual student differences) can, on the average of ca. 60 percent, be traced back to feature differences in the social composition of the student body as well as to school and instruction variables.

(Insert Table 3 *ab*)

The social background features for the students of a school play an over-estimated role here due to analysis (although it is still a dominant one), while differences in school type and instruction are of marginal to moderate significance for the mean cognitive ability of its students. Differences specific to age and subject matter barely modify this result.

(4) However, even here the above-mentioned influence of system differences among the IEA countries as regards their selectivity and diversity can be demonstrated for the example of Sweden. The influence of the social composition of the students in a school is clearly less here in comparison to the entire group; this can be attributed to a welfarist educational organization and to educational policies of equal opportunity. In contrast, the significance of instructional differences is all the greater; the scope of their variation is apparently no longer *comprised* by system restrictions.

(Insert Table 4)

TABLE 4

PERCENTAGE OF VARIANCE BETWEEN SCHOOLS
ACCOUNTED FOR BY BLOCKS OF VARIABLES AT SCHOOL LEVEL
FOR SCIENCE, ;4-Year- Olds

SOURCE: Peaker 1975: 130

	All	Sweden only
Home	702	230
School	145	260
Instruction	153	509

TABLE 5

PERCENTAGE OF TOTAL VARIANCE BETWEEN STUDENTS
ACCOUNTED FOR BY BLOCKS OF VARIABLES AT SCHOOL-LEVEL (Science, 14-year-olds)

Source: Peaker 1975: 130

	All	Sweden only
Home	142	010
School	029	012
Instruction	023	023
T o t a l s	194	045

ables within the group of industrial countries only becomes evident through information about the respective educational and societal system. It cannot be generalized beyond this. This is equally true for the influence of family background, which of course has substantial bearing on the scholastic achievement process, but which is reciprocally connected to the diversity and selectivity of the national education system.

Diversity and selectivity are the two features of educational systems, whose significance is repeatedly stressed by the IEA studies. They refer to strategic points such as socio-structural mobility in the national steering of individual achievement accomplishments (Coombs and Lütschen 1976). Consequently, a number of research programs have tried to break down the frame conditions for these processes more precisely in terms of their allocative and qualificative aspects. The variable selectivity of educational systems is a particularly prominent focus of research for both aspects of analysis. Selective intensive educational systems apparently waste talent reserves which could be made accessible to the qualificatory needs of the employment system. Such systems are also unjust in their regulation of the distribution of education and job opportunities because of factors outside of school which massively favor socially privileged students beginning with their entrance into school.

A number of work groups have tried to identify the school frame conditions for the F.R.G. which could explain the unusually high social selectivity of their educational system (cf. Wendeler 1974; Fend et al. 1976a,b, 1977; Royl et al. 1977; Schorb 1977; Jüngst and Schauder 1978). This was made possible by the introduction of numerous model comprehensive schools and their comparison with traditional types of school systems. The following points

of intervention have proven critical in these investigations: (1) social organization (segregated in vertically ordered school types vs. integrated in comprehensive schools); (2) the point when the first decision about the path of further education is made (relatively early - 10 years old vs. later at 12-14 years of age); (3) the decision-making process as to the course of schooling (discontinuous vs. continuous); (4) the chance for review of decisions on education (high vs. low); (5) the differentiation of learning groups (groups which remain together as a class unit vs. groups which only meet for instruction in a particular subject vs. groups of students which are together for several classes); (6) learning controls (socially comparative vs. intra-individual).

The mean effectivity of schools and school districts were investigated in a number of studies in
 (cf. Burkhead et al. 1967; Plowden 1967; Kiesling 1969; Averch et al. 1971; Guthrie et al. 1971). In their results these studies agree for the most part that the above exogeneous in-put variables of social background of students had the greatest influence on their achievement and that educational in-put variables only have a small significance (cf. Tintin 1978).

3. Expanding Institutional Explanations for School Socialization

More important for the analysis of socialization processes are however those studies in which the educational regulation of teaching-learning processes and courses of cognitive learning development are placed in a theoretical context (eg. role-playing; or conflict models) which contains the structural interaction components of the institu-

tion and the individuals. This is significant for the analysis of educational socialization (Bidwell 1965; Brown and House 1967; Lortie 1969; Meyer 1970; Owens 1970; Cohen 1972; Wellendorf 1974; _____; Corwin 1975; Fend 1974; Schlechty 1976; Ulich 1976; Mitchell and Spady 1977; *Feeder et al.* 1977; Spady and Mitchell 1977a, b):

(1) Position specific behavioral norms and expectations placed by the school system on students (student role) are too unspecifically circumscribed (as these derived from a multidimensional and diffuse function structure) to be able to normatively structure every-day school situations in a way that is clear.

(2) Thus, these are not sufficient for a regulation of individual student behavior which is invariant with respect to reaction, situation, context, and time. This necessitates individual achievements which are much more constructive on the part of the participating actors in order to subjectively code the role structure in educational interaction situations, and to plan and actively enact role behaviour appropriate to the situation.

(3) Thus, the recognition and enforcement of system requirements which are preformed by society succeeds in schools only if there is sufficient consideration of individual student motivation, needs, and ability. Various modes of recognizing authority and applying social pressure are more or less suited in achieving this end. A matrix can be constructed in which educational transmission forms for constructing personal and social identities can be more precisely described from standardization in and outside of school and on the basis of the horizons of understanding and needs systems which vary from student to student.

(4) The fitting of structurally defined segments of the 'student role' with affective and cognitive student features into suitable task configurations is of utmost importance here. The components of instruction, control, preservation, and relationship in these tasks must guarantee that there is cognitive stimulation and that students will be aided in the finding of individual identity, in achieving status recognition, and in gaining confidence in success.

The current research situation is clearly inadequate in light of these considerations. The few empirical studies are grouped around single objective construct features of school organization (openness of environment, autonomy, decision-making structures, consensus as to educational objectives; cf. Goodlad 1960; Moeller and Charters 1966; Brennan 1967; Miklos & Breitwenz 1968; Owens 1970; Sörenson 1970; Zeigler and Peak 1970; Carpenter 1971; Williams 1971; Corwin 1972; Elboim-Dror 1972; Finlayson 1973; Isherwood and Hoy 1973; Taylor 1973; Thomas 1973; Peterson 1974; Peshkin 1977). These studies are noticeably oriented towards types of organizations which have been more intensively investigated: corporations, military, police, unions, churches, hospitals. By extending the scope of the validity for these model-concepts to institutionalized educational processes, the contents of educational tasks, organizational contexts and structures are inappropriately characterized or unrealistically distorted. This was shown in the prototypical application of economic models. The lack of success and the degree of value demonstrated by the economic in-put/out-put models can essentially be traced back to this fact. Future research studies must therefore be directed towards the development of contingency models of institutional effects in which the type and measure of educational accomplishments (which vary with different schools) result from the interactions

of organizational behavior under variable conditions in school environment, such as individual resource supply and the standardization of the interaction within schools.

The gap in explanation between the features of school organization behavior and its effects on the part of the student has made it difficult to develop theories and to do empirical research. Such assumptions about processes and transmission are presently of great interest. The perception of school organization behavior and its translation into learning and assimilating activities stand in the foreground. Here, the social ecology of students can be deduced from the grouping of the individual student and teacher estimations on school or grade level. These are usually typified as a structure created by objective feature structures of school organization and consisting of attractions and restrictions enabling the realization of individual learning desires and determining the acceptance of learning contents, forms and contexts which are dictated by society. Murray's Need-Press-Model (Stern 1970) and the Social System Model from Getzels and Thelen (1960) provide important theoretical elements in the comprehension of institutional systems of rules as an organization climate. Social co-existence in schools can thus be typified with respect to different aspects such as interaction or relationship as well as with regard to different subsystems i.e., teacher - student; teacher - teacher; student - student (Mitchell 1968). Investigations on school climate are made possible by various instruments (cf. summarily Halpin and Croft 1963; Schreiner 1973; Anderson and Walberg 1974; Nielsen and Kirk; 1974; Müller-Wolf 1975; Fend et al. 1976a, b; Geppert et al. 1976; Kahl 1977; Dreesmann 1978).

Until now, few comparisons and validation studies on these instruments have been made. The predominant type of investigation at present tests the use of individual instruments on different populations, school subjects, and school settings (cf. Anderson et al. 1969; Randhawa et al. 1969; Steele et al. 1971, 1974; Trickett and Moos 1973, 1974; Walberg et al. 1973; Epstein and Mc Portland 1976; Walberg 1976; Brookover et al 1978; Hearn and Moos 1978). Insel and Moos (1974) also contend that they have traced the majority of school climate dimensions (which have previously been introduced in various instruments) back to an invariant factor structure consisting essentially of three dimensions: interpersonal relationships, personal development, and systems of supply. This also confirms a feature structure of the organizational conditions of effective system behavior also known from other organization contexts. In so doing, it considers and balances out individual interactive and system-related requirements.

The central problem of these investigations lies in connecting the differences in school climate on these scales with the effects of socialization which are not confounded with general student features such as ability or motivation imprinting or differences specific to learning content, school class, or teacher. In order to bridge the gap in explanation between school climate variables and effect variables, it is necessary to make assumptions (at the expense of theories) about rules of process, transformation, and perception, in order to be able to explain the structure of transmission, e.g., the structures of features of teacher-student interaction. This can be elucidated by the comprehensive school investigation conducted by Fend et al. (1976).

Fend relates one of the most essential climate variables, i.e., the degree and quality of expectations on scholastic achievement ('achievement pressure'), to the imprinting of positive work attitudes ('learning and achievement ethic'). The development of instruments for the understanding of these criteria variables resulted in view of the following theoretical assumptions about: deferment of reward; level of challenge; patterns of attribution; active use of learning time both in and outside of school; social comparison processes. Marginal conditions such as school form, student age and sex as well as value contexts for a particular age group are also more clearly defined in the process of formulating hypotheses. The results show that a high degree of willingness to learn and achieve among students arises only in the situational constellation of high achievement expectations on the part of the teacher, in situations where there are affective and warm ^{social} relationships and in age groups which shares similar values. (Fend et al. 1976b p. 102).

In order for students to be able to meet achievement expectations and to be able to acquire appropriate achievement motivation (especially confidence in success), it is necessary for them to receive supplementation through adequate abilities. Only then can we speak of fitting the educationally pre-formed achievement standards into a pattern of reward contingent on achievement. However, there are discrepancies resulting between the prestructuring of goals and the obtainable resources for awards for other student groups whose school situation is described by other combinations of the contingency factor named. One of the ensuing reactions to this is the depressing experience of the subjective loss of personal control in being able to change a particular situation. Fend and his colleagues

have understood these reactions through the use of an anomia scale which describes individual feelings of impotence and powerlessness as well as a loss of self-value which negatively correlates with the degree of willingness to achieve.

The manifestation of an achievement-oriented school climate is also determined here by institutional restrictions and leads to different effects on the part of the student only because they are transmitted differently through disparities in the organization of educational teaching-learning processes and situations.

This indicates, for one, the substantial context specificity of possible connections between school climate and student variables. The theoretical status of climate dimensions is also uncertain; it is unclear whether or not they should be regarded as condition, effect, or only as a correlate of cognitive learning. These dimensions have previously been brought into a complex pattern of correlation. At the same time, a series of school climate investigations have yielded a stable pattern of results indicating that growth intensive contexts of cognitive learning are characterized by a high degree of orientation towards problems and by a medium-high amount of external control and competitive reward patterns. These contexts are in a position to intercept unfavorable effects of stress from scholastic achievement demands when there is simultaneous access to interactively effective protection and support (Fend and Knoerzer 1977; Moos 1978; Moos and Moos 1978). This is only possible in a school organization in which the different learning demands, learning controls, and learning processes can raise the number of successful students, through early recognition and can help to eliminate learning difficulties through a flexible, tightly-woven system of learning diagnosis and aids (cf. Fend et al. 1976, p. 365).

This still does not provide an explanation for the mechanisms of interactive and institutional transmission of the effects of context and class in the teaching process. In order to do this we must first develop sets of theories which will be presented in the following.

B. Instructional theories of school socialization

1. Preliminary remarks

Of those societal functions of school and instruction sketched above, the transmission of scholastic knowledge contents, information, and skills to masses of students proves to be the most important of their institutionalized tasks. The systematic organization, purposeful planning, precise steering, and permanent optimization of formal teaching-learning processes are aimed at the realization of this objective. ^(Glaser 1976) It is thus natural to illuminate those conditions of cognitive socialization on the part of school and instruction which are critical for this objective and to make them available as instructional technologies for the attainment of general and differential socialization effects.

Up to now, instrumentalist and technological conceptions of this type have extensively determined empirical research into cognitive socialization from the aspect of school and instruction. The manifold analyses of the most important means of instruction (curricula, methods, media, instructional behavior), however, point to a developmental model which has been stagnating despite a substantial accumulation of data (cf. Dubin and Taveggia 1968; Rosenshine 1971; Weinert 1972; Jamison, Suppes and Well 1974, Walker and Schaffarzick 1974). Thus the assumption of a conservative (general and also informative) model for the explanation of the courses of scholastic processes of socialization and socialization effects has been questioned altogether--a situation which makes the analysis of specific condition structures inevitable. ^(Doyle 1978) This can occur through differentiating out independent instruction variables and dependent information and skill variables and their rules of combination,

to los
which up to this time have been formulated only linearly and additively.

In addition, the scope of validity of instructional theories will have to be restricted both in regard to situational and personal^{parameters} as well as temporal parameters. The dynamics of social, economic and cultural change in school-external societal domains, the resulting cognitive and affective cohort differences of particular generations of students, and the organizational, administrative, and curricular internal reforms of the education system also provide for the development of instructional theories of a higher specificity of domain (Cronbach 1975; Snow 1977). Personal characteristics of students, characteristics of their familial socialization context, and conditions of the school system and the school further substantially restrict the range of possible effects of instruction and are in addition confounded with instructional conditions. In view of this situation, the circumscribed socialization effects can no longer be unambiguously interpreted as a consequence of specific instructional influences.

At present differing theoretically-relevant consequences are drawn from this state of affairs. The most important of these are: the development of instructional theories for the explanation of cognitive learning processes (Lundgren 1977), which:

- explain more strongly than previously the frame conditions of teaching-learning processes in school;
- confine themselves to the construction of basal models of teaching and learning in school which contain relatively few assumptions and are therefore verifiable (Harnischfeger and Wiley 1976^b, 1977);
- attempt to relate the multiplicity of scholastic teaching-learning

variables to epistemic deep structures (Olson 1972; Berliner and Rosenshine 1977).

The following presentation attempts to pursue this consequence in an instructional explanation of the socialization effects of school.

2. Frame conditions of school instruction.

Institutional and organizational standardization of scholastic teaching-learning processes in national and regional systems of education lays out important frame conditions for the variation of these processes. These conditions were explained above. Further constraints of teaching-learning processes in school are the equipment of schools in terms of materials and personnel, the size and composition of classes according to origin, ability and eagerness to learn, and the determination of the total instruction time available. The latter results from administrative decisions on compulsory daily school attendance in full day vs. half day schools as well as the establishment of schedules on the level of the school (system). In an international comparison, the IEA Studies documented substantial differences in the time resources for individual subject areas, which in turn have an effect on average scholastic achievement. Documentation from other investigations on the level of the school or school type supplement these results:

Hirzel (1976), for example, varied the duration of the treatment of the instruction unit "fractions" in 93 sixth grade classes according to the : to which the students belonged for a total of eight weeks of instruction. Students in the standard-time group received 8 hours more instruction than those in the short-time group. It can be demonstrated through variance analysis⁴ that a shortening of the duration

of instruction leads to lower test performances, even when the influences of the covariants, intelligence and initial test performance, are partialized out. This result could also be secured through a multiple regression analysis on the basis of classes.

Frame factors of school are also regarded by teachers as constraints on their own instructional behavior and success (Taylor 1974). Dahlblöf (1971) and Lundgren (1972, 1977) investigated some of the implications of these frame factors (which also include a limited instruction time) both on the organization of the instructional process and on students' individual chances for assimilation. Accordingly, possible options in the case of limited instructional resources are: the omission of certain subject areas, a lowering of the level of expectation, and the neglect of weaker students. In no case, however, do school teaching-learning processes remain uninfluenced by these frame conditions. If instruction is geared to students from a steering group in the 10-25 percentile range of the distribution of ability within a class, the frame condition restrictions directly determine the instructional pace and thus also the average attainable cognitive performance level as well as its distribution within the class (Barr and Dreeben 1978).

In addition to the formal frame conditions of school socialization mentioned above (material, personnel, and time), the selection of a complex cultural epistemic structure as valuable scholastic knowledge and therefore knowledge to be transmitted, its curricular elaboration, the determination of forms of its transmission and assimilation in school, and finally its administrative partitioning for various age levels and school

types are the most important content-oriented frame conditions. Teaching plans and lessons determine what material students are to assimilate, not only quantitatively, but also and primarily in terms of content; in which periods this is to occur; what is to be learned by all and what is to be assimilated only by certain groups of students; how it can be determined that particular learning objectives have been achieved; what is to occur if someone has not achieved the learning objectives; and what the attainment of objectives in a given area of learning entitles one to.

This external prestructuring of the transmission of scholastic learning contents has qualificatory, allocative, and integrative functions (see above):

- They regulate which general base level of knowledge is to be attained by as many students as possible, and which "higher" knowledge is to be attained by a small quota of students.

- A hierarchical ordering of scholastic knowledge systems, whose acquisition decides the student's further individual educational and vocational chances in a class society, corresponds in scope, difficulty and complexity to the vertical organization of educational systems according to standardized achievement requirements.

- Curricular decisions on the transmission value of cultural content structures and stores of knowledge precede the selection of particular scholastic contents and the omission or suppression of other stores of knowledge. These decisions are shaped by norms, theories, and systems of justification as to the preservation vs. modification of societal relationships, social regulations and individual living conditions. Thus they are able to positively support as well as to critically question

the individual as well as the societal status quo.

Empirical analyses of school socialization up to now have been primarily directed at the transmission and assimilation of specialized competencies (especially scholastic achievements) and have insufficiently clarified, methodically and theoretically, both the further transmission and the acquisition of cultural stores of knowledge. The majority of available studies therefore range from descriptive to ideologically-critical content analyses--e.g. of reading textbooks or local history textbooks and texts for the teaching of literature (cf. Gmelin 1970; Reger 1971; Silbermann and Krüger 1971; Doderer 1972; Elbracht and Moser 1972; Geiss 1972; Nave-Herz 1972; Beinlich 1973; Watzke 1973; Nauck 1974, 1977; Fend 1979). These works have dealt with:

- the preservation of sex-specific role stereotypes;
- the glorification of the child's world as a harmonious idyll;
- the positive accentuation of secondary virtues (adaptation, good behavior, love of order, cleanliness, punctuality);
- the reinforcement of parental authority and children's obedience;
- the preference for development which is free of conflict, readily comprehensible, familiar, antiquated (e.g. rural) social structures and traditional forms of life.

Fend (1979) has directed attention to far-reaching effect dimensions in the teaching of literature--thus, for example, that of basis codes, which relate to individual transference of works of art to one's own life world, especially to one's own experiences (e.g., of "inwardness," or of "critical consciousness") or that of relevancy structures, which result

from the embedding of an academic subject area into the series of demand, production, and control of scholastic achievement and permit this subject to be instrumentized, e.g., for scholastic advancement.

Gerlach et al. (1976) report from a survey that primary as well as secondary school students voiced opposition to a treatment of leisure-time reading material in class. This stems partly from the fact that students apparently "do not want to see leisure-time reading material integrated into class instruction because of a fear of a qualitative devaluation and destruction of their identification and thus want to maintain the separation of school and school-external reality" (p. 174). Another reason is that secondary school students cannot believe that "leisure-time reading, in particular 'trivial' literature, is an adequate object of instruction for the elevated educational pretensions of the gymnasium" (p. 174). It is particularly those students in whose classes such leisure-time reading material has been treated who are opposed to the integration of such materials into the teaching of literature. "Apparently the institutionalized frame conditions, under which learning in school and thus also the teaching of literature take place hinder the implementation of an instruction which is able to measure up to the high expectations on the part of students. . . ." The attempt to enrich traditional instruction with new contents related to reality as experienced by students would thus only have the effect "that the students would lose all interest in their leisure-time reading if it were tainted by the pressure of compulsory reading learning and achievement" (p. 174).

Such content-related prestructuring and restrictions, however, are also to be found in mathematics textbooks. The examples of applications

and the statements in the texts do make reference to societal reality, but at most have only the function of drilling practice-schemata which relate to a mathematically calculable, arbitrarily interchangeable reality. Aspects of reality relating to conflicts, problems, and ambiguities are thus not dealt with (cf. Schildkamp-Kündiger 1974; Böltz 1978).

3. Quantity of instruction

Several new teaching-learning models emphasize the significance of temporally defined teaching-learning variables with the above-mentioned frame conditions (Carroll 1963; Bloom 1976; Cooley and Lohnes 1976; Harnischfeger and Wiley 1977). ^{Accordingly,} the attainment of cognitive levels of ability is influenced by the total available instruction time as well as the student's active learning time. Providing sufficient time resources in instruction as well as insuring their actual use on the part of students are thus the critical parameter classes of these instructional models.

The nominal instruction time of individual learning groups (e.g. school classes) is normally exogenously prescribed on the level of the school system or the school district. Wiley and Harnischfeger (1974) report that the school year 1969/70 in Vermont comprised on the average approx. 172.6 school days, as opposed to 182.7 days in Maryland. The number of hours of actual instruction (actual instruction time)--conditioned by teacher absences or times when instruction does not take place for any other reason--can deviate substantially from this. Thus, on the basis of an observational study, Harnischfeger and Wiley (1978) report that the actual instruction time can amount to between 56 and 96%

of the total available instruction time.

Even more important than these time discrepancies are the differences among individual school classes arising from instruction itself--i.e., to the extent that available instruction hours are used for the transmission of knowledge or wasted in activities which are irrelevant to both learning and teaching.

Berliner (1978) had teachers in 25 second grade classes and 25 fifth grade classes record the allocation of instruction times for various complexes of teaching materials over a total of 90 instruction days. He demonstrate instruction times for individual complexes which range from a maximum of 400 minutes to a minimum of 29 minutes. This makes a control of the correspondence between instructional content and test content all the more urgent, because otherwise comparisons among even individual school classes would no longer be possible. Hester and Lion (1978) report from observations on instruction in seven different grade levels that only about 50% of the daily 6.5 school hours are used specifically for instruction.

Harnischfeger and Wiley (1978) observed first and second grade classes for a total of 17 school hours and estimated that these classes received up to about 15 school hours more or less of instruction over the whole school year because of variable instruction times.

Table 7 shows summarily that students' active learning time (5) will normally remain substantially behind the nominal instruction time (1).

Berliner (1978) takes as a basis a nominal school year of 180 school days, which holds for most of the United States, but notes that actual instruction amounting to only approx. 150 days (83.3%) of this time

takes place. From observations on instruction in four second grade classes comprising from 96 to 83 hours of mathematics, he ascertained that between 27 and 53 minutes of instruction time daily was allocated to mathematics. The total instruction time per school year thus varied between 67.5 and 132.5 usable instruction hours. Students in these classes, however, are occupied only from 61 to 78% (maximum) of the time, and they themselves use only approx. 37.5 to 48% of the available instruction time as their own active learning time. Table 6 presents the resulting "reduction corrections" from the nominal instruction time up to the active student learning time for these four classes.

[Insert table 6 here]

Quotients between individual time components calculated in the same way make clear that the teachers of these four classes vary in effectivity both in the use of their own teaching time for a given period of instruction (3/2) as well as in insuring the use of this time as active learning time on the part of the students (4/3, 5/3).

In the investigation of Treiber and Schneider (1978), the mean scholastic achievement of 58 fifth grade classes was inserted into a regression equation whose predicate variables were: student background, number of instructional hours in a three month interval, the actual instruction time, as well as the curriculum validity of the test items used as estimated by the teacher. The variance in criteria among the school classes could be explained up to 40% by means of these variables, whereby 24% specific communality was allotted to the variables of student background and 12.5% to the variables of teaching and instruction time (opportunity to learn).

Table 6

ESTIMATES OF NOMINAL vs. FACTUAL QUANTITY OF SCHOOLING
IN FOUR SECOND GRADES*Source: Compiled from Berliner 1978*

	1	2	3	4	5
CLASS 1			67.5oh	48h	33h
CLASS 2	18oh	150 h	80.0oh	5oh	3oh
CLASS 3			125.0oh	78h	5oh
CLASS 4			132.5oh	103h	58h

1 Nominal quantity of schooling, in school year hours

2 Total allocated class time per 150 days, in school year hours

3 Average usable instructional time per 150 days, in school year hours

4 Engaged hours per 150 school year days,

5 Academic learning time per 150 school year days, in hours

Time resources which are provided for instruction in sufficient quantity must also actually be used by the students in order to promote learning. This is determined by the presence and the active learning time of the students during instruction. They therefore require the additional backing by the teacher.

4. Quality of instruction

The relevancy of teaching material, the quality and the information content of instruction are usually described without explicit reference to any theory, by quantitatively or qualitatively ascertaining that there is a correspondence between the learning material treated in class and the students' knowledge of this material as checked through test items. A number of investigations (cf. summarily Rosenshine 1976) confirm the significance of these instruction variables for the prediction of the mean achievement level attained by school classes.

Users of these methods usually omit the explication of their own descriptive theory for the representation of the content structure of teaching materials, since correspondence among the judgments of experts or observers as to whether and in what measure oral or written instruction texts constitute invariant teaching materials appears sufficient. This also holds for those statistical instruments, which in the measurement of quality of primarily surface structural statements made by the teacher, make reference to explicit descriptive theories of intelligence (Guilford) and of cognitive abilities (Bloom) and operations (Taba). They show that teacher statements generally operate on a middle-to-low level of difficulty and thus covary with the level of student statements.

rarely, or only under specific context conditions, are they connected with the learning success of the students in these classes (cf. Dunkin and Biddle 1974, pp. 231-273). This fact can be explained by considering simply the epistemic surface structure of statements on the part of teachers and students. A valid classification of these statements is not possible without a knowledge of the content structure of the area of learning material which is to be transmitted and of relevant initial knowledge on the part of students.

As an alternative to this, several approaches attempt to provide descriptive and explicative theories for the invariant representation of the content structures of various instructional texts, and to compare them with the cognitive structure of the students in order to better clarify the process of the transmission and assimilation of knowledge (Anderson 1977, Achfeulagen & Wierich 1975). in school and thus to better steer it. The relevant theory segments here are:

- (1) Basic scientific studies on memory research, cognitive psychology and psycholinguistics.

Here domain-specific text grammars, semantic models and structural concepts are developed and checked through experimental laboratory work or through computer simulations. Examples are:

- lexical network models, set-theoretical models, and feature models for the association or propositional modelling of concept relations (Kintsch 1972, 1974, 1976; Wood 1972; Anderson and Bower 1973; Gregg and Farnham-Diggory 1975; Rumelhart et al. 1975; Meyer and Schvaneveldt 1976);

- psycholinguistic (small-) text grammars for the modelling of the content structure of (small) text forms (Crothers 1972, 1973; Frederiksen 1972, 1975 ; Meyer 1975);
- cognitivistic models or models from computer simulations with analytical quantities such as scripts, plans, frames, schemata (Collins et al. 1975; Bobrow 1975; Brown and Burton 1975; Kuipers 1975; Minsky 1975; Schank 1976).

The content structure of instructional texts can be modelled only imperfectly by these. Rather, their current significance results primarily from their heuristic value. This can be summarized as follows:

- (a) The findings of lexical semantics show that a number of both reductive and elaborative coding processes can be secured for the learning of words.
- (b) Sentence learning can be influenced by deep structural syntactic features, although in general syntactic information is insignificant when the meaning structures underlying the sentence are taken away from it.
- (c) Predicate-argument structures have been established as the abstract representational form of sentence structures and text structures.
- (d) The process and result of semantic sentence analyses and text analyses result primarily from the student's epistemic structure which is available or which can be activated through concepts and relations which constitute statements. These can vary in the intensity and degree of completeness of the extraction of meaning, depending on context information from the text itself or from extra-linguistic sources. Aids in the augmentation of an analytically penetrating process of understanding therefore also contribute indirectly to the improvement of retention performance.
- (e) Even meta-mnemonic information, knowledge as

to the manner of function of one's own mental apparatus and the applicability of various learning and retention tactics and strategies influence individual retention performance. (f) In general, it results that the measure of available or self-generating foreknowledge stands in an inverse proportion to the measure of the external structuring which is required.

Niegemann (1977), in direct reference to Kintsch's (1972, 1974, 1976) propositional text-semantic theory, explicated the central variable of the transmission of knowledge related to teaching contents in a geometry instruction unit. The subject structure of instruction was described with these three variables:

Sequentialization

Instruction is the transversal of a semantic network which represents the main concepts of the segment of teaching material and its "Isa" and "Hasa" relations according to a proportional notational system.

Connectedness

Two successive teaching utterances are regarded as explicitly connected if an element (concept, feature) or a relation from the first utterance is contained in the utterance immediately following.

Instructional pace

This was determined by means of the number of utterances regarding learning content which were transmitted per unit of time during instruction, after the utterance was weighted according to its degree of potential "familiarity" or "unfamiliarity" for the students (i.e., according to its relative frequency of occurrence in the previous course of the instruction unit).

These variables were transformed into a corresponding instructional

analysis schema and class-specific variable manifestations were coded through various computer programs for tape transcriptions. Thus the quantity of information and the propositional connectedness and sequentialization of instructional teaching utterances could be estimated and used for the prediction of increases in learning. The latter was derived in turn from a knowledge test, whose tasks represented the propositional network nodes of the subject structure of the teaching material.

(2) Psychometric studies.

Here the development and comparison of appropriate methods of analysis for the reliable modelling of the meaning structures of the main concepts of an instructional text stand in the foreground, as well as the pre- and post-instructional cognitive structure of the student. Both structure types are characterized as "associative maps" modelled as word fields and propositional structures with the help of word association, card-sorting, or graph-building tests, represented in similarity matrices, and compared with hierarchical cluster analyses, multidimensional scaling methods or latent partition analyses. It proves to be the case that instruction in school causes the cognitive structure of the student to approach the content structure of the teaching materials. This could be demonstrated for different subject areas (mathematics, physics, botany) (Shavelson 1972, 1973, 1974a; Shavelson and Geeslin 1974, 1975; Traub and Hambleton 1974; Geeslin and Shavelson 1975; Shavelson and Stanton 1975; Preece 1976; Stasz et al. 1976; Hambleton and Sheehan 1977; Rudnitsky 1977; Rudnitsky and Garlock 1977).

The following points, however, remain unclarified in these studies:

- the effects of concept and methods of analysis for the verification of structural assumptions;
- the meaning of inter- and intra-individual learner differences;
- the theoretical explanation as to how the objective structures of teaching material and the cognitive structures of the student are adapted to one another (Eigler 1978; Konold and Bates 1978; Perkins 1978).

(3) Application-oriented structural theories.

For the most part these theories have their origins in the work of Ausubel, Rothkopf and Gagné. According to Ausubel (1968), parameters of ~~the~~ cognitive structure (quantity, quality, clarity and stability, and organization) of the initial knowledge of the studentⁱ and parameters of the organization of the instructional text (potential meaning content, non-arbitrariness, relevance, sequential organization, progressive differentiation, integrative unification, consolidation) are the most important preconditions for meaningful receptive learning. Previously, the empirical application of these assumptions has been primarily aimed at the implementation of specific pre-instructional organizational aids in text-based learning (advanced organizers, overviews, pretests, and behavioral objectives).

Rothkopf's theory (1970, 1972, 1976) of mathemagenous behavior overlaps Ausubel's theory in its technological consequences, but emphasizes further possibilities for activation and steering (inserted questions, rereading, underlining, precise writing, note-taking).

The findings of this investigation confirm the success (although this

is often only moderate) of these organizational aids, especially in receptive teaching-learning situations where their scope of validity is additionally restricted by parameters relating to the situation (teaching material, duration of instruction), to the student (age, talent), and to the relevant mode of reaction. A number of recent joint studies point to these factors (cf. Barnes and Clawson 1975; Faw and Waller 1976; Hartley and Davies 1976; Lawton and Wanska 1977).

Groebe (1972) used Ausubel's subsumption theory in an investigation of the cognitive-conceptual content structure of instructional texts and compared its instructional effectivity with other theoretical approaches (psycholinguistic theories on sentence formation/stylistics; models from information theory on semantic density/redundancy, and Berlyne's theory of motivational curiosity). He found "cognitive structuring" (in Ausubel's sense) to be one of the four most important central variables of the comprehensibility of instructional texts. (It is characterized by: advanced organizers, linear train of thought, emphasis of important concepts; summaries; the giving of examples; clarification of differences/similarities among concepts). The three remaining central variables (grammaticality--stylistic simplicity; "semantic density," and "motivating conceptual conflict"), as well as Ausubel's features, were also confirmed by the studies of ^{Schulz} von Thun (1973), ^{Schulz} von Thun et al. (1973, 1974) and Langer et al. (1974). A substantial portion of the criteria of receptive retention of learning in school can be directly explained and optimized by means of these features of the structuration of written and oral instructional texts.

Larger quantities of teaching material are usually subdivided into

individual sub-areas and introduced into teaching-learning processes according to increasing difficulty and complexity. Such a vertical or sequential arrangement of a complex of learning material must make clear which sub-areas are a necessary prerequisite for learning which other sub-areas. The hierarchical structure which in turn arises in this way is both an explicative and a technological theory of the necessary and sufficient preconditions for the attainment of a learning objective (Klauer 1974; Posner and Strike 1976). Detailed theoretical explications of the construct of the learning hierarchy can be found in Gagné 1973; ~~Res~~ Resnick 1973; and White 1973.

Previous attempts at applying this theory have confined themselves to its descriptive aspects and have analyzed possibilities and limitations of the construction and the psychometric and experimental validation of learning and achievement hierarchies (cf. Capie and Jones 1971; Bart and Krus 1973; Madaus et al. 1973; Airasian and Bart 1975; Klauer 1976; Kleiter and Petermann 1977).

On the other hand, its explanatory and technological aspects have been taken up and tested in only a few studies. They show that the quantity and type of the relevant preknowledge available to the student determine both the possibility of a particular learning program and the speed with which it can be covered. Teaching-learning sequences can thus be appropriately derived from learning hierarchies constructed for this purpose and empirically validated.

Simons et al. (1975) checked a weak hypothetical version of the hierarchy construct in the explanation of class differences in achievement which were independent of intelligence. They collected data on the

achievements in arithmetic of twelve fourth grade classes ($n=297$) and on the students' intelligence. The 73 mathematical test items were ordered according to increasing difficulty and were validated through path analysis according to their ability to be ordered hierarchically. It was shown that the influence of general intelligence on the variation of arithmetic achievement decreases with the increasing difficulty and complexity of the tasks. Groups of three classes each with differing levels of arithmetic achievement (high--low) and the same general intelligence were then compared. The authors of the study report that the preknowledge of the poor classes was on the average lower than that of the good classes and varied more strongly, that general intelligence in the poor classes also explained more variance in criteria and was also more significant in relation to the importance of preknowledge than in the good classes. They interpret this as an indication of differing instructional conditions in the two class groups. According to them, the group which was better in achievement despite the control of IQ received instruction which was directed at the systematic transmission of the relevant preknowledge. Their investigation also showed that the achievements of students with high intelligence are on the average comparably good in both good and poor classes, whereas less intelligent children differ substantially.

C. Interaction theories of socialization in school.

1. Introductory remarks.

Up to now attempts have been made to explain cognitive socialization in school and instruction only through such sets of assumptions about the

assimilation and the modification of individual epistemic structures in which systematic planning, purposeful organization, and effective steering of teaching-learning processes stand in the foreground. At the same time this makes applicable those informative prerequisites which are of significance for their usability in the fulfillment of functions of qualificatory reproduction in the educational system. Previously these were regarded as necessary for the continuing existence of developed industrialized societies. In light of their usability--as, for example, in the satisfaction of the needs of the employment system for an increasingly well-qualified work force--particular societal forms of the formalization and institutionalization of the instruction of large masses of students in an externally-controlled social context have proven to be sufficiently effective and efficient. These are primarily directed at the participation of children in a system of systematic instruction in which individual homogenous age groups of approximately the same qualification level are taught by interchangeable teachers.

It is apparent that forms of the institutionalization of educational processes which are typified in this way also preform their social context and restrict interpersonal relations and interactive communication. They thus indirectly influence both the course and the result of the intended instructional processes as well as the ordinary theoretical knowledge contents which form the basis of the instrumental transmission of knowledge, the development of the child's self-image, and the social relationships within the school class, whether or not they intend or even recognize these effects. Interactional and communicational analyses help to clarify these effects.

2. Language barriers and speech acts

The self-regulating system of the demand for, production of, and control of scholastic achievement is supposed to optimize the transmission and assimilation of scholastic knowledge. At the same time, however, it contains features which can substantially restrict the attainment of precisely this objective. This can be illustrated by considering examples provided by research on language barriers.

The transmission and assimilation of knowledge contents and their influence and modification in school and instruction are closely connected with the use and understanding of elaborate linguistic variants which display a great diversity in syntactic and semantic constructions. If these linguistic variants also standardize instructional linguistic usage on the part of the students, then it must be assumed that individual deviations from the norms of linguistic symbolic organization in educational processes would then also substantially restrict chances for participation and success in academic learning which is heavily weighted with such linguistic prerequisites. "Linguistic barriers" assuming significant importance for learning in school can then be postulated according to the relative distance between linguistic usage as it is expected and as it is manifested by the individual student.

Obvious differences in individual linguistic behavior can be traced back to students' dispositional and personal characteristics ~~that~~ are conditioned by factors external to school--e.g. differences in linguistic development, membership in certain dialect groups (Ammon 1972, 1973) and effects of family origin and family environment (as this varies in

accordance with socio-economic and cultural factors). Efforts at the clarification of such sociolectically-conditioned linguistic barriers have been particularly intensive.

Bernstein (1960) has developed several variants of a socio-linguistic code theory for this purpose. This theory proceeds from the distinction between a so-called public (later: restricted) linguistic usage and a formal (later: elaborated) linguistic usage--which differ according to the speaker's membership in the middle or lower class. These differences can be described by means of a number of surface-structural features (sound discrimination, scope and diversity of vocabulary, semantic structuration and differentiation, degree of syntactic organization, rigidity, and elaboration). The assumptions contained in this code theory have proven to be heuristically productive for German language research and have sparked a series of differentiated subsequent investigations on listening comprehension and on children's written and spoken language (Roeder 1965, 1968; Reichwein 1967; Bühler 1970, 1972; Ferdinand and Uhr 1970; Wiederhold 1971; Bock 1972; Kühnig 1972; Oevermann 1972; Haeberlin 1974; Schlee 1973, 1974; Kiefer 1974; ~~Denland 1975~~ Ort 1976; Urban 1977).

On the whole, however, these studies have reached inconsistent results--a fact which is due primarily to sources of confounding which were overlooked (definitions of social strata, effects of school, differences in intelligence and sex), deficiencies in analysis and evaluation (size of random sample, test of significance), and weaknesses in interpretation (causal explanations, range of validity) (cf. Ort 1976). An actual verification of Bernstein's central assumption--namely that of possible class-specific differences in individual linguistic behavior which in

turn condition success in school--was initially postponed because of its problematic nature and then later given up entirely. This result was due in part to the reception of several parallel investigations in the United States which had been published in the meantime (Williams and Naremore 1969; Cazden 1970, 1971; Cazden et al. 1972; Houston 1970; Labov 1970; McCormick ^u Piestrup 1973). In these the assumption of linguistic differences specific to social class was increasingly questioned, especially insofar as its stronger version laid claim to a validity which transcended that of the individual situation. Since this time assumptions which typify linguistic behavior as situation-dependent and context-specific have been preferred as alternatives (Ort 1976; Wildgen 1977). According to these, utterances of US speakers from lower social classes (with a control on intelligence) are not generally less complex and elaborate, but are only so under situative conditions which impose less elaborate demands upon them. The latter include particularly the feature structure of restrictive and repressive school situations, which therefore present an unfavorable context for speech production and reception for American children of the lower classes. Conditions of the investigation which simulated this structure through ^u (written) linguistic medium, (school-related) choice of topics and arrangements for the collection of data (director of the experiment as an authority figure), thus made possible the observation of linguistic differences correlated with school.

Nevertheless, it is primarily features of the speech constellation of interactive communication in school and not so much non-school personal dispositions in the organization of linguistic ^{syntact} which determine student differences in linguistic usage in instruction (cf. Haug and Rammer 1974).

The feature structure of linguistic utterances in teaching-learning situations in school can be described through their verbalizable context. An abundance of different systems of classification are available for the empirical reconstruction of verbal aspects of instruction (Habermas 1971; Searle 1969; Austin 1962; Bayer 1977), although their deficient or often only indirect reference to specific theories presents a significant disadvantage. Here variants of a speech act theory within linguistic pragmatics provide a sufficient frame of reference for the analysis of linguistic utterances and sequences in instruction. According to this model, speech acts are subdivided into so-called locutionary, illocutionary, and perlocutionary components. The type of the illocutionary act (command, assertion, request, etc.) is of particular significance for the interpersonal determination of a speech act. Here the speaker exercises a communicative influence upon the addressee, so that the analysis of the execution of the act (through illocutionary indicators, indirect speech acts, and performative verbs) is of particular interest (Terbuyken 1976; *Flader 1971*)

Roeder and Schlömer (1976) have attempted to document these factors. They used Bellack's system of categories ^(Bellack et al. 1966) in order to verify possible relationships between the restrictiveness of the student's role in instruction and communicational intensity and linguistic complexity. In a quasi-experiment they had the teachers in eight third-grade classes conduct the class in one session in a restrictive instructional style, in another session in a non-restrictive style--according to the behavioral suggestions given to them in advance. The order and the selection of topics were partially permuted. The analysis of the course of instruction made use of the Bellack system and was based on tape transcriptions.

The number of students was investigated according to "number and scope of student utterances, the structure and pragmatic function (e.g. question, statement) of the sentences realized in these utterances, the extent of nominal and verbal parts, the use of conjunctions, the use of verbs according to tense, mode and voice." (p. 216). The linguistic analysis was confined to the description of a few semantic and syntactic surface-structural features of spoken language. Nevertheless, it could demonstrate the expected relationship between a restrictive linguistic context of the dialogue roles of teacher and students and a restricted linguistic usage.

"Since the interactional analysis showed that the class sessions clearly differ in regard to the proportion of teacher utterances with a particular pragmatic function and that this is also reflected in the proportion of student utterances with a different pragmatic function as well as in the differing quality and length of steps and cycles, it is a trivial result that the students' participation in verbal interaction was for the most part noticeably greater in the sessions conducted in a non-restrictive manner. In contrast, however, the findings of the linguistic analysis appear to us to be non-trivial: differences can be ascertained even on the level of the sentence and its constituents; students in non-restrictive class sessions not only speak more, but also speak in longer, more complex sentences; they formulate problem-related questions somewhat more frequently and express their desires" (p. 269).

3. Leadership theories.

The learning of particular learning contents and the development of

particular abilities in instructional groups is bound to externally set objectives. Membership in a particular group is externally regulated; and even the norms for the achievements which are to be accomplished are steered from without in many ways (Getzels and Thelen 1960). For the purpose of implementing and securing externally imposed system requirements in these groups, the teacher establishes himself as a formal leader who is to perceive those functions of interpretation, information, control, and motivation which are necessary for the success of the school and the students. He is equipped for this with a series of rights and duties and thus also with substantial social power when he assumes his position of leadership. It enables him to regulate, direct, structure, and steer an instructional group as well as to exercise a direct influence on other group members (cf. French and Raven 1959; they distinguish five types of social power: reward, coercive, referent, expert, legitimate power). Teachers are superior to their students in each of these power dimensions and are therefore capable of exerting social influence and assuming group leadership. The course and result of instruction on the part of the students can thus be characterized as dependent on the effective leadership of learning groups by the teacher for the attainment of self-imposed and prescribed objectives. The most important analytical elements here are: the leader, the followers, the task, the situation, and the effects. Previously, various model developments have been grouped about these elements, but in their results they have led mainly to a two-dimensional reduction of a teacher behavior which is either task-centered or student-centered.

Bales explicated this dimensional structure in the steering of even

achievement-oriented groups as a conflict of objectives between the satisfaction of socio-emotional needs and the orientation towards tasks. The subsequent investigational types likewise reduced their objective domains in simplified descriptive and explanatory models, whereby personal dispositions on the part of the teacher were given a privileged position. Most attempts at the application of such models have, however, shown either that this model reduction can only be retained at the price of a substantially lessened explanatory ability or that the model structure must be supplemented by important additional parameters of the student as a person, the teaching-learning tasks, the social context, student-teacher relationship, and teaching-learning situation. This second conclusion is drawn by contingency models of teachers' leadership behavior. Not only is the general effectivity of a particular leadership style thematized in these models, but also its differential significance in an interaction with further, yet to be specified, marginal conditions (Neubauer 1974).

A prominent example of this is Fiedler's contingency theory of effective leadership (1978). This theory explicates the individual leadership style by means of the motivational orientation of the leader and describes it one-dimensionally on the axis "task-orientation"-- "relation-orientation." The success of this individual orientation model results from the interaction with the situative favorability, which is determined through "leader-member relationships," the task structure and the power of the position of the leader and which is measured by means of methods developed for that particular purpose. By subdividing each of the three situational dimensions into two, ($3 \times 2 = 6$) different situative conditions can be constructed for which different

statements can be formulated as to the relationship between teacher leadership style and learning group effectivity.

Reavis and Derlega (1975) applied this model to the leadership of instructional groups under changing conditions of situative favorability. They varied (quasi-) experimentally leadership behavior (task- vs. person-oriented instruction) and situational conditions (good vs. unfavorable teacher-student relations, high vs. low task structures, strong vs. weak leadership power). Replies from 184 eighth-graders to questionnaires on the appropriateness of teacher behavior under conditions of variable situative favorability confirmed the contingency assumptions; the achievement differences remain non-significant, although they are in conformance with the hypotheses.

Contingency assumptions relating to more narrowly circumscribed individual leadership tasks on the part of teachers (such as deciding, informing, controlling, motivating) have not yet been investigated. For example, Vroom (1976) and Vroom and Yetton (1973) have developed a contingency model which differentiates teachers' individual decision behavior according to situational conditions (importance of the decision, availability of first-hand knowledge, structuredness of the problem, necessity of the agreement of their co-workers, acceptability of decisions of autocratic leaders) and which could certainly be adapted for the planning, regulation, and steering of instructional situations in school.

4. Learning in groups.

Several theories of cognitive socialization regard the fact that scholastic knowledge is acquired in a process of achievement demands,

production and testing within particular age groups as simultaneously providing possibilities for the explanation of the course and the success of this process of acquisition. Thus an interaction of features of the composition of the school group (e.g. social strata, race, sex, aspiration, performance) with individual student features are *assumed with respect to* cognitive criteria variables, which are reflected in so-called context effects. These are therefore generally assessed as indicators of intra-group influences and attempts are made to explain their origin at least by means of the following theories:

In the course of their participation in processes of achievement production and testing which extend over many years, students also acquire cognitions regarding their own ability and talents. These cognitions are acquired and influenced primarily through a social comparison of the student's own individual school performance with that of his peers--through features of the judgments of teachers and fellow students, through his own experiences as to his own difficulties and successes in the attempt to deal with achievement demands, and through his own evaluation based on the standard of his individual reference group, its attributions, interpretations, and expectations before and after the production of achievement (Pettigrew 1967),

The development of a reference group effect on cognitive abilities and achievement correlates proves to be contingent on at least the following conditions:

- the type of the reference group:

Several investigations found in the case of United States student populations that the performance of black students improved particularly

with a high proportion of white middle-class fellow students in the school and in their own class--apparently, however, as a function of their own familial educational background and their social distance from significant role-models (cf. McPartland and York 1967; Mayeske et al. 1969; St. John and Smith 1969; Crain 1970; Armor 1972; Cohen et al. 1972).

- the type of the individual standard of comparison:

In order to clarify inconsistent empirical findings, Alexander and Eckland (1975) differentiate the type of standard of comparison according to manifestations of the ability and the social status of the reference group and predict different reference group mechanisms for the two dimensions:

- (a) Membership in a higher status group also increases the probability of setting a higher expectation level and this creates favorable preconditions for absolute improvements in performance.
- (b) Membership in a group of higher ability lessens relative scholastic achievement in comparison to the reference group norm and thus lowers the student's self-image of his own ability as well as individual educational aspirations--a fact which in turn results in lower scholastic achievement.

Their results from a re-analyzed investigation conducted over a period of time confirm these assumptions and suggest in the case of educational and political measures of differentiation and segregation that the juxtaposition of learning groups of lower status and higher ability be avoided.

- the extent of relative gratification or disadvantage:

Krug and Hanel (1976), Rheinberg and Enstrup (1977), Rheinberg et al. (1977) and Rheinberg (1978) ^{and Krug} show that students who are comparably weak in learning display a more favorable self-image, higher achievement motivation and lower examination anxiety in the case of segregated schooling--i.e., in a (special school) group composed wholly of such weaker students--than when they attend non-segregated primary and secondary schools in which they stand at the end of the achievement distribution of their school class.

- the uniformity vs. diversity of possible reference groups:

In their comparisons of comprehensive schools, Fend et al. (1976^b) investigated effects of traditional vs. innovative forms of school organization, which differed primarily in regard to their level of selectivity towards socially disadvantaged students. The most important institutional differences here lay in the point of time of the first decision as to the student's further course of education (at 10 vs. 12 to 14 years), in the type of the decision process on the student's course of education (punctual vs. continuous), in the type of grouping of students (a differentiation spanning several academic subjects vs. subject-specific differentiation), and in social organization (segregated vs. integrated). Accordingly, comprehensive schools organize learning processes such that:

- (1) There are more and more frequently changing subgroups in which students can measure themselves against others--a factor which increases the change of their relative success.

- (2) Learning aids and achievement demands are diversified--a factor which relatively increases the number of successful students.
- (3) Learning controls are individualized and continuous--a factor which tends to deemphasize deficiencies in achievement, makes their elimination more readily possible, and thus also makes the assignment of individual students to particular learning groups more readily correctable.

The data collected by the study group on individual willingness to achieve, self-image, school involvement, anxiety, etc. conform extensively with this assumption structure, even through only a weak form of verification was chosen. Nevertheless they do indicate a development of reference group effects which is conditioned by the school (form).

- on the type of standard of reference in the judgment by others:

^{et al. (1977)}
 Rheinberg [^] have been able to show that teachers (can) judge their students with a social rather than an individual reference norm--a fact which leads to differing consequences in their behavior towards individual students ^{in the behavior} as on the part of these students themselves. Instruction under an individual reference norm, accordingly, is to promote an exhibition of individual achievement motivation which is confident of success and to allow students to face test situations with less anxiety. The results reported by Rheinberg support these assumptions.

- the heterogeneity of the reference group.

Reference group assumptions are normally empirically anchored only by means of the height of the standard of comparison and individual distance from it ($\bar{X}_i - X_{ij}$). ^{and Krug} Rheinberg (1978), however, ^{have} ~~has~~ pointed to the fact

the extent of relative gratification or disadvantage has differing effects in classes of a high vs. low spread--i.e., it would be less accentuating in heterogeneous classes than in homogeneous classes. More strongly differentiated instructional measures (at least with regard to level of difficulty of the tasks) can be introduced as transmission mechanisms in classes which are heterogeneous with respect to achievement, in view of the fact that in groups of a greater spread of achievement, individual deficiencies in achievement are experienced with less force than in the case of a greater homogeneity in the classes.

- personal features of the students.

Here a particularly prominent position is assumed by those groups of assumptions which interactively connect effects of features of the reference group (number, diversity, heterogeneity and stability of reference groups) with achievement-oriented individual parameters (measure of quality, attribution tendencies, strategies of self-reinforcement). This is particularly critical for students who are weaker and more fearful of failure and who are in large classes which are heterogeneous with respect to achievement, because they seldom receive the opportunity to work problems appropriate to their ability, to trace their lack of success to causes other than their own lack of giftedness, and to receive information contrary to this in judgments of their performance and causal attributions by teachers and fellow students (Fend et al. 1977; Rheinberg & Krug 1978).

versions of the 'Pygmalion effect' (cf. Baker and Crist 1974; Brophy and Good 1974; Braun 1976; Hofer and Dobrick 1978). These are not of further interest at this point as they do not illuminate the significance of differential interaction behavior for the acquisition of knowledge and the production of achievement in school. Of importance, however, is the explanation of transmission processes on the part of the student.

One form of explanation claims that quantitative and qualitative differences in the interactive allocation of learning opportunities through the teacher also directly influences the individual acquisition of knowledge and achievement performance: Advantages which are granted or withheld from individual students in interactive teaching-learning situations are: being given questions of appropriate difficulty, having the opportunity to answer these correctly and completely, and having their answers confirmed. Taken on the whole, these advantages can directly influence the quality of individual scholastic achievement (Smith and Luginbuhl 1976). There are also assumptions that are more hypothetical in nature than these explanations in which specific aspects of teacher - student interaction are complemented on the part of the student with cognitive intermediate processes of perception and transcription of interactive events. Achievement-oriented systems of cognition and motivation were previously described primarily through theoretical approaches of causal attribution. The most important symbolic elements here are:

- Standards of excellence and norm values which students assume in the acquisition of knowledge and in the achievement process.
 - Attribution tendencies
- in the explanation for one's own individual success or failure in achievement.

-- Self- reinforcement strategies

which determine how responsible students feel for the results of their actions and in what manner they experience satisfaction or dissatisfaction with success and failure (cf. Schmalt and Meyer 1976; Rheinberg 1978).

The formation and manifestation of these achievement- oriented personal dispositions which can be understood as naive psychological patterns of interpretation of a student's own scholastic achievements are influenced directly by teacher- student interaction in school and in instruction. The assignment of tasks which are of medium difficulty or somewhat higher has repeatedly proven to be helpful in the stimulation of achievement motivation. If the same set of problems are assigned in the instruction of a heterogeneous learning group, they will be either too high or too low in difficulty for some of the students and thus inappropriate to their ability. If the student is aware that the selection and assignment of different tasks is done purposefully, i.e., with consideration for his level of ability and motivation, then he is able to infer from the scope, difficulty, and complexity of these problems what the basis is for the other person's evaluation of his achievement.

The teacher can also let a student directly or indirectly know which causal explanations he holds appropriate for the success or failure of an achievement task.

Scherer investigated (1972) whether or not the achievement of students who are intelligent but low in achievement could be improved by attributing their failures to causes in such a way that they are positively motivated. ^{Here,} Teachers of the experimental classes were instructed in verbal interaction to give selected students only such explanations which attributed their failure to a lack of effort and not to a lack of giftedness. Only in this way

did it seem possible to make up for objectively inadequate achievement through an increase in effort. After eight months the students had assumed the teacher's attributions which were favorable to motivation (cf. Heckhausen 1979, in this vol.).

Indirect possibilities are produced through verbal as well as non-verbal interactional tactics: e.g., leaving students alone in a failure situation, praising him less often, criticizing him more severely, and in placing him further away...etc. (cf. Brophy and Good 1974). This can also have counter-intuitive results: a student may be more inclined to conclude that the teacher considers him ungifted if he is praised for success in extremely easy tasks which almost any one could complete. Younger children with an even less elaborate pattern of cognition conclude that a teacher has a high opinion of their ability^{even} if they are praised for very simple tasks (Meyer 1978; Meyer and Plöger 1975).

The intensity and extent of achievement-oriented self-reinforcement are produced by the experience of the validity of an achievement standard and by the awareness of one's own effort and ability in achieving this standard. The experience of positive or negative effects are thus nullified in the case of tasks that are unrelated or inappropriate in difficulty. These tasks can no longer be made compatible with individual effort or ability. This is even more critical if the student himself has already built up unfavorable causal attributions, an unfavorable concept of his ability, a predominantly negative pattern of self-reinforcement.

Cognitive intermediate processes in individual achievement efforts are thus directly as well as indirectly influenced by features of teacher-student interaction. This is confirmed by several studies for the following constructs: confidence in success as opposed to fear of failure (Rheinberg

et al. 1978); test anxiety (Rheinberg et al. 1978); the estimation of one's own improvement in achievement (Rheinberg and Peters 1978); causal attribution (Cooper 1977). As central reactions to experiences of scholastic success or failure they influence the student's formation of expectations with respect to his ability to change his own school achievements, his ability ^{and} to direct these through increased effort within the scope of what he knows to be his own ability. These features also influence the student's subjective calculation of effort and thus the type and extent of future achievement efforts.

Features of teacher - student interaction are accordingly closely tied into a system of achievement demands, achievement results, and achievement evaluation. Differences in interaction are thus also ^{and} disparities in the allocation of formal chances for learning and in the recognition of past opportunities for learning. This state of affairs can be both directly advantageous as well as disadvantageous to individual students. At the same time, the achievement-oriented change in scholastic interaction however also means that social attributions, interpretations, ^{and} expectations before and after the results of scholastic achievement, form the basis for the development of one's own concept of ability (cf. Shavelson et al. 1976).

The manifestation of a generalized self-concept of one's own scholastic achievement ability is, however, not only of individual significance, but also has social functions which can only be fulfilled by sufficient correspondence between scholastic evaluation and one's own self-estimation. Only then can those aspects of scholastic achievements in integration result which are necessary in securing the legitimation of societal conditions and the creation of mass loyalty. This can be made clear in view of the most important cognitive determinants.

Thus, the assumption and acceptance of binding scholastic achievement norms as a component in the formation of the concept of one's own ability consist of:

- academic achievements that are accessible to a direct comparison and which present one of the most important universal standards of evaluations;
- social gratification alone or gratification that is primarily linked to individual achievement in competition with others;
- the application and implementation of these norms independent of the person is a just evaluation of achievement because it is objective and neutral;
- the distributions of social gratifications and the formation of social hierarchies are just in as much as these are linked to standards of quality (cf. Parsons 1964; Boocock 1966; Dreeben 1968; Gintis 1972; Hurrelman 1975).

Inter-individual differences in student achievement are traced primarily back to internal differences in ability and effort on the part of teachers (Meyer and Butzkam^m 1975) and students (Fend et al. 1976, 1977). The frequent and exclusive use of these causal explanations makes individual learning efforts and learning abilities a suitable means of changing one's own living conditions. The failure of those people who are not successful in improving their situation can, on the other hand, be explained by their own lack of corresponding abilities and motivation.

D. Multi - Level Analysis

Theories explaining the acquisition of knowledge and cognitive learning processes have previously preferred achievement criteria which contain few presuppositions and that are easily measureable. These have been connected with a number of educational structural conditions with variables of systematically planned learning environments and with features of the teaching - learning processes. Initial student differences in level of knowledge and in cognitive structure, antecedent and concurrent conditions of socialization, and intra- individual development changes, were frequently brought in only summarily as control variables.

It was not possible even here to successfully reduce the complex objective domain to models with relatively few parameters as would have been useful for practical research. The assumption of universal effects of socialization of school and instruction were invariant with respect to time and independent of the population could only be maintained with the loss of empirical verification and informative contents. Analyses of the surface structure of teaching and learning processes and situations generally indicate statistically as well as practically significant effects of school and instruction.

This has already been illustrated by the IEA studies. Here the assumption of general school achievement effects had to first be corrected by sub- grouping educational systems according to developing and industrial countries. Only slight disparities in effects were demonstrated in the educational systems ~~of the industrial systems~~ of the industrial countries; these showed a thoroughly inconsistent pattern of effect and could be ex-

plained in a few exceptions through system variables which were introduced. In the comparison of educational effects within national educational systems, it was demonstrated on the other hand, that the effectivity of school systems is interactively connected with the structural features of educational systems, with the student population (characterized by mandatory attendance vs. free choice) as well as with the disparities in family income and social status.

It was also indicated that the explanatory models which were simply conceived with respect to the general meaning of institutional, instructional, and interactional parameters of scholastic socialization had to be transformed into differentiated contingency models with a narrow range of applicability because of empirical pressure. It is evident that surface structural modelling of educational socialization effects tends to obscure various things because the models do not make reference to assumptions in the underlying transformations and mediation processes and structures, or, they go into these only in an unsystematic manner.

The necessity of developing theories of educational socialization against the deep- structural background of the individual acquisition and modification of knowledge contents is increasingly accepted. The relevant social contexts and learning environments are deeply and complexly intertwined. Various ordering schemata may be used to disentangle them. (cf. Bronfenbrenner 1977). It is natural^{to} order the educational conditions of socialization hierarchically and to attempt to explicate them on different levels. This also corresponds to^{the} customary, practical, and analytical differentiation of levels according to educational system, school district,

school, and school class. It must of course be supplemented by such parameter classes which characterize the influence of socialization environments external to school (e.g. family and community) and that are explicable on the individual level. From this results a hierarchical set of parameter classes which suggests the use of multi-level analyses and the estimation of educational socialization effects in vertically differentiated models (cf. Weinert and Zielinski 1977). In the past, explications differentiating according to levels of analyses and the connection of explanatory variables of educational socialization effects have been incorrect.

Explanatory models usually only take one level of analysis into account in the selection of variables while other (hierarchically higher vs. lower) variables are left out entirely or are only considered inadequately. In verifying the model, the resulting mistakes in specification lead to distorted estimations of co-efficients (usually an over - estimation of the significance of the home). This makes it difficult for non-experimental studies to explicitly introduce relevant explanatory variables on differing levels of analyses and it also makes it difficult to specify the type and extent of the significance of the criteria.

This also means that identical explanatory variables (e.g. vocation of father) vary in significance according to level specificity (cf. Cronbach et al. 1976; Burstein and Miller 1978):

On the individual level, for example, the father's vocation can indicate various possibilities (genetic make-up, learning environment beneficial to scholastic success, cognitive quality of parent - child interaction) for the explanatory value of parent-child specific variables.

On the level of school class, the same variable is more likely to mark the standard (X) used for student specific self- estimation of status in relation to other students.

On the school and community level, the father's vocation may characterize social structure differences in the student population; it may also indicate the selectivity of types of schools of further education dependent on social and educational policy decisions (e.g., about acceptance and selection criteria).

Only through the representation of individual hierarchy levels by means of explicitly introduced variables, can the previously mentioned interconnectedness of students in school classes, in schools, school forms, and in school systems be partially disentangled. Only in this way can the specificity of school effects as in the IEA studies, for example, be explained from the interaction of school and school system variables. If this is not done, school effects may possibly remain obscured and their contextual reference to specific frame and marginal conditions may be lost, rendering the influence mechanism incomprehensible.

- The vertically differentiated connection between variables from different levels of analysis have up til now been accounted for in the following way:

- (a) Assumptions are selectively formulated and verified only for one level of analysis, i.e., only on the school class level.
- (b) Assumptions are selectively formulated for various levels of analysis, but only verified on one level. Variables from different levels are brought to ~~one~~ one level through data transformation (aggregation, disaggregation). The same set of data can be successively subjected

to one single level of analysis or to successively different single level analyses.

- (c) Assumptions for only some levels of analysis are formulated and simultaneously verified on different levels.

Up to now, methods of analysis such as type (b) have dominated, whereby the obtaining of information is attributed to a successive verification of multi-level models through several single level analyses (cf. Walberg 1976; Dreesman 1978). Nevertheless errors in specification occur when different level variables (e.g., student, school class, and school) are not placed on an appropriate level when they are placed on a common influence and explanation level.

In an investigation conducted by Treiber and Schneider (1978), the significance of several variables from different levels (school classes and student background) are first estimated in two single level analyses - i.e., once on the class level and once on the student level. In a multi-level analysis the weight of these variables from different levels was then ascertained as follows:

--An analysis of co-variance estimated the sum of the effect of all student background variables on the individual level ($n = 1943$). In an analysis of communalities, the sum of effect variables of student background went, together with the class variables, into a class level ($n = 79$).

(Insert Table 7)

TABLE 7

UNI - VS. MULTI-LEVEL ANALYSIS ESTIMATES
OF UNIQUE AND CONFOUNDED VARIANCE PORTIONS
IN EXPLAINING SCHOOL ACHIEVEMENT

	Uni-Level		Multi-Level
	Class	Student	
Sample Size	79	1943	
Background: Unique	411	244	297
Classroom Context: Unique	066	008	067
Both confounded	- 008	005	- 013
Total criterion variance explained	469	257	351
Unexplained criterion variance	531	743	649

Source: Treiber & Schneider 1978

A comparison of the results show that the co-efficient of student background variables (.297) in a multi-level analysis are similarly estimated on an individual niveau (.244), as in the single level analysis. School class variables^(0.67), however, are estimated on the school class niveau as in the single level analysis. These results accordingly support the assumption that the multi-level that was used specifies correlations between variables from different levels that are correct for the individual and the class niveau. In the single level analysis this was only possible for one level at a time. Here the influence of the class in the single level analysis is considerably under-estimated on an individual niveau (0.008 vs. .067), while the single level analysis significantly over-estimates the influence of student background variables on the class level (.411 vs. .297).

Thus, in the explication and correlation of individual explanatory variables of the effects of educational socialization, it is clear that their relative position in a hierarchically ordered structure of variables must be specified and taken into account in adequate multi-level analyses. Suitable models of analysis may be found in the works of Cronbach et al. (1976); Wiley (1976); and Burstien and Miller (1978).

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IV. SUMMARY AND CONCLUSIONS

1. Schools are societal institutions whose most important tasks include the cognitive socialization of younger generations. It is generally taken for granted that schools actually fulfill this function.
2. Little scientific research has been made into the actual and or possible effectiveness of school socialization. Above all, there is a lack of psychological theories which describe and explain the formation of developing cognitive abilities through ecological, institutional, and social conditions.
3. If one chooses a cognitive paradigm instead of a behavioristic one, then one assumes that development is not the result of externally determined cumulative learning process, rather that development must be viewed as the result of internally directed processes of confrontation with reality and processes of assimilation ^{on the part of} of an actively participating and thinking subject. Thus, it is necessary to construct idiographic development - socialization models as well as nomothetic ones.
4. The complexity of the objective domain of educational socialization and the heterogeneousness of theoretical and methodological possibilities has lead to strongly divergent patterns of description and explanation, in which the significance of school for the process and result of cognitive development is controversially judged.

IV. SUMMARY AND CONCLUSIONS

5. This discipline's lack of identity and the external orientation of its psycho- pedagogical research has hindered the development of methods of analysis which correspond to the problems. It has also hindered the development of research programs for the explanation of the effects of educational socialization on cognitive development.
6. Investigations that link only some of the few variables¹ with regard to institution, instruction, and interaction, with the total increase in achievement provide an extremely low theoretical contribution to the description of the process and effect of educational socialization.
7. The ^{assess-}ment of the extent of the effects of educational socialization and the categorization of their desirability are controversial. The institutionalization of educational processes is primarily justified by the transmission of cultural knowledge and instrumental abilities to masses of students. It is emphasized, on the other hand, that it is precisely the unintended school experience - in the sense of a hidden curriculum - which may be formative and lasting in its significance for individual lives. These can then be reconstructed as 'critical life events' which explain desired as well as undesired effects of education.
8. The theoretically postulated relationship between conditions of socialization in schools and concurrent socialization factors outside of school demands the construction of context models of educational socialization.

9. The process and effect of socialization in schools can be reconstructed according to the respective line of theoretical inquiry on different levels of analysis (school system, school type, school class, teacher- student dyads). Further theoretical and methodological development of multi- level models receives special attention in this context.
10. The research into the effects of socialization in schools must be supplemented through experimental and quasi- experimental analyses of the effectivity of alternative conditions of instruction on the features of cognitive development.
11. In systematically combined vertical and horizontal cross- section studies, universal and differential changes in cognitive structure should be comprehended and related theoretically and causally (as far as is possible) to conditions and variations of conditions in the educational environment.
12. The ability of cognitive development to be influenced by school should not only be analyzed during childhood and teens, but also in the framework of a life- span development perspective.
13. Within the process and result of cognitive socialization, the modification of the individual knowledge structure, the ability to think, and the subjective evaluation system all play a major role.
14. The theoretical analysis of developmental processes in behavioral modifications ^{that are} elicited experimentally and quasi- experimentally (instructional approach), and the stronger orientation towards instructional research by means of cognitive development models, as well as the increa-

sing weight of process features within newer socialization models present convergent theoretical development. They promise a future improvement of our level of knowledge about the influence of schools on cognitive development. Theories that differ in the rang

15. Theories that differ in the range of their validity (and thus vary in precision) are necessary for the scope and complexity of socialization as an object of research. These theories must link the following through the use of explicit rules: model elements for the description of learning contents, models for the description of cognitive structures (in terms of final and desirous conditions), models for the explanation of transformation processes on the part of the learner, and models for the description and explanation of the pedagogical steering of such individual transformation processes (lessons).

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