CHAPTER 1

INTRODUCTION

THE Army's unprecedented utilization of films and similar mass communication media during World War II provided a favorable opportunity for experimental studies on the effectiveness of these devices. This volume describes a series of such studies conducted by the Experimental Section of the Research Branch in the War Department's Information and Education Division. The films studied included the "Why We Fight" series, designed for indoctrination of members of the Armed Forces concerning the events leading up to American participation in the war, and a number of training films studied in cooperation with other divisions of the War Department. The methods used in these studies and the results obtained are described here in the belief that there will be increasing use of such procedures both for determining whether motion pictures and similar media really do succeed in attaining their objectives and for modifying the products in accordance with the results obtained by research.

These experimental studies comprised a large-scale attempt to utilize modern socio-psychological research techniques in the evaluation of educational and "indoctrination" films. In nearly all cases, however, the studies had an immediate practical purpose and did not constitute a systematic research program. The present volume is, therefore, essentially a report on those by-products of the applied research that are thought to be of scientific interest. In preparing the report, an attempt has been made to give some systematization to the results and to present a rationale of the general field of research on mass educational media.

In the majority of the studies motion pictures were used as the communication medium. For this reason the discussion that follows is phrased mainly in terms of films. However, the primary interest throughout is not restricted to films as such, but rather is in principles which would apply more generally to any mass communication medium. It is to be expected that ultimately the re-

sults of film studies will become part of a more general body of principles concerning mass communication. Mass communication principles in turn will presumably become integrated into a larger body of principles concerning the manner in which ideas and ways of reacting are acquired through learning. A systematic treatment of educational film research therefore should ultimately include principles at three different levels of generality:

1. *Basic learning principles*—common to all educational devices.
2. *Mass communication principles*—applying to films and similar educational media.
3. *Film principles*—related specifically to the medium of films.

The *basic learning principles* would be phrased in terms of very general concepts, such as "repetition," "response," "motivation," "interference." *Mass communication principles* would translate these principles into the terms of more specialized learning situations —"participation," "interest," "initial attitude," "attention," etc. *Film principles* would be generalizations at the most specific level, translating from the two more general levels into a specialized terminology for films. This might include terms like "dramatic presentation," "animation," "voice-over narration," "discussion breaks," etc.

The research to be described is mainly restricted to analysis of *the effects of films on the audience.* Therefore many types of research connected with films will not be covered here: problems of film distribution, methods of maximizing voluntary attendance, library "research" on background material, curriculum analysis, etc., are excluded. Even with this restriction to analysis of the educational effects, a number of different kinds of film research may be classified, each with its own requirements and restrictions as to conclusions that may be drawn.

Objectives of Film Research

A basic distinction can be made between studies where the purpose is to evaluate a completed product and those where the purpose is to investigate variables by controlled variation. These two kinds of research may each in turn be divided into two subtypes, giving four general classes of film study:

1a. Evaluation of a single film.
 b. Evaluation of a class of films.
2a. Experimental investigation of a single variable by controlled variation.

b. Experimental analysis of two or more variables in combination.

Each of these classes of film research is briefly characterized below. The studies described in Part I of this volume are *Evaluative* (1a and 1b) while those of Part II employ *Controlled Variation* (2a and 2b). In both kinds of studies the main emphasis was on the measurement of changes in knowledge, opinion, or behavior produced by a film or other communication device. This contrasts with most commercial film research, which is limited to polling the audience to determine what they think of the film.

1a. *Evaluation of a single film.* A film may be produced to achieve a particular educational objective and a purely practical research project can be carried out to determine the extent to which this objective is achieved. The adequacy of the research is determined by the representativeness of the sample audience, the representativeness of the conditions of testing, and the validity of the measuring instrument. The sample of people must represent the population for which the film is designed, the experimental presentations must approximate the actual conditions of use of the film, and the measurements made must reflect the behavior changes desired of the film as an educational device. The measurements need not reveal all of the behavior changes produced by the film but may be primarily focused on designated objectives. For example, a film may have the purpose of explaining the structure of the American government and it would be unnecessary to measure any American history that might be taught by the film. Or, a film may be designed solely to stimulate discussion on a subject, in which case only the effects of discussion stimulated need appropriately be measured, although the audience may incidentally have learned a number of facts from the film.

It is important to note that conclusions from an evaluative study of a single film apply to *that particular film;* generalizations to other films have the status of untested hypotheses. Some film studies may not actually have the purpose of evaluating a single product but nevertheless may conform to the pattern of such a study and have the same limitations on generalizability. Thus a test of the effects of a single film may be conducted "to determine the utility of films as educational devices"; obviously the conclusion from such a study would normally have little generality.

Aside from their limited scientific value in contributing testable hypotheses which may lead to the development of principles, evalu-

ative studies are useful as a form of *applied* research. If the evaluations are made when the films are finished products, the most the results can tell the film producer is whether he has succeeded or failed in attaining specified educational objectives. If he has failed in major respects, the only recourse is to reject the film or design supplementary materials to reinforce its weak points. Further application of the results is possible only to the extent that the implications of the findings can be generalized to future films of a similar nature.

However, if a "rough cut" or preliminary try-out version is used in the evaluative study, prior to the completion of the finished product, the results can be more useful to the producer. They may then be utilized in modifying the film, or if need be in redesigning it, so as to try to correct or reinforce the weak points in its presentation. Ideally such evaluations should be carried out as early in the stage of production as feasible, and repeated after each major stage of revision. By successive correction and re-evaluation one might achieve a far more effective communication than if the product had been carried through to completion as originally designed.

1b. *Evaluation of a class of films.* A research project may seek to evaluate a class of films rather than a single product. In this case, besides the problems of adequate audience sampling, representative conditions for testing, and validity of the measuring instrument, there is the additional problem of adequate sampling of the class of products about which the conclusions are to be made. The conclusions have to apply to the *average* film of a particular kind—a consideration which greatly multiplies the size of the project as compared with evaluation of a single film.

For example, a study may be done to determine the effectiveness of films in teaching a particular subject, such as general science. Even if an adequate sample of existing films of this type were used and compared with an adequate sampling of other instructional devices, the conclusion would apply only to *existing* films of this type and would not determine how effective such films *could* be.

This form of research has also been used in attempts to get at the effect of a particular film variable. For example, the question may be, "Which is more effective for educational purposes—silent film or sound film?" The variable here would be sound accompaniment in educational films. A number of examples of sound and silent films —comparable in varying degrees in other respects—are compared to determine their "relative effectiveness." The results of this

mode of attack have doubtful generality. At best they could give only the typical effects of the variable as usually employed; when the sampling of films is small, even this conclusion cannot be drawn.

2a. *Experimental investigation of a single variable by controlled variation.* A more efficient mode of attack on the type of question discussed in the preceding paragraph is one in which the variable under consideration (in this case, the use of sound) is studied by means of controlled variation. Here all factors are held constant except the one being investigated. For instance, in the case of sound vs. silent films controlled variation would involve comparing the effectiveness of sound and silent films having the *same subject and pictorial content.* This would require the use of two films (or of pairs of films) differing only in the particular of having representative sound accompaniments for the pictorial material in one film (or set of films), with the appropriate portions of the sound replaced by visual titles in the parallel film or films. Thus instead of trying to "average out" differences due to noncomparability, the experimental and control forms of the film presentation are constructed so as actually to be comparable.

Even where this form of research is undertaken, there may be difficulties in achieving comparability with respect to irrelevant variables. To use the above example of the effects of sound accompaniment, this factor might be controlled by using a sound film with the sound omitted, or a silent film might be used with sound "dubbed in." But if the techniques of sound and silent film differ, the result might be quite different when the sound is omitted from a sound film and when the sound is added to a silent film. Sound accompaniment might turn out to be an important factor in the former case and a detriment in the latter case. With other types of variables, the problem of achieving comparability of control and experimental conditions might readily be solved. For example, a comparison of a color film and an achromatic print of the same film would probably involve no similar difficulties, nor would the measurement of the effects of showing a film twice as contrasted with a single showing.

Probably one of the greatest difficulties in the way of drawing useful conclusions from this type of film study is the problem of generality. An inherent feature of such research is that it seeks a conclusion about a single variable without respect to other variables with which it might interact. Thus sound accompaniment might be an aid to learning under some conditions and a detriment in

others. An unqualified conclusion derived from a single-variable study would ordinarily have to be checked with a variety of films and under a variety of conditions before its generality could be determined.

2b. *Experimental analysis of two or more variables in combination.* As suggested above, it seems likely that with the complexity of variables present there would be few empirical generalizations that would hold up for all educational films, all audiences, and all conditions for using the films. Variables would be expected to interact so that the effects of any one variable would have to be differentially designated according to the accompanying variables. Accordingly, the result of an attempt to determine the generality of a conclusion about a single variable would lead to a series of principles rather than a single principle.

Because of this likelihood, the type of research that will probably result in the broadest generalizations for the field of educational films and related media is research studying the controlled variation of several variables in combination. The qualifications on the generalizations are thus determined, and generalizations may be stated in the form: "Under condition *A*, result *1* is obtained, whereas under condition *B*, result *2* is obtained."

Multi-variable experimentation will be needed to establish such principles, and the research will be benefited greatly by being based upon adequate theory. A "shotgun" empirical approach would necessitate studying any number of variables in combination, whereas the development of a successful theoretical structure makes it increasingly likely that the experimenter can select in advance the proper variables—both those which most influence the effects of a communication and those which modify that influence. In addition, there is more likelihood that the correct generalization will be made from findings proceeding from a theoretical statement, which is already couched in general rather than specific terms. A purely empirical generalization, on the other hand, may often generalize in terms of the wrong variables. For example, in early research on memory, the "law of forgetting," was formulated on the assumption that forgetting was due to the lapse of time. Subsequent theoretical developments deriving from other experiments led to the prediction that time was a false variable in this generalization and that it was the nature of the activity intervening between learning and recall, rather than lapse of time per se, which was primarily

responsible for forgetting. This prediction was subsequently verified experimentally.

These advantages of a theoretical structure emphasize again the desirability of integrating scientific research on the educational effects of films with research on other educational methods and with the psychology of learning in general. Wherever possible, the concepts and variables of film study should be related to those of a general theoretical structure which is applicable to the entire field of education.

Of course research does not necessarily have such broad scientific aims; it may sometimes have a purely practical purpose. For example, it may be desired to determine which of several available films should be selected for use in a given course of instruction. The answer could make an important difference in the success of the course, but it would have no implications for general principles about films except to suggest hypotheses useful in subsequent scientific research. But even for practical purposes the decisions one can make on the basis of principles are often more effective—because of their known generalizability—than those based on conclusions from specific evaluative studies. The ultimate objective in developing general principles is, in fact, to improve our ability to make wise practical decisions.

Kinds of Variables Related to Effects of Films

The discussion so far has taken "variables" for granted and has not discussed different types of variables that may influence the effects of a film. Such variables could be classified in a variety of ways. The classification that follows is simply in terms of *locus* of the variable, but at least serves to identify, in broad categories, the areas in which film research problems might exist.

1. *Population variables.* One of the first considerations of the producer of an educational film is the nature of the audience which a film or other communication is designed to affect. Thus one group of variables determining a film's effects are the *population variables.* Important examples of such variables in most educational films would be *age* (general maturity), *intelligence,* and *previous knowledge* of the subject matter. For example, a film for children would be designed differently from one for adults; a film for an audience composed of individuals differing widely in learning ability might require a greater range of kinds of presentation than one for a

homogeneous audience; and a film for specialists would be pitched at a different level than a film for laymen. In educational films with special purposes, other population variables might also become particularly important. Thus, in a film with a broad educational purpose such as one designed to overcome prejudices, the initial attitudes of the audience might be particularly important.

2. *Film variables.* With the nature of the audience in mind, a film producer must decide what to put into the film in order to achieve its educational purpose. The total field of what may be included in the film or other communication may be referred to as *film variables,* or content variables, and the producer must include some things and exclude others according to their probable effects on the intended audience for which the film is designed. To a certain extent, of course, the contents of the film are determined by the educational purpose, but principles relating content variables to effects on the audience would also be an important guide, particularly to mode of presentation.

3. *External variables.* Once a film has been produced, the educator must decide the most effective way of using it. Variables other than properties of the film and properties of the audience may be called *external variables.* For example, the effects of a film may differ according to what supplementary material is presented, either prior to or after the film. Or, effects of the film may be studied as a function of "discussion breaks," interpolated quizzes, and other procedures involving interrupting the film and using devices designed to maximize its effectiveness.

It should be pointed out that the three kinds of variables cannot be considered independently; rather, research on any one of these variables is best carried out in relation to the interactions with other variables. Furthermore, a given psychological variable may occur in more than one of the three categories outlined above. Thus motivation, as a variable in learning, will be a *population* variable in that some audience members will possess more motivation to learn than others; it may be a *film* variable if techniques to motivate the audience are incorporated into a film; or it may be an *external* variable if a supplemental technique of motivation—such as announcing in advance that a quiz on the film will be given—is used in conjunction with showing a film.

The relation of film effects to *population variables* and *external variables* can be analyzed in any kind of film research. For example, an evaluative study of a single film can show how the effects vary

as a function of intelligence, or age, initial bias, or other characteristics of the individuals in the audience. Here some replication of effects is possible even in evaluating a single film, since the film may have a number of discrete effects which can be individually related to a given population variable. Similarly, the evaluation of a single film under two or more external conditions of presentation constitutes a study of the effects of an external variable, although the generality of the conclusion may be limited. In the study of *film variables,* on the other hand, it is usually necessary to have two or more controlled versions of the film. The only exception to this would be a single film in which controlled variation was accomplished in the treatment of different parts of the film; but this approach lacks complete control without another version in which the treatment of different parts is reversed. For this reason studies of film variables are usually more difficult and expensive than studies of population or external variables.

Kinds of Effects of Films

So far little consideration has been given to kinds of *effects* produced—the dependent variable in the science of educational films and related media. It is important to distinguish two broad categories.

1. *Interest and evaluative reactions of the audience.* In the production of Hollywood features the main criterion of an effective film is the "box-office"—that is, the attendance at the film. With this criterion, one relevant concern for research is to measure the immediate reactions and evaluations of the audience. Whether or not the audience showed interest in the film would probably be the film's most important "effect." Subsidiary measures would be the audience's opinions and comments about specific aspects of the film.

Such evaluations on the part of the audience may frequently be a useful part of research on educational films. Part of the purpose of the film may be to initiate interest in a subject, and interest shown in the film might serve as one measure of its motivational value. In any case, interest in the film would be important from the standpoint of maximizing attention, and thereby the amount learned, during the showing. Other aspects of the audience's evaluations of authenticity, fairness, and coverage of relevant facts may also be useful indices of factors influencing what is learned, particularly in a film on a controversial issue.

There is, however, a tendency for many individuals who are not

familiar with experimental research on educational films to think in terms of audience evaluations as the sole measure of the effectiveness of films. Although evaluations by the audience are usually of importance in educational films, the real purpose of the film is to *teach* something, and the effectiveness of the film in this sphere must be determined by some measure of what has been learned. It is even possible that much might be learned from a film that was intensely disliked.

2. *Measurement of what the audience has learned.* The kind of measurement usually most relevant to determining the effects of an educational film or of particular variables in the field of mass communications is measurement of the extent to which the film or other communication device actually teaches the material to be learned. If a film is designed to teach history, the critical question is the amount of history learned by the audience as a consequence of seeing the film. This cannot be determined by asking the audience how much they learned—it can be determined only by giving a history test with and without exposure to the film. Similarly, if the purpose of the film is to reduce a particular prejudice, the relevant measure is a measure of the extent of this prejudice with, as compared to that without, exposure to the film.

In some cases it is relatively easy to measure the actual behavior a communication is designed to influence. A film on history would probably be a good case in point, since history is a verbal subject and it should not be difficult to prepare the relevant verbal test. On the other hand, a film for infantrymen on the subject of hand-to-hand combat is designed to affect men's ability to take care of themselves in combat, which would be a difficult ability to measure, either in training or in combat. An indirect measure might be obtained from *simulated* hand-to-hand combat, but a verbal test would be very indirect and of unknown validity as a measure of the teaching effects of the film on performance at the actual task.

Nature of the Film Research Done by the Experimental Section

As indicated earlier, all of the studies carried out by the Experimental Section had a practical purpose rather than a purely scientific one. In most cases, film materials studied were prepared independently by film-makers to achieve desired effects rather than to establish principles of film construction or use. Even where a clear-cut test of a factor was possible in a study there was little or

no opportunity to determine the generality or the limits of the findings by replication with a variety of materials.

Three general categories of kinds of films were studied. These are described below.

Orientation films. A preliminary study undertaken by the Experimental Section was to get information on the desirability of using documentary films instead of a series of orientation lectures then being given by local camp personnel in the Army. Following this study, a series of "Why We Fight" documentary films was initiated by the Information and Education Division. As a sequel to the earlier study the Experimental Section was called upon to evaluate the first four films in the series. One purpose of this research was to evaluate the effectiveness of the films in imparting information about the background of the war and in effecting changes in attitudes toward the war that were related to the objectives of the Army's orientation program. Another purpose of the research was to insure against the possibility of any undesirable effects that might result from the films. Partly for this reason the studies of each film were carried out prior to the general release of that particular film for Army distribution.

The content of the orientation films was primarily factual material, but there was a considerable amount of interpretation of the factual material. The films were shown during training hours, but they were not presented as part of any courses of training on which the men would be tested. These films may therefore be distinguished from instructional films that are integrated into a regular teaching program in that little or no external motivation is applied as an incentive for learning the material presented. The films were more like voluntary education—they had to "sell themselves." Little expectation of immediate application—either in an "exam" or in putting the material into practice—was present as a stimulus for paying close attention. For these reasons, together with the fact that some of the content was controversial material, considerable emphasis was placed on stimulating interest and getting acceptance of the interpretive material.

Three general types of measurements were made in connection with orientation films: (1) measurement of experimentally produced changes in knowledge of factual material; (2) measurement of experimentally produced changes in interpretations, opinions, and "morale"; and (3) the audience's evaluation and acceptance of the

films. The last type of measurement was, of course, not experimental; men were questioned after seeing the film for the stated purpose of finding out what they thought of it. However, in the experimental measurement of film-induced changes in interpretations, opinions, and "morale," it was necessary to measure the effects of the film without awareness on the part of the men that an experiment was in progress. This was necessitated by the type of effect being studied—if the men knew they were being tested some might give what they thought were "correct" answers rather than answers expressing their own feelings in the matter. Thus *learning* the content and *accepting* the content must be distinguished. In the case of changes in knowledge of material accepted by the audience as factual, on the other hand, measurement may be made with full knowledge that a test is being given.

Training films. During the course of the studies of orientation films, a series of investigations was requested by personnel concerned with visual aids in the Military Training Division of Army Service Forces. This organization had no research facilities for studying the training value of their films and other visual aids, and wished to use research methods as an aid in improving the effectiveness of their products. In line with this request, several experimental and nonexperimental studies were carried out on training films, film strips, and other visual aids. These were practical studies with the purpose of testing the training value of factors which on a priori grounds seemed possible sources of product-improvement. In some cases the studies took the form of controlled variation of one or more variables.

With instructional films of this type there is for the most part no problem of authenticity or acceptance of the material. Also, the use of such a film is usually integrated into a general course of instruction in which there exists external motivation to learn the material shown in the film. This motivation is in terms of an expectation of early application of the material, either for some useful purpose or at least in examinations on the subject of instruction. Thus such a film does not usually place much emphasis on "selling" itself; rather it is usually assumed that an external source of motivation is present and effort is concentrated on other aspects of effective teaching methods. Correspondingly there is usually no need to test for effects without awareness on the part of the audience that a test is in progress. Normally no test would be announced in advance of the film showing, unless this was a factor being studied; but no at-

tempt would be made to conceal the connection between film and test once the test was about to be administered. In fact at this point it might even be desirable to maximize test motivation, to permit measuring the amount of learning that occurred without dilution of effects because of lack of effort.

Films designed to satisfy general interests. Having been stamped as "film testers" by experimental studies on orientation films and other films, the Experimental Section was also called upon to carry out a number of nonexperimental studies of films sponsored by the Information and Education Division. In some of these studies chief concern centered about what the men thought of the product. For example, a study was carried out to determine whether a film describing Army educational opportunities overseas during the redeployment period would "boomerang" because it was "too Hollywood" to make a convincing presentation. Similar audience-evaluation studies were carried out on a number of films in a series designed to satisfy overseas men's desires to know about what was going on back home, in other theaters of operations, other branches of service, etc. Studies of these films were designed primarily to determine what kinds of topics, presentation methods, etc., were liked or disliked by the men. Thus measurements with these films were in terms of audience evaluations of the products.

Scientific Status of Present Investigations

As stated earlier, the present studies do not comprise a systematic program of research in the field of educational films. Most of the studies were evaluative and all were dominated by practical rather than theoretical considerations. However, the studies covered a fairly wide range of designs, variables, types of films, and kinds of effects measured, and they illustrate many of the methodological problems that are encountered in research on films and similar mass communication media. No specifically methodological studies were possible within the scope of the purpose of this program, but some evidence was accumulated on methodological problems and in several instances new techniques were utilized.

In some respects the studies were carried out under advantageous conditions not usually possible in film research with civilian subjects during peacetime. Although the audiences were restricted to the male population and to the age range of those eligible for military service, they had a wide range with respect to intellectual ability and various regional and socio-economic factors. Moreover, it was

possible to avoid a problem sometimes regarded as insoluble in the study of films designed for general consumption—namely, the fact that the audience members attend voluntarily, and there is often no way to control this "self-selection" factor without biasing the results by the psychological effects of forced attendance. In the Army compulsory attendance is the norm, so the problem was automatically eliminated. This advantage is particularly relevant in the case of orientation and general interest film studies, because these films were of the type that would be used in attempts to achieve broad educational purposes among members of the general public, where the self-selection problem is most acute. Another favorable condition in the Army studies was that in most instances it was possible to carry out the studies with exact duplication of the conditions under which the films were to be used. Thus there was no problem of degree of applicability of "laboratory" findings to the real life situation.

Some of the material to be presented is in the form of pure hypothesis, since some of the results were obtained on a particular film with no opportunity to check them in further studies. Where such findings seemed important if proved generally true, or where they seemed reasonable on theoretical grounds, they have been mentioned as likely factors for future study. All of the results suffer from one of the faults common to a great deal of existing research on films and other communication media: they are results obtained in a single study or a few studies and therefore have unknown generality. However, they are presented as contributions to the accumulation of single studies from which generalizable principles will eventually be possible.