

EDUCATIONAL PSYCHOLOGY

BY

JAMES BART STROUD, PH.D.

*Professor of Psychology
Kansas State Teachers College
of Emporia*

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To
My Daughters
Margaret and Elizabeth

PREFACE

This book gives an exposition of those psychological facts and principles which have particular reference to educational problems. In those instances where there was no established precedent for the inclusion or rejection of a particular item of subject matter, the guiding principle has been simply this: Does this constitute material which the student of education should know? The text treats the conventional subjects of educational psychology, namely, learning, retention and recall, work, fatigue and efficiency, intelligence and intelligence testing, educational measurement, heredity and environment, mental development, and related topics. The reader will also find short chapters dealing with the subjects of instinct, emotion, and physiological psychology. The author feels that our knowledge of the subject of personality has been developed sufficiently within the last few years to warrant a thorough discussion in a book of this kind. Certainly no apology is necessary for the inclusion of this subject in a textbook of educational psychology.

The author has endeavored throughout to maintain a critical attitude toward the subject matter. The field of psychology is not understood perfectly enough at present to vouchsafe a dogmatic treatment. Furthermore, the day is probably not immediately impending when such a practice will be justifiable. So much in human behavior is relative that the student will profit more by a thorough grounding in basic principles. He needs to be schooled in the critical handling of such data. Relationships which hold perfectly true under some situations break down when these situations are altered. The reader should be cautious in drawing generalizations from data whose universality has not been tested. In order to further this aim some attention is given now and then to the methods by which

experimental research is conducted. Some such knowledge is essential to a critical appreciation of psychological data.

It has been the author's policy, when other things are equal, to use the recent experimental literature as the factual material of the book. However, it has seemed advisable frequently to sacrifice the advantages accruing from this policy for purposes of historical continuity, and in order to include those experimental studies which, in the author's opinion, have the greatest merit. It has not been possible to treat any of the subjects exhaustively. At best, no more than a few sample studies have been cited in support of each topic. For this reason it has been necessary to ignore many excellent investigations which reflect credit upon the workers who have made them.

One cannot carry out an undertaking of this kind without feeling grateful to the many investigators who, in true scientific spirit, have really done the pioneer thinking in the field, and who have labored unceasingly to discover scientific facts for the solution of the pressing problems. Anyone who has attempted to organize the subject matter of educational psychology cannot but be appreciative of the outstanding contributions of Professor E. L. Thorndike. There is scarcely a major subject in the entire field which has not been enriched by his capable leadership and tireless research.

The writer wishes to acknowledge his indebtedness to certain authors by whom he has been particularly influenced in the preparation of this book. A few of these are Professors H. A. Carr, F. N. Freeman, H. E. Garrett, A. I. Gates, R. Pintner, E. S. Robinson, P. Symonds, L. L. Thurstone, and J. B. Watson. Specific acknowledgments will be made in the appropriate context.

Professors H. B. Reed, J. A. McGeoch, and John Breukelman have read portions of the manuscript, and each has given many valuable suggestions. Professor H. A. Carr has made a critical examination of the entire manuscript. Perhaps to him more than to any other is the author indebted for whatever merit the book may have. Professor T. C. Owen has also gone over the

manuscript with care and has made many helpful suggestions in the interest of clearness and accuracy. Finally, the author wishes to acknowledge the valuable suggestions and criticisms of his colleagues, Professors W. H. Gray, H. E. Schrammel, and B. E. Tomlinson.

J. B. S.

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EDUCATIONAL PSYCHOLOGY

CHAPTER I

INTRODUCTION

THE SCOPE OF EDUCATIONAL PSYCHOLOGY

Fifty years ago the subject matter of psychology was limited to a few restricted topics, chief among which were the sensory and perceptual processes and association. Since that time knowledge of the subject has deepened and broadened. A subject which treats human behavior in all of its phases—its origin and development, the factors which influence it, those which promote its efficiency, and those which relate to personal adjustment—naturally has many branches. These divisions are often arbitrary, and at best serve merely as convenient methodology. Some of these which are commonly recognized are child, educational, abnormal, clinical, vocational and business, and animal psychology.

Educational psychology is a branch of psychology which treats of those facts and principles which are basic in educational theory and practice. It is not in any sense a course in methods; this is clearly the work of Education. There is, however, an organized body of psychological data, a knowledge of which is essential for sound educational policies. Educational psychology aims to give an exposition of those psychological principles with which the student of education should be acquainted. Such a student should be familiar with the modern status of the instinct hypothesis, and with the facts pertaining to the nature and development of emotional behavior. He should have a thorough knowledge of heredity, environment, individual differences and their causes, work, fatigue and

conditions of mental efficiency, mental growth, learning and retention, the nature and measurement of intelligence, educational measurement, and the nature and development of personality.

Historically speaking, learning, retention, and recall have constituted the most important subject matter of educational psychology. The question of the original nature of man has also occupied an important place in the thinking of educators. This issue, until settled, must continue to require the attention of the educational psychologist. There is probably no topic in the entire field of educational psychology which is as vital as is this in shaping pedagogical policies. Suffice it to say for the present that there has been a significant shift in opinion on this subject within the last twenty-five or thirty years. Educators formerly assumed that inheritance plays a much larger rôle in shaping the distinctive features of man's behavior than they do at present. In other words, cultural influences are given an increasingly important place in the development of human behavior.

Intelligence testing and educational testing have comprised one of the major divisions of educational psychology for thirty years or more. Questions of mental efficiency, usually treated under such headings as work, fatigue, and learning, have received their share of attention for almost an equal length of time. Within more recent years psychologists and educators have been paying a great deal of attention to the larger subject of behavior as a whole. This subject is discussed in the present text in the chapters dealing with mental growth and personality.

Teaching is, in a peculiar way, the joint concern of education and psychology. We should recognize that learning is the true measure of successful teaching, and that learning is a reaction on the part of the student. The point, and the only point, at which learning takes place is in the *mind* of the student. Effective teaching requires effective methods, and successful methods of teaching must be built upon an understanding of the mental life of the students. It is, therefore, the ultimate goal of educa-

tional psychology to supply the educator with a complete knowledge of those psychological facts and principles which are basic for sound pedagogical practice.

THE NATURE OF PSYCHOLOGICAL RESEARCH

The psychologist gathers his data through careful observation, controlled experimentation, and statistical analysis. His subjects are human adults—normal and abnormal, children, infants, and animals. In fact, he observes mental phenomena wherever they are manifested. These phenomena as they appear in adults are usually so intricate and complex that the psychologist finds it profitable to study them in a simpler form, as exhibited by animals and children, and in exaggerated form, as in the case of abnormal individuals. The elementary psychological principles appear to be applicable to practically all living organisms. The principles of nerve conduction, sensory processes, learning and habit formation, retention, emotional reactions, and changes in behavior organization are virtually the same in all the higher animals. Differences in manifestations of these fundamental psychological processes are chiefly differences in degree rather than in kind.

There is a close parallelism between the progress made in most of the branches of psychology and the success with which the experimental method has been adapted to those branches. Perhaps more advancement has been made in child psychology within the last few years than in almost any other branch of psychology. This is due, in no small measure, to the adaptation of the experimental procedure, so successful in animal research since 1900, to the problem of child development. Educational psychology is no exception to this rule; those problems which are of special interest to the student of education have yielded to the experimental attack with encouraging results. There is, however, one field in which notable progress has been made with little direct application of the experimental technique, namely, the field of abnormal psychology. Here data have been collected principally by careful observation and elaborate

case histories—procedures which conform more closely to the clinical than to the experimental method.

Both the clinical and the experimental methods depend basically upon observation, and the distinction between them is at best a relative one. The experimental procedure is essentially a method of controlled observation. While the best clinical observations are not uncontrolled, adequate controls have not been highly perfected in the majority of cases. The clinical method may be best described as the method of personal interview although the clinical psychologist usually makes use of standardized tests and measurements. The clinical and experimental methods differ considerably in their objectives; the former is more often concerned with remedying behavior disorders and in effecting personal adjustment to life's problems, whereas the latter is concerned chiefly with discovery of general psychological principles. Statistical analyses are often used to compensate for differences in experimental control.

Descriptive and explanatory concepts. As a matter of practical procedure, the student will find that it makes for clear thinking to keep descriptive and explanatory concepts distinct. Care should be taken not to confuse that which is observable and describable with that which is explanatory or theoretical. The psychologist strives to understand mental life as completely as possible, and introduces theoretical concepts from time to time; but observation and description should not be confused with those principles which are introduced for purposes of explanation.

In dealing with the problem of handwriting, for example, the psychologist is concerned chiefly with the nature of the learning process and with the factors which influence it. Detailed observations should be made of the behavior displayed in learning to write. The motion picture camera and other recording devices—especially those for muscular tensions—are of great service. A complete account of the learning process would involve description of diffuse muscular activity (which in the initial stages is pronounced), of muscular tensions (those

of the hand and arm used in writing as well as those of a general nature), and of facial and bodily expressions. Repeated observations probably would show as a concomitant part of the learning process a gradual elimination of this excessive activity. A complete account of the learning procedure would also require a description of the particular movements executed, such as the rôle played by the fingers, hand, and arm, the position of the hand, the nature of the sideward movement along the line, and the timing and rhythmical character of the strokes. Finally, the nature of the output should be analyzed for speed and quality. Progress is evidenced by improvement in spacing, in uniformity of size and shape of the letters, and by the gradual assumption of individuality in style. Thus, a true description of the process can be made only in terms of observable behavior manifested and in terms of quantity and quality of output. In such an account the nature and number of acts displayed in the initial stages should be stated, and the order of elimination of non-essential acts and the acquisition of new ones should be described. These changes in behavior should then be correlated with changes in output.

When all of the pertinent data pertaining to handwriting have been compiled, and the nature of the process of learning has been described both in terms of behavior and in terms of product, it is legitimate to undertake to explain the nature of the learning process in terms of general psychological theory. But the two categories, description and explanation, should not be confused. In attempting to *describe* the process of learning to write, one should never say that a child learns to write by fixing the pleasant and eliminating the unpleasant responses.

Attention is also called to the fact that behavior cannot be described in terms of *neurons*, *synapses*, *bonds*, or *pathways*. These structures are observable only in dead tissue. In no case is one able to examine such tissue and to say anything at all specific about the behavior it executes. It is impossible by an examination of the nervous system to tell whether an individual, when alive, was educated or illiterate, whether he sang,

smoked cigars, or suffered fears; in fact, nothing distinctive about his behavior can be discerned by this method. Such knowledge of an individual can be secured only through a study of his behavior. An examination of the neural structure of a monkey shows a speech center, as in man, and the neuro-muscular mechanism might lead one to conclude that the monkey talks; but observations of his behavior show that he does not. While many brilliant experiments attest the correlation between mental life and neural mechanism, behavior cannot be *described* in neural terms. However, all of our attempts to *explain* behavior are founded chiefly upon neural hypotheses.

SOME EDUCATIONAL PROBLEMS

As is stated above, teaching, in order to be effective, must be adapted to the mental conditions of the students for whom it is planned. In psychology, just as in medicine, most things are relative. If this were not the case, if the symptoms were manifested alike in all individuals, and if all individuals responded to the same kind of treatment, very little knowledge would be required to practice medicine. If the nature of mental life were constant for all individuals, if all persons learned equally well, had the same interests, the same abilities and temperament, and were all equally affected by the same incentives, little training beyond a knowledge of subject matter would be required for successful teaching. Since this is not the case, effective instruction must be planned not only with reference to the intellectual abilities of the pupils, but also with reference to the many other abilities and traits which influence the character of the work done.

The functions of the school do not end with effective teaching of the specific subject matter of a prescribed curriculum. Since the average child spends much time in school during the development period, the school should assume some responsibility for his full development. Children spend a large share of the normal life span in school; this should be both profitable and enjoyable in the widest sense. Perhaps, instead of planning the student's

entire program for the promotion of a single goal, adult citizenship, the school might well give considerable attention to the purely pleasurable side of school life. It should be concerned with the adjustment of the student to school life and with the more or less permanent personal problems of life, as well as with his career. In other words, the school should educate for a happy life for its students, and for happy and useful citizenship when they have been graduated.

The members of a class usually exhibit wide differences in intelligence, interest, temperamental and emotional conditions, stability, home training, culture, ambition, social tendencies, attitudes toward school, and in many similar respects. They also differ in size, age, anatomical development, health, and personal appearance. The school, through its teachers and supervisors, is able to render effective assistance in the development of the personality of the pupils only in case these variable factors are taken into consideration.

Let us review briefly some of the most important respects in which children differ. As a rule, the members of a class show considerable variation in age—a tendency which increases somewhat with each succeeding grade. It is also true that children of the same chronological age often vary markedly in height, weight, and physiological maturity. Wide differences in age, and in rate of development of children of the same age, increase the problems of socialization within the class.

Children differ in rate of mental growth and in the ultimate level of attainment, just as they do in physiological growth. As we shall see in the following pages, the distribution of intelligence approximates rather closely the normal probability curve. These differences are significant not only because they affect the learning ability of students, but also because they must be taken into consideration in planning the student's career, and in guiding him in the adjustment to his life's problems.

The fact of racial differences cannot be overlooked in an up-to-date educational program. In Chapter XII the question of

racial differences in intelligence is discussed at some length. It seems incontrovertible that in America the intellectual prowess of the Negro is inferior to that of the white population, and that the Indian is surpassed by both the white and the Negro races. The Mexican children within our borders also appear to be inferior to white children in intellectual status. Some provision must be made for these differences in an educational system. While no significant differences have been established between other races in intellectual status, there are other notable racial differences which must be taken into consideration in any adequate educational program. Variations in racial traditions, ideals, codes of ethics, cultural values, and religious views are some of these factors to be considered in connection with problems of motivation, interest, discipline, social adjustment, and vocational guidance.

Ordinarily, the members of a class differ widely in learning ability. It is a well-known fact that students of the same level of intelligence vary widely in scholastic achievement. This fact is accounted for in terms of differences in interest, motivation, adjustment, home life, previous training, and the like. Anything less than a high correlation between the intellectual ability of a student and his scholastic accomplishment must constitute an indictment of our educational institutions, taken collectively. Necessarily, effectual teaching, as well as successful attempts to effect an adequate adjustment between the child and the total school situation, must take into account these differences in learning ability.

Child training is to a large extent an individual matter, as is apparent whether one considers the larger problems of adjustment to school life and to other social situations or the more restricted problem of classroom instruction. The teacher's opportunities are often circumscribed by her desire to treat all children fairly, and by the demand of the community that she do so. Treating all pupils fairly has sometimes been confused with treating them alike, particularly in the matter of discipline. It is not what measures are adopted, but their effect,