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MEDIA CREDIBILITY: AN EXPERIMENTAL COMPARISON OF THE EFFECTS OF FILM, AUDIO TAPE AND WRITTEN COMMUNICATIONS ON BELIEFS IN THE EXISTENCE OF UNUSUAL PHENOMENA

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MEDIA CREDIBILITY: AN EXPERIMENTAL COMPARISON OF THE EFFECTS OF FILM, AUDIO TAPE AND WRITTEN COMMUNICATIONS ON BELIEFS IN THE EXISTENCE OF UNUSUAL PHENOMENA

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CHAPTER I

INTRODUCTION

Many years ago, Nazi Propaganda Minister Goebbels is reported to have written in his diary words to the effect that visual images--no matter how he himself manipulated them before they were released--possess greater credibility than spoken or written words (Doob, 1948).

Since the demise of Nazi Germany, a large amount of social science research has been devoted to examining the complexities of the persuasive effects of film and the other mass media. An examination of this extensive literature (i.e., as compiled by Schramm, 1954 and Steinberg, 1966) reveals an overwhelming number of studies which investigate very complex changes in attitude, opinions and behavior as a result of exposure to a wide variety of messages originating in experimental laboratories, classrooms and "real life." This profusion of studies, most of which subsume multiple interactions of media, prior attitude, ego involvement and differential communication content, has led many investigators to conclude that very little can be clearly said about the comparative effects of media without a considerable number of qualifying statements.

Thus, unless one is willing to accept Goebbel's claim as simply further evidence of the notion that "seeing is believing" and stop there, the exploration of the parameters which affect the credibility of film and other media would appear to require a journey along a well-trodden route through a maze of complex interacting variables. The present study is an attempt to explore these parameters at a more basic level, utilizing a comparatively unique type of media content and dependent variable.

The content of the media used in this study, which will be discussed in detail in Chapter III, documents the existence of a highly unusual and unique phenomenon--retarded twins who can calculate dates in seconds from the year zero to centuries in the distant future. One of the primary dependent variables examined is a person's change in belief in the existence of this and other equally unusual and unheard of phenomena after exposure to the media. Thus, unlike most studies which indirectly investigate credibility solely through the measurement of complex attitudes, this study focuses directly on a person's perception of the credibility of what he receives from the media by asking him, "Do you believe that what you experienced does in fact exist?"

"Belief" therefore, as used in the present study when referring to experimental subjects' "change in beliefs," has a very limited connotation and refers exclusively to a person's belief in the existence of a thing or event. This use follows that presented by Fishbein and Raven (1962) in their attempt to operationally distinguish between belief and attitude. For them, belief is the probability dimension of a concept--is it existent or nonexistent?--whereas attitude is the evaluative dimension of a concept. Obviously these are interrelated factors and Fishbein

and Raven discuss at considerable length the fine distinction between beliefs in something and beliefs about it. Within the context of the limits of the present study, the distinction is, however, irrelevant.

By utilizing beliefs in the existence of phenomena which are obscure, noncontroversial for most people, and comparatively free of ego involvement, the effects of many interesting but confusing variables have been reduced, thus allowing examination of a process that has seldom been investigated. This process is the individual's use of the mass media as a source of his belief in the existence of the realities of the world. As Tannenbaum and Greenberg (1968) point out, our preoccupation with the effects of media on violence, political behavior, attitude change, etc., has obscured the profound role of media in the creation of a national culture and its contribution to a more homogeneous social structure. They observe that Americans have begun "to rely more and more on the media to provide the experiences of their environment (p. 370)" and express concern about the media's narrowing range of input. This daily input of electromechanically transformed bits of reality are the "stuff" of which attitudes are formed, and thus the study of the comparative credibility of media and its relation to beliefs in the existence of things or events at a very basic level appears warranted.

After making the observation cited above, Tannenbaum and Greenberg present a comprehensive review of the literature on the effects of mass media which is notable for an absence of empirical or theoretical studies related to the issues they have raised or the highly related issue of credibility. The present author's detailed examination of the literature

of social psychology and related areas in communication and media theory and production also revealed a scarcity of empirical studies in media credibility. However, a number of studies which are highly relevant to various aspects of the problem have been conducted and will be discussed in the remainder of this chapter.

Communicator Credibility Studies

The definitive work in this area was conducted by Carl Hovland and various associates. Descriptions of his experiments and a review of related studies are available in Hovland, Janis, and Kelly (1953). A detailed restatement of his theoretical formulations and methodology would be both redundant and logistically prohibitive. Therefore, a very brief statement of those aspects of his work of primary relevance to the present study will be presented.

The basic premise of Hovland's concept of communicator credibility is the common notion that the effectiveness of a communication depends in great part upon who delivers it. For Hovland, credibility resides primarily in the source of a communication and that source may be a person, groups or media. Operationally, however, in Hovland's experiments and in most of those which have followed from his work, the source is usually an attributed source by the experimenter and is typically a person, group or institution. In at least one experiment (Hovland & Weiss, 1951), the attributed sources included a form of media (Pravda) as a low credibility source and various American journals and magazines as high credibility sources.

Hovland specifically subsumes the channel through which the message is transmitted as a perceived source, but he apparently does not believe

that there are any significant differences in the individual's response as a function solely of the media or channel. "However the same basic factors and principles probably underlie the operation of each of the many types of sources, so an analysis of the psychological processes mediating the reaction to one kind of source may be expected to be applicable to other types (Hovland et al., 1953, p. 19)."

Two major parameters of communicator credibility are postulated by Hovland: (a) expertness, or the extent to which a communicator is perceived to be a source of valid assertions; and (b) trustworthiness, or the degree of confidence in the communicator's intent to communicate the assertions he considers most valid.

Experimental manipulations of these parameters by Hovland and Mandell (1952), Ewing (1942), and Kelman and Hovland (1953) produced ambiguous findings. For example, in some instances where trustworthiness was varied, differential perceptions of fairness or bias were elicited but opinions were not changed (Hovland & Mandell, 1952). In a related study by Kelman and Hovland (1953), significant opinion change was found. Hovland provides complex explanations for the wide variety of findings with many modifying or limiting factors hypothesized for the conditions under which source credibility effects can be secured.

When considering Hovland's findings and their relevance to the present study, it is important to recognize that Hovland's primary dependent variable was attitude change and consequently, there are important interactions between content, source and pre-existing attitudes. Hovland is well aware of these interactions and in fact they represent the major part of his findings. Only those conditions presented by Hovland that are of possible relevance to the present study will be summarized.

Hovland states that "source credibility has maximal effects on acceptance when the source and content are such that there would be considerable discrepancy between the attitudinal responses to each of them alone (Hovland et al., 1953, p. 41)." Thus, the effects of a high credibility source are most apparent when such a source is seen as being responsible for a communication which, by itself, would produce little acceptance. If, however, the communication is one that would be strongly rejected, then other factors come into operation. Hovland's conceptualization of this process is essentially similar to the cognitive consistency approach to attitude change, with the individual hypothesized as having various alternatives available to him to restore cognitive balance. Hovland, for example, speculates that under conditions of high communicator credibility and low acceptance of content, there is a tendency to dissociate the source and the content. In the process of considering various factors which would contribute to the individual's ability to dissociate source and content, Hovland suggests that a greater tendency to deny the source will exist as a function of the ambiguity of the evidence as to the source's actual responsibility for the message. He further speculates that the "evidence will be most clear cut when the source appears personally and is more ambiguous when the speech is recorded, printed or filmed, and even more so when the source is quoted by someone else (Hovland et al., 1953, p. 45)." (It should be noted at this point that in fact the majority of Hovland's studies, and those reviewed by him, utilize printed communications with attributed sources which are figuratively if not literally quoted by someone else--namely, the experimenter.)

An examination of the history of the "communicator credibility" type

study since the work of Hovland and others in the early fifties reveals little change in the basic methodology of the research. The primary change is in the elaboration of the parameters considered relevant to the concept of attitude itself and methods of assessment. A number of these studies are reviewed by McGinnies (1970) in his social psychology text. McGinnies concludes that source credibility is a potent variable affecting response to persuasive communication but that it primarily interacts with other factors such as ego involvement and the discrepancy between the initial attitude of the subject's and the position taken by the communicator.

There is little doubt that the research of Carl Hovland and his associates represents the definitive work in communicator credibility; however, the fact remains that in the fifteen years since then, rapid development in both the technology of mass media and the subsequent ability of video tape and high-speed, high-resolution film emulsion to depict and recreate reality has at the very least made it necessary to question certain assumptions of Hovland's regarding the equivalence of media. For example, it is doubtful that one can, totally, assume that a film, video tape and audio tape are equally ambiguous sources of a communication, or that any one of them will be more ambiguous than a source which appears personally.

It is also possible that today's subjects in social psychological experiments are more habituated to a level of reality in all media that would make them more suspicious of the basic element of deception so characteristic of the "attributed source" design type study. As noted earlier, the design of the Hovland type study, and those which have followed, has subjects receiving a communication indirectly through the ex-

perimenter.

The present author has not found any credibility study of the Hovland type in which the subjects received their communication directly from a genuine source. In most of the experiments reported in the literature, the source is, in fact, a product of some form of deception by the experimenter. Subjects are typically given a booklet with written paragraphs attributed to various sources or they listen to a speaker, or tape of a speech, in which the person is introduced or otherwise identified as having certain credentials of varying credibility.

In the definitive study, "The influence of source credibility on communication effectiveness," conducted by Hovland and Weiss (1951), numerous deceptions were utilized at every stage of the experiment. These are listed in order below:

Deception #1: Students were given an opinion questionnaire, five days before the major experiment, attributed to a "National Opinion Survey Council." The questionnaire included questions on the trustworthiness of a long list of sources (including the ones to be used later) as well as questions related to the content to which they would later be exposed.

Deception #2: The principle investigator appeared before the class as a guest lecturer, ostensibly to discuss the psychology of communication. Instead, he handed out booklets containing articles for them to read to "provide live data on which to base a discussion later."

Deception #3: The articles in the booklets were attributed to various trustworthy and untrustworthy sources. Some were in fact real and others fake.

Deception #4: The students were then given an opinion questionnaire, "differing in format" from the one given five days earlier and ostensibly

having nothing to do with the previous one.

At any one of these points, it was possible for a student not to believe the deception. The credibility of the experiment itself was thus open for evaluation at each critical step. In addition to the explicit points along the experimental route, a basic assumption had to be that the students made no inferences about any possible relationship between the points, especially between the before and after questionnaires and their initial ratings of the trustworthiness of the sources which turn up again as the sources for the articles they read.

Although the ethical and methodological problems of deception *per se* in psychological experiments have received some attention in recent years (Kelman, 1967; Stricker, 1967; Stricker & Messik, 1969), few, if any at all, published studies of credibility in communication have apparently considered these issues. It would appear that at the least, the possibility should be considered that such credibility factors as "trustworthiness" and "intentions of the communicator" can also be applied to experimental manipulations. It should also be apparent that these factors, when combined with factors related to the perceived reality of the message, would make experimental deceptions even less easy to disguise when using film or video media.

The sensitivity of individuals to subtle variations in the "mechanics" or quality of media and its relationship to communicator credibility is suggested in a study conducted by Greenberg and Razinsky (1966). They presented groups of student subjects with different versions of a persuasive message purported to be a student theme. The primary independent variable was a manipulation of the number of errors in spelling, grammar and punctuation. The results indicated that the errorless version was

perceived more favorably and its source considered more competent and trustworthy; however, there was no significant effect found on persuasion. The experimenters considered the possibility that the student subjects may not have recognized many of the errors and in a subsequent replication, they asked subjects to later identify all of the errors they could find. When the subjects were then divided into quartiles on the basis of perceived errors, an analysis revealed that the more errors perceived, the less attitude change. The significance of this finding however, was statistically marginal at the .10 level.

It also seems likely that the attribution of the source as students writing a theme sets the level of credibility (at least with respect to the persuasive message) at a relatively low level to begin with. In another sense, however, it is possible that the attributed source plus a certain number of errors in the message would at least be perceived by the peer subjects as an "authentic" message. Had the source been presented as a high-level personage and the message contained numerous errors, then one would expect a number of possible outcomes including a dissociation of the message from the source and concurrent suspicion of the experimental deception. This research is significant with respect to the present study because it suggests that persons are sensitive to variations in the quality of the "mechanics" of the media channel and relate this to their perception of the credibility of the communication. Correct spelling and punctuation are very obvious source credibility qualities and perhaps it is stretching an analogy to consider them akin to the syntax of film and video; however, the issue is intriguing.

In summary, the majority of communicator credibility studies were conducted in the early 1950s following a pattern established by Carl

Hovland and his associates. Various factors such as trustworthiness and expertness were found to be significant determinants of a person's evaluation of a communicator's credibility; however, the major assumption in all of these studies was that credibility of a communication resides primarily in the source--the communicator. Later studies have continued to operate on this assumption and have only concentrated upon varying more subtle aspects of the communicator's credibility. The channel of communication used by the source in these experiments has always been either a written booklet or a tape recording. The possible relative credibility of the channels *per se* (or media) was not considered a significant problem. The credibility of the deceptions so frequently used was also apparently not considered a sufficiently significant problem to warrant gathering data on subject's suspicions. Both of these problems are considered in the present study; however, their consideration requires information from other disciplines which shall be presented in the remainder of this chapter.

Media Use Studies

Media use studies, as exemplified by the work of Elmo Roper and associates (1962) and the definitive work of Gary Steiner, *The People Look at Television: A Study of Audience Attitudes* (1963), approach the concept of credibility from a specific methodological frame of reference, namely mass audience preference. The research strategy involved is invariably a large-scale survey in which large numbers of persons are asked which of the media they believe to be the most "reliable" source of news. A typical survey question used by Roper is: "If you get conflicting reports of the same news story from radio, television, the magazines, and

newspapers, which of the four versions would you be most inclined to believe...? (Roper, 1962, p. 19)" In 1962, the results of Roper's study indicated television as the most believable source of news and newspapers the least believable.

Unfortunately, for purposes of the present study, most surveys reveal little regarding just how believable is "most believable." A considerably more extensive survey is reported by Steiner (1963) who found that respondents considered television and newspapers approximately equal on "presenting the fairest and most unbiased news" with newspapers being given a slight edge. Obviously, such findings are at best merely suggestive of broad attitudes held by respondents at various times. Whether one can equate believable with "fair and unbiased" is another issue that remains unresolved.

A more recent study by Chang and Lemert (1968), which included a Roper type survey question, found that among users of all media, television news was the dominant believability choice. The relevance of Chang's study, however, is not primarily due to this data. Of considerably greater interest are Chang's related findings regarding the reasons given for believability choice. The primary reasons given in response to an open-ended question are categorized by Chang under the heading "True, On Spot, Can See and Hear." However, in addition to these expected responses related to the "live" characteristics of television, approximately 1/10 of the subjects responded in ways that Chang categorized under "Must Be Good, Audience Huge, & Network." Unfortunately, Chang does not discuss these responses; however, it seems safe to assume that he is categorizing, therein, responses which equate believability with a "must tell the truth" attribution to television as a function of its not being able to deceive

a large public. The present author conjectures that these responses may be tapping a basic parameter of credibility, related to persons' beliefs about the difficulty of faking visual media, which shall be elaborated upon later.

In summary, the significance of the media use type survey is that it represents the primary methodological approach to the question of media credibility currently in use. The media user is asked to state his preference using various criteria which include terms which can be equated with credibility. Within this frame of reference, there is evidence that television news has higher credibility than other media. A preliminary exploration of the reasons for this choice is provided by Chang's study. Television news is seen as real by virtue of its live quality and it also has a certain "must be" dimension of credibility. The present study will attempt to explore these factors within the framework of a controlled experiment.

"Media Effect" Studies

An extensive literature dealing with the effects of media upon individuals and groups has accumulated in the past thirty years. The present author has investigated this literature and has found that studies dealing with credibility, "believability," or even "reality" as major parameters are virtually nonexistent. It should not be inferred that the investigators totally ignore these concepts, but rather that the concepts are more likely to appear as a minor footnote to a discussion rather than experimental variables. Lumsdaine and May (1965), in their comprehensive review, provide one example of the contemporary treatment of relevant concepts. "Live action," "realism," and "identification" are

concepts which are grouped together as a separate heading. The studies reviewed, however, are all concerned with the differential effects of live versus filmed or taped presentations in classroom learning settings. The confounding of content and method differences, as Lumsdaine and May point out, makes generalizations regarding significant differences in the effect of various media extremely difficult.

This seemingly inherent problem in cross-media comparison is also a factor in studies of attitude change. In a brief review of experiments which attempted to compare one channel of communication with another, Rosnow and Robinson (1967) concluded that the generalizability of such results is "dubious." They suggest that rather than comparisons, "a rank ordering of the channels on the basis of their potency as catalysts for facilitating or inhibiting the impact of a communication" would be of more value. The present study hopefully provides some data in this area.

The fact that most cross comparisons of media are inevitably tied to a particular content message transmitted through a particular and unique film or tape, plus the fact that the media do have basic differences in information capacity, should not, in the present author's opinion, completely negate experimental efforts at comparison, especially in areas where there is a tendency to assume an equivalency.

The descriptive survey studies discussed previously provide ample evidence of the fact that the news media are not perceived as equal in credibility by the respondents. The fact that such perceptions are obviously the product of complex interactions between past experience, specific content, and varying secondary sources of news should not discourage all effort at bringing the problem into the experimental labora-

tory. One of the few attempts to accomplish this at a very simple and perhaps methodologically naive level is a comparative media effect study conducted by Croft, Stimpson, Ross, Bray, and Breglio (1969) which compared attitude changes elicited by live and video tape presentations. The study is primarily of relevance because the authors partially attribute their finding that the live condition produced greater "attitude change" to a credibility factor which they assume to be greater under "live" conditions. This assumption is, in turn, based upon their opinion that a live communicator is available for challenging and questioning and therefore will be considered a more credible source. The authors also suggest that there is a "cue deficit" inherent in video tape. This cue deficit is attributed to the black and white image and the small size of the screen which the authors believe reduces the "realness of the television presentation."

It is the present author's opinion that the generalizations possible from this study are severely limited by numerous methodological problems; however, because it is one of the only empirical laboratory studies that even remotely considers credibility in relation to visual media, the issues that are raised warrant further discussion. The methodological problems are: (a) The presentation consisted of a straight, unadorned speech against intercollegiate athletics. The format of a "camera talk" reduces the T.V. presentation to its lowest possible level of impact and thus preempts any of the effects of films or video (i.e., motion, cutting). (b) The video tape shown to the experimental group was <u>not</u> made during the live presentation to the control group and thus the authors' contention that the two presentations were exactly the same is questionable. (c) The authors do not indicate that the professor giving the speech was

also present at the video tape presentation. This, assuming that in all likelihood he was not, opens up the possibility that the differential effects secured were the result of the demand characteristic inherent in the physical presence of the advocate during the rating of the after attitude scale by the live group.

The inferences drawn by the authors from their results are also questionable. First, there is little doubt that most if not all professional television and film producers, as well as rhetoricians, would readily agree that it is possible for a live speech to a small group to be more effective than a television presentation, especially if the T.V. presentation is nothing more than the reading of the same speech.

On the other hand, it is not difficult to construe conditions under which the opposite could be true. For example, Croft et al. (1969) discuss at length the "cue deficit" of television in such areas as "image size," "clear representation of facial expressions," "voice quality," etc. They also offer as an explanation for their findings the conjecture that the "social distance" generated by the T.V. set as compared to the close proximity of the live speaker allows the audience to judge the "sincerity" of the live speaker's message better. Finally, the T.V. image because of these cue deficits makes the subjects "feel removed from the real situation, experiencing less personal involvement and more ambiguity about the credibility of the argument."

Obviously, all of these inferences may indeed be correct under certain conditions and especially under the conditions of the experiment described in which the video tape was essentially produced almost as an irrelevant element in the communication chain. If the image was too small to see facial expressions and the sound too poor to judge voice quality,

and the distance between the viewers and the T.V. set so great as to create an "unreal feeling," then these are functions of the experimenters' design, not the television medium. The capacity of video tape to permit presentation of cues such as facial expression, voice, body language, etc., is well established as evidenced by its present use in the teaching of psychotherapy. Investigators such as Ekman and Friesen (1969), Ruesch and Kees (1964), and Birdwhistell (1960) plus many others have provided ample empirical evidence of the capability of film and video tape to provide high definition information to the viewer in these areas. A film or video presentation of a human subject allows one to stare at his face with an intensity that is obviously socially prohibited in live conditions. Perhaps the subjects of Croft et al.'s experiment did indeed stare at the professor to the extent that they perceived, better than live, the insincerity of his message which, after all, was a deception.

In the formulations of their hypothesis that live presentation would produce greater attitude change, the authors based their opinion, in part, upon the contribution of the credibility implied by a live speaker who thus makes himself available for interaction. This factor unfortunately is not discussed at length and is not brought up again in their discussion of their findings. This is an intriguing notion which raises many problems. Educators interested in the possible role of feedback and interaction in classroom use of video have considered the problem. However, the role of "potential interaction" in determining the perceived credibility of a source has not been examined empirically. Common sense, the great precursor of hypotheses in behavioral sciences, would indicate it to be a potent factor influencing credibility. The dilemma posed, then, is from what other major credibility sources of strength do T.V.

and film draw upon since they are obviously maximally deficient in this ingredient at the present state of technology.

In summary, "media effect" experimental studies, with the exception of a few studies such as Croft et al. (1969), have seldom been concerned with factors such as realism, believability or source credibility. They have primarily focused on the larger question of "which channel is best for producing a specific effect." This sought-after effect is usually some form of specific classroom learning or opinion change in response to a mass media campaign. These studies are relevant to the present study primarily because they do in fact represent the majority of experimental attempts at cross-media comparisons. Although they do not explore in any detail the variables being investigated in this study, their criticism by various investigators does bring to light the problem of generalization which must be dealt with by this study also.

Film Realism

In the theory and production of the film is found the concept of realism, one of the major constituents of credibility which is seldom discussed or examined in social psychological studies of credibility.

From the beginning, makers of motion pictures have been aware of the power of film to affect viewers by the impact of its realism. It is interesting that from the very inception of film as an industry, two major formats evolved: the realism of Lumière and the artistic imagination of George Méliès. The early pictures of Lumière ("Baby's Breakfast," "The Card Players," etc.) were brief realistic glimpses of everyday life. Méliès, on the other hand, produced (in the 1890s) films of pure fantasy. Utilizing primitive (by today's standards) techniques he created magic

in which anything could happen, from inanimate objects being transformed, to human beings disappearing. Méliès created in film a world of illusion in motion found nowhere else in man's previous perceptual history.

It is an understanding of the sixty-year history of these dual capacities of realism and fantasy and their continuous interaction which is essential to provide a full appreciation of the media's possession of a base line of credibility not found in any other electromechanical form of communication. It is beyond the scope of this study to review the vast historical literature related to the development of realism/fantasy in film. It should be pointed out, however, that to the present author's knowledge, nowhere in this literature are found reports of empirical studies investigating the factors related to realism or credibility which would satisfy the methodological protocols currently demanded of behavioral scientists. Anecdotal reports of the realistic film's effect on audiences are numerous but data as such virtually nonexistent.

One film theorist, however, more than any other, Siegfried Kracauer, has addressed himself to those aspects of the film media most related to reality and any study which purports to deal with media factors of credibility and verisimilitude must at least take cognizance of his definitive work, Theory of Film: The Redemption of Physical Reality (1965). At this point, the primary relevance of his theory is that it provides one very broad source of "motivation" which can be hypothetically applied to the film viewer. If one is concerned with the parameters which affect the viewer's perception of reality and credibility in film, then it should be of some significance to know what related factors bring and keep him before the screen in the first place. Obviously the question actually is more complex than those already being raised in this study. However,

Kracauer does present an extensive philosophical and pragmatic, if not empirical, conceptualization of the process. Kracauer's position is that film, with its roots firmly planted in the evolution of realistic still photography, derives its potency at all levels from its ability to cut through the ideological debris and complexity of modern life and make us experience physical reality.

> The truly decisive reason for the elusiveness of physical reality is the habit of abstract thinking we have acquired under the reign of science and technology. No sooner do we emancipate ourselves from the "ancient beliefs" than we are led to eliminate the qualities of things. So the things continue to recede. And, assuredly, they are all the more elusive since we usually cannot help setting them in the perspective of conventional views and purposes which point beyond their self-contained being. Hence, were it not for the intervention of the film camera, it would cost us an enormous effort to surmount the barriers which separate us from our everyday surroundings.
>
> Film renders visible what we did not, or perhaps even could not, see before its advent. It effectively assists us in discovering the material world with its psychophysical correspondences. We literally redeem this world from its dormant state, its state of virtual nonexistence, by endeavoring to experience it through the camera. And we are free to experience it because we are fragmentized. The cinema can be defined as a medium particularly equipped to promote the redemption of physical reality. Its imagery permits us, for the first time, to take away with us the objects and occurrences that comprise the flow of material life (Kracauer, 1965, pp. 299-300).

Thus, from at least one major film theorist's point of view, viewers are seen as possessing some other motivation than a need to escape into a fantasy world. Film is seen as providing one resource for the individual's drive to organize and structure the world. One need not agree with all of Kracauer's speculation to accept, at the minimum, the notion that film does indeed serve this function in a significant manner. The sudden surge in contemporary youth's interest in film as viewer and producer is perhaps more than coincidental with the search for meaning so

characteristic of the present younger generation. It is the present author's contention that irrespective of the intensity of this "need" for the redemption of reality by film one is willing to accept, the fact remains that a large portion of what we have come to accept as the reality of the world beyond our immediate experience has been, at least initially, perceived through the film and television media. Thus, questions related to the factors contributing to our attribution of credibility to film are more than academic. One study which has attempted to deal with specific film characteristics contributing to reality was conducted recently by Utz (1968).

Utz's study was concerned with the specific contribution of color upon viewers' perception of reality. Within the frame of reference of media studies, his approach is comparatively one of the most molecular. Unlike other media investigators who have varied various parameters including color, Utz was not concerned with such matters as the amount of learning which occurs, or degree of attitude change. His primary dependent variable was the subject's rating of the film's "reality." The primary independent variable was color versus black and white in ten short film clips of everyday type activities, some of which were real and others staged. One large group of subjects saw only color versions, another only black and white, and a third a mixture. Subjects were asked to rate each film clip as either "real" or "staged." A staged film was defined as one which was controlled by the photographer who directs the action taking place. In addition to the reality rating, the subjects also responded to several semantic differential scales.

Utz's most general finding was that color may have an effect when it interacts with other variables, but color alone does not increase the

rated perception of reality.

Examination of the rated reality of specific film clips and various interactions between subjects grouped by their media usage, however, produced a complex network of differences in rated reality. A few examples are: (a) color caused an increased reality for indoor scenes and correspondingly a decrease for outdoor scenes when compared to black and white versions; (b) reality judgments did not depend upon level of media usage. However, "trends" appeared such as "heavier T.V. users prefer black and white in their reality (p. 63)"; (c) on the semantic differential scales, color clips are faster, more interesting and more serious than mixed or black and white clips. Reality interacts with the "fastest" and "most interesting" scales. Considering the fact that Utz made every effort to hold down such compounding variables as content, ego involvement, etc., the complexity of his interaction findings points to the difficulty of assessing the role of specific factors contributing to the perception of reality in visual media.

In discussing the limitations of his study, Utz observed that the possibility existed that some subjects may have used "the difficulty of staging the scene" as a criterion for judgment. This observation, made briefly as an afterthought in reference to an experimental artifact, suggests a possible factor that may have considerable relevance to the basic credibility of film and television. Common sense would seem to indicate that many things seen in film or on television are perceived as credible simply because it is difficult to conceive of anyone having gone to such difficult and costly lengths to stage them. Few persons would doubt the reality of a scene shot from a helicopter of a long parade winding its way down Fifth Avenue as crowds of several hundred thousand

spectators watch. If the example appears extreme, it should be pointed out that the spectacular triumphant march scenes characteristic of many Nazi propaganda films were carefully blended mixtures of reality and film staging.

Obviously if Utz had included a film clip of a large group of several thousand students, all engaged in some purposeful activity, the perceived reality of that scene would be high. Subjects would see little to be gained by the experimenter in staging such an elaborate deception simply for the purpose of producing a ten-second film clip for use in his experiment. One can speculate that the subjects' perception of the ratio of the film's difficulty and cost to their perception of the communicator's gain would be quite high and thus, in this one dimension, its credibility would also be high. The implications of this proposition are explored heuristically on a limited basis in the present study.

In summary, from the area of film theory we find a long history of theoretical and practical concern with the essential dualism of the film medium--its capacity for evoking verisimilarity or fantasy, reality or fiction. In the theoretical writing of Kracauer one finds a poignant awareness of the potential of film (and now television) to become one of the primary means whereby man experiences the reality of his environment. The experimental study of the parameters associated with such concepts as realism in film has with few exceptions not been undertaken. Utz's study attempted to isolate, with some small degree of success, the contribution of color. His study is important in that it represents one of the few empirical attempts to come to grips with the methodological problems of investigating perceived reality (and thus credibility) in film at a very basic level.

Two comparatively polar approaches to the concept of credibility have emerged from a review of the literature. At one extreme there are the experimental studies of the Hovland type which investigate credibility as it resides in the attributed source of a communication. At the other extreme one finds the theoretical notions of men such as Siegfried Kracauer who are concerned with the intrinsic elements of the film medium which make it potentially realistic and thus credible. In between these extremes is a vast literature of experimental attempts to study the effectiveness of particular media communications in eliciting changes in specific but complex attitudes and opinions. With the exceptions noted, there have been few attempts to study the comparative credibility of media. In the next chapter many of the areas of research and theory discussed above will be integrated in the formulation of specific propositions and hypotheses concerned with the comparative credibility of film, tape and written media.

CHAPTER II

STATEMENT OF THE PROBLEM

A comprehensive investigation of the literature of social psychology, mass media of communication and the theory of film has revealed very few empirical studies which compare the relative credibility of film, audio tape and written media. Studies which do deal with the various parameters associated with credibility are (a) primarily confined to one medium; (b) concerned with complex interactions of attitude, content and ego involvement; or (c) dependent upon multiple deceptions which may affect the overall credibility of the study itself.

Thus, the problem to which this study is directed is a relatively basic one and can be stated in the form of the following questions:

1. Can visual, audio and written media be considered as equivalent in basic credibility? Survey studies indicate that television is considered a more credible source of news. "Seeing is believing" is an accepted truism. The assumption of many laboratory studies, however, is that the results secured with one media in a credibility study are applicable to others because the mediating psychological processes are the same (Hovland et al., 1953). If, however, the media differ greatly in their base line of credibility as a result of such factors as their perceived ease of deception or perceived difficulty of production, then such differences must be explored.

2. Does the source of a communication have the same effect on its credibility no matter what media it is transmitted by? The Hovland type study would lead one to conclude that all forms of media are equally sensitive to their attributed sources. This has not been conclusively demonstrated, however, in a controlled experiment.

3. What are the comparative effects of various forms of media on persons' beliefs in the existence of things and events? Common sense and astute observation tell us that all media are powerful sources of derived beliefs. Behavioral scientists, however, have tended to overlook the issue due to a preoccupation with the extremes of the media effect continuum. Much effort has therefore been spent upon determining the ability of media to present information, which is specifically intended to be learned, or to change attitudes and opinions, or influence behavior. Little has been done to investigate the relative impact of media upon our day-to-day acquisition of beliefs in the existence of things and events.

The construction of operational hypotheses directed at the problems outlined above was arrived at by the following chain of reasoning:

1. At this particular time in man's history, a great deal of what he believes to be true of the world about him is derived from information transmitted by the mass media.

2. A significant amount of this information is presented in the mass media not to persuade or otherwise change attitudes, but rather as events. On the other hand, attitudes are in great part built upon an initial base of such information.

3. A fundamental condition which will affect the manner in which this information is processed and subsequently attached or built into

attitudes is the degree to which it is accepted as representing reality.

4. In film and television, credibility is highly correlated with realism. Analogies with printed material which are described by critics as "realistic" are possible but only serve to obscure a very significant physically based distinction. As the capacity of the media to recreate reality becomes more and more sophisticated, the empirical determination of the subtle factors contributing to or subtracting from credibility becomes important and should be investigated.

5. Credibility, as typically studied by social psychologists, is assumed to reside primarily in the perceived source of the communication. Media is considered a source; however, it is generally assumed to have no unique qualities with respect to credibility other than a varying preference vis-à-vis reliability by viewers or readers. Social psychology studies have thus primarily focused upon source credibility as an independent variable within specific media, usually the printed word or a sound-recorded speech, and with minor exceptions seldom made cross-media comparisons.

6. A fundamental assumption basic to all studies in credibility is that experimental subjects perceive the experimenter's manipulations and deceptions as credible. If this is not the case and if there are differences in subjects' suspicions as a function of their perception of the ease with which different media can be faked, this factor is an important variable and one which can be examined within the framework of a laboratory type experiment.

7. The transmission of a message requires an expenditure of effort by the sender. In the case of the mass media this effort is to some extent perceivable by the receiver and can be conceptualized by him as the

"difficulty" and/or "cost" of producing the communication. It would appear logical that the receiver's perception of this aspect of the communication process would affect, to some degree, his overall perception of the credibility of a message, especially when it is paired with his perception of what the sender has to gain by transmitting the message.

It is therefore concluded that in order to investigate the parameters associated with credibility in media, it will be necessary to begin at a basic level and determine what, if any, factors are relatively unique to various forms of media. The following propositions are thus tendered:

1. To the degree that a film or video communication of purported factual information is perceived as realistic, it will possess a basic level of credibility which is relatively independent of its attributed source.

2. The same communication transmitted by audio recording, or the written page, will (a) not possess as high a level of credibility as film, and (b) will be more sensitive to the effects of its attributed source.

3. One of the major factors contributing to these differences between media is the individual's perception of the relationship between the cost and difficulty of the communication's production and the expected gain of the communicator. This factor may be especially significant in the laboratory type experiment in credibility where the credibility of the experimental deception itself can be scrutinized by subjects in terms of the perceived difficulty of deception as related to the experimenter's gain.

4. The film communication of factual information, if perceived as

real and credible, will have greater impact upon individuals than the same information transmitted by audio or written channels. This impact may take the form of changes in related beliefs (generalization).

These propositions may be operationalized in the form of the following hypotheses:

#1. No significant differences in credibility are found when a factual film is presented in the following forms: (a) with a high credibility source identified in credits, and (b) without the above credits.

#2. Significant differences in credibility are found when the same basic factual information presented in the film is presented in the following forms: (a) audio tape recording with credits indicating a highly credible source, (b) audio tape recording with no credits, (c) written document with credits indicating a highly credible source, and (d) written document with no credits.

#3. The credibility of the communications vary significantly from highest to lowest in the following order: (a) film, (b) audio tape recording, and (c) written document.

#4. Changes in beliefs about related phenomena are greater for persons viewing the film than for those hearing the tape or reading the written document.

#5. Subjects rate the media presentations as costing more and being more difficult to produce from highest to lowest in the order of film, tape and written document.

#6. Subjects rate the probability of the media presentation they experience as being a fake from lowest to highest in the order of film, tape and written document.

CHAPTER III

METHOD

The basic design of the experiment followed the format of a pretest-treatment-postest design with subsequent cross-validation by replication. The author is aware of the many criticisms concerning reactivity, experimenter demand, and validity which have been made of the use of this design in social settings (Campbell, 1957; Orne, 1966; Webb, Campbell, Schwartz, & Sechrest, 1966). However, as Campbell (1957) has observed, there are conditions wherein the type of data desired can only be secured in this manner. As has been discussed in Chapter I, the credibility of the format of the "credibility type" pretest-postest experiment itself is one of the variables brought to the surface for examination in this study.

Subjects were tested regarding their belief in the existence of various phenomena, presented with documentation of the actual existence of one of the phenomena via various media and then immediately retested on their beliefs about all of the phenomena. The general format of the experimental design is presented schematically in Table 1 below. Each cell represents an independent group of subjects who receive <u>one</u> version of the six possible combinations of media/attributed source treatments. Thus, F1 subjects viewed a film which has a highly credible source indicated through appropriate credits. W2 subjects read a written document

Table 1

General Format of the Experimental Design

Attributed Source of Media	Media		
	Film	Tape	Written
High Credibility (Credits)	F1	T1	W1
No Source Indicated (No Credits)	F2	T2	W2

with no source (credits) indicated. Each group of subjects was tested on their beliefs in the existence of various phenomena before and after exposure to media. The design of the experiment included cross-validation by replication.

Subject Population

The subject population consisted of students enrolled in introductory psychology courses on two separate campuses in Oklahoma. The first experiment was conducted at The University of Oklahoma in Norman and the second was conducted two weeks later at Central State College in Edmond.

The possibility of randomly assigning subjects to each media treatment group was considered and rejected in favor of random assignment of intact classes for the following reasons. The time required to conduct the experiment, based upon pilot studies, was found to be forty-five minutes. This would have made it necessary to spread the six experimental sessions over a period of several days, after normal class hours, to permit an adequate number of alternative "sign ups" for students. Previous experience with such methods also indicated that considerable interaction between experimenters and subjects is unavoidable as various manipulations

and rescheduling of individual subjects becomes necessary in order to match subjects' availability with the experiment schedule. The highly unique and interesting nature of the phenomenon used in the media would have also made it difficult for subjects who had already participated to avoid discussing the experiment with others over a period of several days.

In addition to these relatively explicit factors, it was decided that, theoretically, subjects who were exposed to the media unexpectedly in an on-going class would be at least relatively more similar to persons who "came across" a television program or picked up a magazine article than subjects who have been through a long and complex process of signing up for an experiment. Obviously in either condition the subject knows he is a subject in an experiment. However, in one condition he knows it for quite a long time and has "participated" from the moment he responded to his instructor's call for volunteers.

Finally, the examination of the possibility that major differences in the intact classes as groups might contribute to differential results was made possible by conducting a complete cross-validation study at another school.

Upon completion of the experiment with all groups, individual subjects were selected for final inclusion in the analysis of the data on the basis of their initial belief in the existence of the specific phenomenon presented in the media treatments. An understanding of the criterion for selection, and the measurement used, is dependent upon a more complete description of the details of the entire methodology; thus, this material will be presented subsequently in the section devoted to measurement and tabulation of data. Table 2 below presents a summary of the

Table 2

Summary of Subject Demographic Data

	Number of Subjects			Total/ Sex	$\bar{X}$ Age
	Film	Tape	Written		
Oklahoma University					
Males	23	20	22	65	20.5
Females	22	23	15	60	20.0
Central State College					
Males	23	28	24	75	21.6
Females	20	20	19	59	21.5
Total/Media Treatment	88	91	80	259	

characteristics of the final subject population used in the study.

Stimulus Phenomenon

The content of the media presentation (the stimulus phenomenon) to be used had to meet certain requirements. (a) It had to be relatively non-ego involving yet sufficiently interesting as to command attention. (b) It had to be relatively unknown or unheard of. (c) It had to lend itself to equal treatment by different forms of media. As Hovland (1954) has adroitly pointed out, it is difficult to generalize from results which compare the effects of radio vs. film in a presentation on sculpture. This final requirement is perhaps the most difficult to meet for in one sense it is the difference in ability of various media to represent reality that is a critical variable. An absolute adherence to this criterion would virtually make it impossible to ever conduct any type of cross-media study. Therefore, the criterion is met adequately when

one can assert that most of the necessary information is capable of being fully presented in each media used.

The phenomenon selected is that of the idiot savant calendar calculating twins which was initially reported by Horwitz, Kestenbaum, Person, and Jarvik (1965). The twins, whose IQs are in the 60 to 70 range, are capable of calculating calendar dates from the year zero to several hundred thousand years in the future. Previous experience in presenting research regarding the twins before large groups (Parsons, Addis, & Langdon, 1968) has indicated that for persons who have not read the literature dealing with the phenomenon, the feats of the twins are quite unbelievable. Pilot studies conducted to test the various procedures used in this study provided data which indicated the majority of students had never heard of the twins.

The degree to which the criterion of "lending itself to equal treatment by different forms of media" was met can never be accurately determined; however, the fact that the abilities of the twins are mental (calculating) rather than physical satisfies a major component of the criterion. The only visual aspects of the phenomenon are related to the degree that the "idiot like" qualities of the idiot savants are strikingly apparent in the visual medium. On the other hand, the sound qualities of their voices provide similarly strong evidence of this, and the content of what they say when transcribed provides ample evidence of the same qualities. The important point is that the basic information <u>is capable</u> of being transmitted by visual, audio or written media. The differences in impact upon the receiver, on the other hand, is one of the variables being investigated.

The final and perhaps most important aspect of the idiot savant

calendar calculating twins which makes them such a unique and powerful stimulus phenomenon in a study of credibility is the fact that for most persons there is no way to validate their performance. Unlike a communication purporting to document a physical phenomenon, or for that matter, one advocating a point of view, the communication of the calculation of a date several hundred thousand years in the future to be fully accepted as credible requires the subject to put his full faith in the credibility of the communication. There are no objective cues available to him in the media or in his own experience with which to completely validate the phenomenon and thus his decision to accept or reject what he sees, hears or reads about it must in great part be dependent upon cues which relate to the credibility of the source of the media, the media itself and the conditions under which he finds himself the receiver of an unexpected communication--namely, a participant in an experiment.

The Other Phenomena

In addition to the idiot savant twins, subjects were tested on their beliefs in the existence of six other phenomena, three of which in fact do exist and three which were the product of the author's imagination. The phenomena were selected from an original group of fourteen which were used in pilot studies on the basis of their being rated as the least believable and thus relatively comparable to the idiot savant twins. Two types of phenomena were used--cognitive, which described feats similar in many respects to the twins, and physical, which described feats which were comparatively unrelated to the twins. Each phenomenon is described below and a complete description, as presented to subjects, can be found in Appendix A.

Cognitive

Samuel. A child who has total recall of books and television programs. (This case is not specifically true; however, similar feats have been observed.)

David and William. Retarded twins who have ESP powers. One of the twins can answer complex math problems which are presented to his brother who is in another room. (Not known to exist.)

Elliot. Six-year-old child who can solve complex problems in symbolic logic. (Not known to exist.)

Physical

Harold. An autistic child who pours water into glasses, on the run, so that each glass shows a positive meniscus and one more drop would cause the water to overflow. (Based upon a true case described to the author in a personal communication from Bernard Rimland, but not published to date.)

Bicycle Speedster. A 50-year-old man who holds the world's pedal bicycle speed record of 124 m.p.h. (True.)

Tarahumara Indians. Indians who run non-stop kick ball races several hundred miles long. (True.)

Media

Film. The film used was "July 19, 132,470 is a Saturday: An Interview with Idiot Savant Calendar Calculating Twins" (Addis, 1968). The film is 16mm, sound, black and white and, in the original version, 18 minutes long. Five minutes of redundant material from the original film was edited out in order to reduce the overall amount of time required for the experiment. The editing process was conducted by a professional film editor and there is no abrupt cut in film continuity.

The film documents an interview conducted by William Horwitz, M.D., with the twins in which they answer a series of complex questions relating to calendar dates. (A transcript of the sound track of the film can be found in Appendix B.) It is important to note several distinctive characteristics of the film of particular relevance to this study: (a) It is genuine and documents a real phenomenon in a manner which is unstaged to the extent that no script was used, there was no rehearsal and the final version was minimally edited to reduce redundancy; (b) The film is basically an interview and contains no other "visual aids," such as charts or graphs related to calendars. In terms of the dynamics of film such as editing, camera movements, cutaway shots, etc., the film is essentially static.

Tape. The audio tape recording is an exact duplicate of the sound track of the film and was made from the original magnetic tape used to print the optical track of the film. It consists exclusively of the interview conducted, plus an opening and closing statement by a narrator which provides some background on the twins. This narration is the exact same as that heard in the film with the exception that in the film the narration is a "voice over" accompaniment to general silent shots of the twins. It is important to note that the sound track at no time makes references to anything that would require a visual accompaniment to understand. In other words, the sound track of the film is no different from what one would anticipate hearing as an audio-only interview.

Written communication. The written communication was a document which contained an exact transcript of the sound track of the film and audio tape including the narration. The physical format of the document will be described in the next section dealing with attribution of source.

Attribution of Source

High credibility source version. The film in its release form contains opening credits attributing its production to the Behavioral Sciences Audio Visual Laboratory of the Department of Psychiatry, University of Oklahoma Medical Center and identifying the film as one of a series of teaching and research films. The National Institute of Mental Health is also identified as providing support for its production. The interviewer's (Dr. Horwitz) credentials are also specified.

The audio tape recording included the same credits as those on the film, and were spoken by a narrator who identified the tape as one of a series of teaching and research recordings. The introductory narration describing the twins was also included.

The written document contained the same credits which, in this instance, were placed on its cover sheet in a form that indicated the document was one of a series of teaching and research documents produced by the laboratory. A copy of this document can be examined in Appendix B. It should be noted that the document was professionally printed and thus had a physical appearance which was more genuine than the typical forms produced by ditto which students continuously receive, such as study guides, attendance forms, etc.

No source indicated versions. The film version consisted exclusively of the body of the film with all credits and narration deleted. The production format of the film permitted this to be accomplished without any abrupt cuts.

The tape version was, again, a duplicate of the sound track of the film minus the credits and narration.

The written version was the same as the credits written version with

the exception that the cover sheet was simply labeled, "An Interview with the Idiot Savant Calendar Calculating Twins," under which was the statement, "On the following pages is an exact transcript of an interview which was conducted by the psychiatrist who is the Assistant Director of the Institute where the idiot savant twins are being studied."

Test Instruments

The "before" test booklet. The before test booklet, a complete copy of which can be found in Appendix A, consisted of an instruction cover sheet and seven pages on each of which was a brief paragraph describing the seven phenomena. The instructions requested that the subject read each paragraph and then indicate his belief about the existence of the phenomenon described by placing a vertical mark on a line (100mm) which was labeled "False, Non-Existent" to the left of the line and "True, Existent" to the right of the line. This type of scale is similar in most respects to the "simple graphic rating scale" described by McCormick and Francis (1958).

The order of appearance of the seven phenomena was varied so that each phenomenon appeared in every possible position. The result was that not more than two subjects in the largest group received booklets that were identical in order of presentation of phenomena.

The "after" test booklet. The after test booklets contained the same seven paragraphs and rating scales, varied in presentation as indicated above. In addition to the paragraphs, the following additional questions were asked:

1. "Do you have any idea what the experimenter conducting this research is trying to prove?"

2. "Do you have any idea what the experimenter expected you to do?"

3. "Do you believe it possible that the film/tape/document you viewed/hear/read could have been faked, and staged using actors/staged using actors/written, just for the purpose of research?" (This question was rated on a 100mm scale from "Impossible" on the left to "Very Possible" on the right.)

4. "How probable do you believe it to be that the film/tape/document was indeed a fake, and was staged using actors/staged using actors/written just for the purpose of this research?" (This question was rated on a 100mm scale from "Improbable" on the left to "Very Probable" on the right.)

5. "Did the idea that the film/tape/document might be fake ever enter your mind prior to this point in the experiment?"

6. "How difficult do you believe it would be to produce a fake of a film/tape/document exactly like the one you have just seen/heard/read?" (This question was rated on a 100mm scale from "Easy" on the left to "Very Difficult" on the right.)

7. "What is your best guess as to the total cost in dollars (materials and labor) of producing the film/tape/document? Circle one pair." ($5-25, $25-50, $50-100, $100-200, $200-400, $400-800, $800-1,600, $1,600-3,200, $3,200-6,400, $6,400-12,800)

8. "If you got conflicting reports of the same news story from radio, television, magazines, and the newspapers, which one of the four versions would you be most inclined to believe? Which one would you be least inclined to believe?" (This question was used only as "filler" material.)

It should be noted that question #3 was used to provide those sub-

jects who are literal minded an outlet for their compulsion so that question #4 could be freely answered. Experience with question #4, when used alone in pilot studies, had revealed a number of subjects who wrote in comments such as "anything is possible" or "very possible but not likely."

The Experimenters

All experimental sessions, including those of the cross-validation study, were conducted by one experimenter and his assistant. The experimenter was a 25-year-old graduate student in biological psychology who was selected on the basis of his "middle-of-the-road," clean-cut appearance, mild Oklahoma accent, and general demeanor. His assistant, who projected the films, played the tapes and distributed test booklets, was a 25-year-old college graduate who is employed as a film production specialist. His general appearance and demeanor is quite similar to the experimenter. Both persons conducted each session wearing a suit and tie.

Procedure

All experimental sessions were conducted in intact normally meeting classes. The instructor in each class began the session by telling the students that an experiment would be conducted in class today and then introduced the experimenter whom he identified as Mr. Langdon, graduate research assistant to Dr. Addis of the Psychology Department. The instructor then left the classroom. The experimenter presented the following instructions to the students, which he had previously memorized, in a confident but relaxed manner:

> We are asking for your assistance in a research project being conducted by Dr. Addis of the Department of Psychology. What you will be asked to do will not require any personal information from you other than your birthdate, sex, and college year. The research does not involve any type of testing that

will be used to evalute your performance in this course. Previous experience has shown that students have enjoyed participating and have learned a great deal from the experience. At this time we cannot tell you the full details of the research; however, during a regular class session later this semester, a complete explanation and the results will be presented to you. Our only request is that you agree not to discuss any of the details with your friends or any other students for the remainder of the day because a great number of students in other classes will be participating in this project.

If there is anyone here who does not wish to take part in this research, he should not accept the materials to be given out, but he should remain at his desk during the class period and use the time to read.

Does anyone have any questions at this time?

From this point on, we ask that you not talk with each other and devote your full attention to the booklets that will be given to you. Each booklet has all necessary instructions on the front sheet. Read it carefully as soon as you receive it and proceed immediately. Complete each page before turning to the next and when you are finished simply close the booklet and wait for the end of the time period. If you have any major questions about what to do, please come up front and ask me. However, if at all possible, just proceed. You have approximately ten minutes to complete the booklet and we will tell you when there are just a few minutes remaining.

After the subjects completed the before booklets and they were collected, the experimenter simply announced that they would now view a film, listen to a tape, or be given a document to read (depending upon the treatment condition assigned to that group). After receiving the media presentation, the after booklets were distributed with no additional instructions other than, "You will now be given a booklet like the first one. Would you please fill it out, completing each page before going to the next and when you are finished simply close the booklet and it will be collected." It should be noted that the experimenter did not know whether the condition for each group was credits or no credits until the media presentation. This was known, however, by his assistant.

After all subjects had completed their booklets, the experimenter expressed his appreciation for their participation and reminded them of

their commitment not to discuss the details of the project with other students for the remainder of the day. The first experiment, conducted at The University of Oklahoma, was completed in one day, utilizing six classes meeting in the same building, one immediately after the other. In the cross-validation experiment, conducted at Central State College, four of the groups were run on one day and two early the following morning. Central State College subjects were asked not to discuss the project for two days. In both studies, each group run after the first session was asked to note on their booklets if they had heard anything about the experiment prior to that time. Only three subjects indicated that they had "heard there was an experiment but knew no details."

Measurement and Tabulation of Data

Before and after booklets for individual subjects were matched by comparing data on birth, sex and major field. Each booklet was then examined for completeness and any subject who did not respond to all paragraphs and questions was rejected. Approximately 10% of the original population was rejected on this basis. Skipping of pages, which had apparently been pressed together tightly from being stacked, accounted for most of the rejections. It should be especially noted that the rejection process was conducted prior to any measurement of the data.

All 100mm line scales were measured by use of a transparent mylar overlay which was divided into ten 1cm units. Subjects' marks on the line which fell exactly on the dividing line between two units were rare, but when found were consistently scored toward the right (high). The decision to use 10 units rather than 100 was based upon the possibility of considerable error in measurement at the millimeter level plus the

finding that a great many subjects made short horizontal marks above the line which could only be accurately measured by the 10cm unit overlay. By virtue of applying a 10cm unit scale, the lowest score a subject received was one and the highest, ten.

The ratings by all subjects of only the before scale on the idiot savant twins was then measured. All subjects whose before rating was five or above were then excluded from the study. By application of this criterion, the subject population was limited to only those persons who initially did not believe in the existence of the idiot savant twins. The mean before scores on the twins for the subjects who met the selection criterion are presented in Table 3 below.

Table 3

Mean Before Scores on Twins

Media	Oklahoma University	Central State College
Film with credits	1.58	1.50
Film without credits	1.94	1.60
Tape with credits	1.47	1.85
Tape without credits	1.71	1.48
Written with credits	1.90	1.64
Written without credits	1.60	1.81

As can be seen from Table 3, this process resulted in a comparatively uniform base line of initial belief in the critical phenomenon of the twins. An examination of the initial belief ratings of the other phenomena also revealed comparatively uniform mean scores for each group; however, individual subjects' scores ranged from one to ten. In order to make change in belief independent of pre-media ratings and cir-

cumvent ceiling effects, the differences between before and after ratings were transformed into proportion of possible change scores.

Three terms were utilized: (a) a subject's before rating, (b) a subject's after rating, and (c) the maximum scale rating possible in either direction. The net change score received by the subject represents the ratio of (b) minus (a) to (c)--the total possible change. Thus, a subject whose before rating was six and after rating was ten received a net change score of ten minus six divided by ten (maximum possible score), or .40. This method of scoring is similar to that used by Levonian (1963) in his study of opinion change mediated by film and follows the "effectiveness index" method presented by Hovland, Lumsdaine, and Sheffield (1949). As an additional check against the possibility of biasing by unknown parameters inherent in the analysis of proportion data, the arcsin transformation procedure recommended by Walker and Lev (1953) was also applied and all proportion scores transformed into radians prior to the analysis of variance.

After all individual ratings were transformed, each subject's scores for the three cognitive phenomena were added together and the mean calculated; the same was done with the three physical phenomena. The final result was that each subject had three basic scores related to phenomena: (a) proportion change on the twins, (b) mean proportion change on cognitive phenomena, and (c) mean proportion change on physical phenomena.

The scores for the additional ratings and questions asked of subjects, which were only responded to in the after booklet, were tabulated and means calculated where appropriate prior to statistical testing.

The primary data related to media, phenomena, credits and replication were organized for testing by an analysis of variance utilizing the

least squares method for unequal groups as presented by Winer (1962). The results of this and other statistical tests applied to the data are presented in the next chapter.

CHAPTER IV

RESULTS

The overall results of the study can be most clearly observed by examining the mean proportional changes in subjects' ratings of their beliefs in the existence of the phenomena after exposure to the various media as presented in Table 4 below.

Table 4

Summary of Mean Proportional Change:
Media, Credits, Schools

	Oklahoma University			Central State College		
Media	Twins	Cognitive	Physical	Twins	Cognitive	Physical
With Credits						
Film	.99	.18	.02	.95	.25	.06
Tape	.42	.00	.00	.86	.02	.00
Written	.76	.21	.02	.48	.00	.00
Without Credits						
Film	.98	.24	.04	.81	.08	.00
Tape	.62	.08	.01	.56	.00	.11
Written	.48	.02	.00	.48	.03	.07

An examination of the mean proportional scores presented in Table 4 would appear to indicate that major differences in change exist as a possible function of the variables of media, credits and phenomena. A

possible difference between the two populations of the schools can be observed as well as the possibility of interactions between all of the variables.

The results of the overall analysis of variance, as presented in Table 5, however, provides strong unequivocal evidence for only two main sources of variance: phenomena (F = 250.69, p = <.01) and media (F = 9.57, p = <.01). The interaction of these two variables (P x M) is also

Table 5

Analysis of Variance: Media, Phenomena, Credits, Replication(Schools)

Source of Variance	Error Term[a]	df	MS	F	p
Phenomena (P)	#2	2	255.65	250.69	<.01
Media (M)	#1	2	20.04	9.57	<.01
Replication (R)	#1	1	3.29	1.57	NS
Credits (C)	#1	1	2.50	1.20	NS
P x M	#2	4	5.99	5.87	<.01
P x R	#2	2	1.41	1.38	NS
P x C	#2	2	3.05	2.99	NS
M x R	#1	2	2.27	1.08	NS
M x C	#1	2	1.43	0.08	NS
R x C	#1	1	0	0	NS
P x M x R	#2	4	1.77	1.74	NS
P x M x C	#2	4	0.54	0.53	NS
P x R x C	#2	2	0.64	0.63	NS
M x R x C	#1	2	5.82	2.78	NS
P x M x R x C	#2	4	1.64	1.61	NS
[a]Error Term #1 MRC (S)		247	2.09		
Error Term #2 MRC (S)(P)		494	1.02		

a highly significant source of variance (F = 5.87, p = <.01). All other interactions were not significant.

It should be especially noted at this point that Replication (Schools) as a main source of variance or as an interaction term was not significant; therefore the presentation of the subsequent tables will represent combined population data unless otherwise specified.

Hypothesis #1

The first hypothesis stated: "No significant differences in credibility are found when a factual film is presented in the following forms: (a) with a high credibility source identified in credits, and (b) without the above credits." The mean proportional change of all subjects viewing the film with and without credits can be observed in Table 6 below. The slight differences are not significant as indicated by the analysis of variance (media x credits interaction) and thus the hypothesis is supported.

Table 6

Mean Proportional Changes: Film, Credits, Phenomena

Media	Twins	Cognitive	Physical
Film with credits	.98	.21	.04
Film without credits	.90	.14	.01

Hypothesis #2

The second hypothesis stated: "Significant differences in credibility are found when the same basic factual information presented in the film is presented in the following forms: (a) audio tape recording with credits indicating a highly credible source, (b) audio tape record-

ing with no credits, (c) written document with credits indicating a highly credible source, and (d) written document with no credits." The mean proportional changes of all subjects hearing the tape and those reading the written document are presented in Table 7 below.

Table 7

Mean Proportional Changes: Tape, Written, Credits, Phenomena

Media	Twins	Cognitive	Physical
Tape with credits	.73	.02	.00
Tape without credits	.59	.02	.06
Written with credits	.62	.09	.01
Written without credits	.48	.02	.03

Although the differences between credit and no credit treatments is larger than that observed with film (.14 on the twins for tape and written as compared to .08 for film), that difference cannot be considered significant on the basis of the results of the analysis of variance (media x credits interaction). Thus, the hypothesis is not supported.

Hypothesis #3

The third hypothesis stated that: "The credibility of the communications vary significantly from highest to lowest in the following order: (a) film, (b) audio tape recording, and (c) written document." Table 8 below presents the mean proportion change scores for the three media with credit and no credit treatment groups combined.

It is apparent from Table 8 that mean proportional change on the phenomena is greatest for subjects who viewed the film, next for those

Table 8

Mean Proportional Change: Media, Phenomena

Media	Twins	Cognitive	Physical
Film	.95	.17	.02
Tape	.66	.02	.01
Written	.56	.05	.02

who heard the tape and least for those who read the written document. The overall analysis of variance indicated that media was a main source of variance; however, it is possible that this effect may be primarily due to the large difference between film and the other media. In order to determine the significance of the relative differences in media, a series of comparisons were conducted (Least Squares Solution, Winer, 1962, p. 378). The results of these analyses are presented in Table 9.

Table 9

Comparisons Analysis: Media

Comparison	Error Term[a]	SS	df	F	p
(Film) vs. (Tape) (Written)	.01201	.22949	1	19.10824	<.01
(Tape) vs. (Written)	.01639	.00015	1	.00915	NS

[a]Error Term = MS_{media} x subj. w. groups

The results of the comparisons analysis pinpoints the major difference in media as being between film and the other media. The difference between tape and written media cannot be considered significant.

Hypothesis #4

The fourth hypothesis stated that: "Changes in beliefs about related phenomena are greater for persons viewing the film than for those hearing the tape or reading the written document." An examination of the mean proportional change scores presented previously in Table 8 indicates that film subjects changed on related phenomena (cognitive) .17 as compared to .02 and .05 for tape and written document subjects, respectively. Although the overall analysis of variance provides some support for the significance of these differences by virtue of the phenomena x media interaction effect ($p = <.01$) and the previous comparisons analysis of media confirm the difference between film and the other media, the possibility exists that these differences may be significant only in relation to the phenomenon of the twins. In order to more precisely compare the mean changes in phenomena across media, a series of comparisons were made of the interaction between media and the twins phenomenon and cognitive phenomena. (The differences between media for the physical phenomena are obviously not significant and were not analyzed.) The results of this analysis are presented in Table 10.

The results of the comparisons analysis of the media-phenomena interaction further confirms the previous finding that the film medium subjects changed significantly greater than the other media subjects and that there was no difference between tape and written conditions. It also provides the additional information that these differences are also highly significant with respect to related phenomena (P_2--Cognitive). Thus, the hypothesis is supported.

Table 10

Comparisons Analysis: Media-Related Phenomena Interaction

Comparisons[a]	Error Term[b]	SS	df	F	p
Film (P_1) vs. Tape (P_1) Written (P_1)	.01201	.22949	1	19.1082	<.01
Tape (P_1) vs. Written (P_1)	.01639	.00015	1	.0092	NS
Film (P_2) vs. Tape (P_2) Written (P_2)	.01755	.22030	1	12.5527	<.01
Tape (P_2) vs. Written (P_2)	.02394	.02764	1	1.5450	NS

[a] P_1 = twins phenomenon; P_2 = cognitive phenomena
[b] Error Term = MS_p x subj. w. groups

Hypothesis #5

The fifth hypothesis stated that: "Subjects rate the media presentations as costing more and being more difficult to produce from highest to lowest in the order of film, tape and written document." The mean scores for all subjects of their rating of "cost" plus "difficulty to produce" are presented in Table 11 below. These data were secured by

Table 11

Mean Cost + Difficulty of Media

Media	$\bar{X}$ Cost + Difficulty
Film	5.531
Tape	3.593
Written	3.325

adding the subject's score (1-10) on the rating scale in answer to question #6 to the category he picked (1-10) in answer to question #7

and taking the mean of the two scores. The differences between the media were tested utilizing comparisons tests. The difference between film and tape was found to be highly significant (F = 119.47, p = <.01) and the difference between tape and written to be not significant (F = .6771).

Hypothesis #6

The final hypothesis stated: "Subjects rate the probability of the media presentation they experience as being a fake from lowest to highest in the order of film, tape and written." The mean rating of all subjects by media is presented in Table 12 below. These differences were tested utilizing non-orthoginal comparisons tests. The results indicated that the difference between film and tape was significant (F = 8.88, p = <.01) and that the difference between tape and written was also significant (F = 4.12, p = <.05).

Table 12

Mean Ratings of the Probability of the Media Being Faked

Media	$\bar{X}$ Fake Rating
Film	3.955
Tape	5.407
Written	6.388

In addition to the question concerning the probability of the media being a fake, the responses to which are directly related to the hypothesis, an additional "filler" question was asked which can be considered relevant to the same hypothesis. This question which required a "yes" or "no" answer simply asked if the idea had occurred to the subject (prior to that point in the experiment) that the presentation might be

a fake. The percentage of "yes" responses to this question are presented below in Table 13. The probability of obtaining these responses for each media group was found to be $<.01$ when examined by the binomial test.

Table 13

Percentage of Yes Responses to the Occurrence of the "Idea" of the Media Being a Fake

Media	% Yes Responses
Film	38
Tape	75
Written	73

CHAPTER V

DISCUSSION

The results of this study provide information about two interrelated aspects of credibility. The first, which is related to media, was the original and primary focus of the study. Data relating to this aspect will be discussed first. The second aspect is concerned with the possible effects of the credibility of experimental deception in the study of communication. This problem was explored heuristically as the study progressed and will be discussed last.

The first two hypotheses dealt with the comparative effects of source credibility across the three media. The overall analysis of variance provided clear evidence that there was no difference between the credits and no credits film treatment groups. The significance of this finding in relation to the previously developed theoretical notion of the distinctive credibility of film per se is somewhat diminished by the fact that differences in the other credits/media groups, although almost twice that of the film groups, were not significant.

The lack of predicted difference in the credits vs. no credits conditions in the tape and written groups can be interpreted in several ways. Since most investigators have found considerable difference in the effect of high vs. low credibility communicators on attitude change, it is possible that such differences are not as strong when the dependent variable

is a simple belief in the existence of an unusual phenomenon. On the other hand, the fact that the beliefs used in this study were, by comparison to the typical attitudes measured, low ego involving and free of anchors in the individual's cognitive frame of reference, would lead one to expect them to be even more sensitive to the cues offered by an attributed source.

Another more plausible interpretation of the finding lies within the design of the study itself and is related to the relative difference between a highly credible attributed source and no source being attributed at all. In most credibility studies the source is varied from high to low rather than from high to none. The possibility of utilizing a low credibility source such as "The Mummers Theater Cinema Society" or the "Drama Department" as an attributed source for the idiot savant film and tape was considered. However, the explicit and obvious quality of such cues, in the author's opinion, would have depressed the overall credibility of the entire procedure and defeated one of the unique aspects of the experiment--namely, that no deception was involved in the experimental treatment materials. Given no identified source for the media communication, it is quite possible that subjects then responded to the nearest available source--namely, the experimenters and the source of the experiment, "Dr. Addis," who in this case had been identified as a faculty member of the same university identified on the credited versions of the media. If this did occur then evaluation of credibility was transferred to the experimenters and experiment.

That there was no significant difference between the high credibility source and "no source" versions of all of the media though partially interpretable within the limits of the available data still represents an un-

expected finding which raises questions about the relative importance of prestigeful and authoritative sources in the study of communicator credibility. The closest approximation to the "no source condition" in prior experiments as found in the literature is the use of a third "neutral communicator" in a high vs. low credibility study conducted by Kelman and Hovland (1953). In this study, audio recordings were used and the neutral communicator was identified as "a member of the studio audience selected at random." Although its relevance to the present study is limited by the fact that this study was replete with deceptions and dealt with opinion change on juvenile delinquency as a dependent variable, the finding that the "neutral source" was no less effective in changing attitude than the highly credible authoritative source is interesting (positive and neutral were significantly different from negative). When taken in combination with the results of the present study, it suggests the possibility that many of the significant effects attributed to high credibility communicators may in fact only be obtainable when the experimental design is such that the "high credibility source" is contrasted with a very obvious "low credibility source." If the high credibility source effect is not dependent upon cues available in extreme treatment conditions and if it is to have any meaning outside of the laboratory, then it should be demonstrable when contrasted with neutral or "zero" sources.

In the strictest sense, the results of the present study only provide evidence for the apparent irrelevance of an authoritative source when the subject content of the media message is concerned with beliefs in the existence of things which are comparatively noncontroversial, and with which the receivers are unfamiliar. These conditions are, however,

not unlike those under which a considerable amount of television communication is received with the exception of the fact that with broadcast television, an implicit, highly credible source is always present--the media itself.

The third hypothesis predicted that the credibility of the three media would vary from highest to lowest in the order of film, tape and written. The results confirmed this prediction with mean proportional change scores on the twins, for example, being .95 for film, .66 for tape and .56 for written. Comparison tests of the three media, however, showed the primary source of variance to be between film and the other media. The difference between tape and written was not found to be significant.

The large and significant difference between film and the other media attests to the comparative power of the film to convince subjects of the existence of a phenomenon that they had previously found unbelievable. Out of all of the subjects who saw the film (and met the subject selection criterion), only three did not change their belief in a positive direction. This, by itself, however, is not a particularly unique or unexpected finding if one keeps in mind the fact that the film was genuine. Had the subjects accepted a film purporting to document the ESP twins or an act of levitation, the results would have perhaps been considered with some degree of surprise, if not concern. In this regard, it is of interest to note that the idiot savant twins were, in fact, rated less believable initially than the ESP twins. Obviously there are limitations in generalizing from the results secured with this one film to notions about the capability of film <u>per se</u> to convince persons of the unbelievable; however, the fact remains that there are many events and

phenomena that can be created for film or video that would be more believable to begin with than the idiot savant twins. A key factor in determining the degree to which any film presentation is accepted as being real is no doubt the degree to which the acceptance or rejection of its reality was of vital concern to the viewer. In the case of the subjects in this study, one can only speculate that their degree of concern or ego involvement was quite low when compared to attitudes about the vital issues of the times being transmitted by media. On the other hand, such attitudes are based in part upon the day-to-day assimilation of bits of media-transmitted, second-hand reality.

The unexpected finding was the fact that the tape-recorded interview of the twins which was an exact duplicate of the film sound track was apparently not considered any more credible than the written document. (It should be pointed out that both tape and written media did produce a change in beliefs that would, on their own, be considered quite adequate by any mass media practitioner bent upon changing beliefs.) Unlike the groups who viewed the film, the tape groups included numerous subjects who did not change at all or believed the phenomenon of the twins less after hearing the tape.

One explanation of the lower level of credibility given the tape is the fact that tape recordings in general are considered highly fakeable. It is a fairly common belief that under most circumstances, tape recordings are not admissible as evidence in a court of law. An examination of the responses by subjects to the questions dealing with the probability of the tape being a fake and the "idea" of it being a fake indicates that the majority of the subjects did in fact consider this to be very likely. This aspect of the problem will be discussed subsequent-

ly since it is related to another specific hypothesis, but at this point it is noted that apparently tape can be considered by subjects as suspicious a form of experimental deception as a written page, even when in fact it is genuine.

The fourth hypothesis dealt with the impact of the film and predicted that subjects who viewed the film would change their beliefs about related phenomena more than subjects who heard the tape or read the document. The analysis of the data by comparison test provided clear support for the significance of the finding that film subjects changed .17 on related cognitive phenomena as compared to .02 and .05 for tape and written subjects, respectively.

This finding can be interpreted as evidence for the impact of the film. "Impact" is a term frequently used by film and television producers and critics in its most literal sense. The equivalent psychological term could be considered "stimulus strength" and the equivalent process that of generalization. Thus, one could interpret the subjects' responses to cognitive phenomena as following, for example, Hilgard's definition of generalization--"the process whereby a novel stimulus produces a response learned to another similar stimulus" (Hilgard, 1948). Although it is not the present author's intention to interpret these findings within the context of learning theory, the question of how much individual subjects change on related phenomena was in fact correlated with their change on the phenomenon of the twins was considered pertinent. The correlation was tested utilizing the Pearson Product-Moment Correlation Coefficient (r) and found to be .36, significant at $<.001$. Thus, one can only say that a small percentage of the change on the related phenomena is reliably accounted for by subjects who also changed on the

twins. To look for the specific correlation within only the film groups per se would be relatively meaningless since virtually all film subjects did in fact change greatly on the twins.

As a result of the subject selection criterion used (initial rating of the twins), persons who viewed the film were disbelievers to begin with and the film obviously convinced them that this was an incorrect stand. It is not surprising then that they may have also reconsidered their beliefs about the other phenomena. Attitude theorists such as McGuire (1968) have shown that the logical relationship between components of an attitude is an important factor in determining what and how much change. Beliefs on the other hand are considered even more intertwined in cognitive systems (Fishbein, 1967; Rokeach, 1968). Thus, it is not an unexpected finding that subjects changed related beliefs in this experiment.

Most theories based upon the concept of cognitive consistency would also predict that subjects who perceived their new belief in the existence of the twins to be inconsistent with not believing in the other cognitive phenomena would also change their beliefs in the other phenomena. (A compilation of cognitive consistency theories can be found in Abelson, Aronson, McGuire, Newcomb, Rosenberg, & Tannenbaum, 1968.)

It is also possible to account for some unknown amount of the film group's performance with the comparatively simple inference that having been very strongly convinced of the truth of an unbelievable event, they were more likely to have a brief but effective response set of "anything is possible." In the final analysis, it is impossible to arrive at any complete quantifiable accounting for the effect of the film from the data available. From a purely descriptive point of view, the results

are relatively clear cut; the film had greater impact.

The fifth hypothesis predicted that subjects would rate the media presentations as costing more and being more difficult to produce from highest to lowest in the order of film, tape and written document. The results of comparisons tests indicated that the mean cost and difficulty score for film (5.5) was significantly different than the mean scores for tape (3.6) and written (3.3) but the difference between tape and written was not.

One approach to this finding would be to simply consider it as additional evidence of the comparative low credibility of the tape and written media presentations and attribute their low cost-difficulty ratings to the "need for consistency" motivation of subjects to rate something they did not believe as not costing very much to make and being easy to produce. The fact that the measure was taken <u>after</u> the final ratings of the phenomena makes it virtually impossible to eliminate this possibility as a major factor in accounting for the relationship of cost-difficulty to believability in this study. A measure of subjects' prior perception of cost-difficulty might have been illuminating; however, one would then have only accomplished a reversal of the cognitive elements and the contribution of a consistency motive would still remain enigmatic.

Another approach to this dilemma would be to manipulate subjects' beliefs in the relative cost-difficulty of media at a specific point in time prior to their participation in an experiment such as that used in this study. For example, a "dummy" experiment could be conducted in which subjects were polled on the desirability of initiating courses in media production. Information about the laboratory fees related to the costs of student production could be included and varied from low to high for

separate groups. The assumption, however, that subjects have not perceived the relationship between the experiments nor acquired additional information in the interim between experiments is at best a tenuous one.

The inclusion of questions related to cost-difficulty in this study was undertaken primarily for heuristic purposes and was related to the notions about this concept presented in Chapter I. The finding that subjects do in fact differentially rate the cost-difficulty of film and the other media, even if due to a consistency motive, does at the very least indicate some evidence for a cognitive relationship and provides a base upon which to undertake a future investigation of possible specific correlates. A direct approach to the problem would be to question persons about their basis for believing a particular media communication was not a fake. For example, the present author has, on numerous occasions, asked groups and individuals why they would not suspect that a televised football game they happened upon was not a fake produced to deceive them. Two types of answers were invariably received. The first generally dealt with the fact that the viewer had never been given any reason to doubt its veracity in the past. In other words, the reality of most events viewed on television are confirmable by other media, individuals who witnessed it in person, etc., and the viewer has never had the experience of being "faked out." The second type of answer (though somewhat similar) involves the cost-difficulty parameter. It typically is a variation of the statement, "I cannot conceive of why anybody would go to the trouble to fill up a stadium with fifty-thousand spectators and put on a phoney football game. What could they gain by it?" Within this statement are the elements of a simple mathematical model for one aspect of media credibility:

$$\text{Credibility factor X} = \frac{\text{(A) perceived cost-difficulty}}{\text{(B) perceived communicator gain}}$$

Thus, a televised football game would be rated very high on (A) and very low on (B) by the average person, leaving its credibility (with regard to this dimension only) very high. A political campaign film might also be rated very high on (A) but also very high on (B), i.e., the presidency. In the case of the present experiment, the film was rated relatively high on (A). We can only assume that the rating of the communicator's (experimenter's) gain would be comparatively low, i.e., a successful experiment.

The credibility factor thus calculated would of course mean very little be itself and no doubt would be found to interact with all of the other credibility factors delineated by past experiments and observation. In deference to the currently popular television program which relies so heavily on its fictional characters' persistent belief that "no one would go to that amount of difficulty and cost to fake me out," the present author has labeled the factor "The Mission Impossible Effect."

The conjecture of a possible "Mission Impossible Effect" in mass media credibility may appear to be facetious. When one considers the increasing degree to which we all are dependent upon television for our daily input of the realities of the world, however, its investigation by social scientists would appear warranted. During the time this experiment was being conducted, several hundred thousand boxing fans all over the world paid to see a fictional fight produced on film between Cassius Clay and Rocky Marciano, many months after Marciano had been killed in an accident. The script for the fight was produced by computer analysis of the probabilities of the outcome, given data on each boxer's fight history.

All possible endings were filmed and only the director and editor knew which was used in producing the several thousand prints which were screened simultaneously across the country. Professional bookmakers accepted bets on the outcome. If one can hypothetically consider the possibility of there being a viewer of this notable event in the history of mass media, who by some quirk of circumstance did not happen to know it was a fake, it is a fairly safe assumption that the "Mission Impossible Effect" would be highly relevant to understanding his response, whatever it may be.

The final hypothesis predicted that subjects would rate the probability of the media presentation being a fake from lowest to highest in the order of film, tape and written. The mean ratings of film (3.95), tape (5.40) and written (6.39) were found to be significantly different when tested by comparison tests.

The same question of a "consistency motive" accounting for this difference is of course pertinent and as indicated previously, there is no way to either eliminate or evaluate this factor from these available data. In this instance, however, we find that although there was no significant difference between the tape and written subjects' changes in beliefs about the phenomena (both being low), there was a significant difference in their ratings of the probability of each medium being a fake. Thus, in this instance, a cognitive consistency argument is weakened by the fact that both groups were equal on one of the two cognitive elements which are ostensibly out of balance. A consistency interpretation would require an explanation of why the written subjects needed to be even "more consistent" than the tape subjects.

The implications of these results are of primary significance with

respect to the problem of deception in controlled experiments which will be discussed subsequently.

External Validity: Major Hypotheses

When considering the overall interpretation of the results of a study such as this, one of the major questions which must be asked is, "To what extent can the results be generalized to other populations?" This question of "external validity" (Campbell, 1957) can only be answered in part and then only by scrutinizing the elements of the experimental treatment and the population used. There is little doubt that a population of college students responding to a test booklet in a formal classroom is at best a remote approximation of the general mass media public. In the present experiment, a comparatively varied population was secured by virtue of the differences in the student bodies used in each replication. The population at The University of Oklahoma was, in general, made up of students studying a wide range of major fields and included many out-of-state students, as well as a sizeable "hippie" element. Central State College students, on the other hand, were primarily business and education majors from rural Oklahoma. In a series of pilot studies similar to the present study, night school students were used who represented occupations from policemen to shop foremen. The results of these studies were in agreement with the major findings of the present study.

Another factor affecting the external validity of the study is concerned with the basic problems in any cross-media study. These problems, which deal with the fundamental differences inherent in media, were discussed in part in the introduction to this study. Many notable investigators take the position that it is virtually impossible to make cross-

comparisons of channels of communication (Hovland, 1954; Rosnow & Robinson, 1967) and perhaps this is one reason why few, if any at all, cross-media experimental studies in credibility have appeared. On the other hand, most of the methodological objections are based upon the problem of designing a content presentation which can be reasonably equated across media. This problem in turn appears to have been a function of the goals of most cross-media studies which were to test comparative "effectiveness" in teaching or ability to change complex attitudes. This was not the objective of the present study. However, one of the major products of this study is the development of a unique approach to the content material problem which can be used for other types of cross-media comparisons. The use of unusual and unknown phenomena need not be limited to the type used in this study, nor for that matter be limited to true existent persons, events or things. The concern expressed in this study for the implication of the ability of media practitioners to create phenomena is a reality and can just as readily be used for the "nobler" ends of experimental social psychology. Thus, for example, one could approach a study of media credibility, scientific dogmatism, attitude change, or several combinations of each with video or film "creations" of extrasensory perception.

With respect to the present study, the validity of the inferences that can be drawn about film credibility in general on the basis of an experiment utilizing a particular film are obviously limited. Replications of this study utilizing other phenomena and films would perhaps eventually provide sufficient data with which one could make suitable inferences about media credibility with a relatively clean methodological conscience. On the other hand, the results of the present study provide

strong unequivocal evidence in support of what are comparatively simple hypotheses, and have at the very least brought the problem into the experimental laboratory. Finally, the question raised of the Mission Impossible Effect, the role of perception of "phoneyness," and the further delineation of the factors contributing to differential impact are all issues that can and should be explored further.

The Credibility of Deception

As this study evolved from its initial conceptualization through a review of the literature, pilot studies and the conducting of the experiments, the author became increasingly aware of the importance of a fundamental assumption basic to nearly every experimental credibility study published to date. The assumption is that the subjects have perceived the experimenter's deception of attributed source as credible in itself. If a subject receives a written, persuasive message attributed to Pravda and subsequently shows little attitude change, his response cannot be attributed only to the low credibility of Pravda unless one is confident that the subject does believe that the message did, in fact, come from Pravda. If we have no information about this belief, then an alternate explanation of his low change score is equally plausible--namely, that at best, he is responding on an "as if" basis and is thus playing the rules of the experimental game as he sees them. A highly relevant development of a similar process is Bem's "self instruction" concept of attitude statements (Bem, 1968).

If the investigator is willing to accept this possibility on the basis that such a subject is still providing him with some indirect indication of his rating of the credibility of Pravda, then the entire

elaborate and complex procedure of measuring change in attitude, etc., is essentially superfluous. A more direct approach would be to simply ask subjects to rate the credibility of Pravda.

The number of subjects in the long history of credibility research who have in fact not found the experimental manipulation of attributed source itself to be credible is apparently unknown since none of the experiments published have reported attempts to secure such data. This is typical of the field of social psychology. According to Stricker (1967), only 27.3% of all attitude change studies published in 1964 which used deception reported any information at all about subjects' suspicions.

The results of the present study would appear to indicate the possibility that the number of suspicious subjects is quite large when the message is in the form of a written paragraph or tape recording, the two most commonly used media in credibility studies.

In response to the question asking subjects if the idea that the film, tape or document may have been faked had occurred to them, 75% of the tape and 73% of the written treatment subjects responded "yes" as compared to 38% of the film subjects. Since the question came after the rating of the phenomena, it is, of course, impossible to infer a causal relationship; however, to clarify the contribution of this factor to the overall results, the total subject population was dichotomized by "yes" (N = 161) and "no" (N = 98) answers to the question. The two groups' mean proportional changes in belief about the idiot savant twins were found to be "yes" .53 and "no" .98. Utilizing the median chi square test, with the population evenly divided on change scores, the differences were found to be highly significant ($X^2 = 58.4$, $p = <.001$). In the present study, it would appear that the idea of a message and its at-

tributed source being a fake is a potent one.

It is true that in this study, unlike attitude change credibility studies, the subjects were asked to respond directly to the believability dimension of the message. One could thus speculate, with some justification, that in attitude change studies the believability of the message and source is not the subject's focus or "response set." Since little if anything is known about how subjects perceive an experiment and even less about their response sets, there is little comfort in assuming that subjects in attitude change studies are profoundly more insensitive to the believability of the message or its source than the subjects in this study. The results of the present study should be even more cause for concern in this area when one keeps in mind that the tape and written communications were in fact genuine and no deception was involved.

The problem of "how subjects perceive an experiment" can be approached to a limited extent in this study by examining subjects' responses to the questions about the "purpose of the experiment" and "what the experimenter expected them to do." It should be noted that some attempt was made to reduce the expectancy or demand quality of the questions themselves by phrasing them "Do you <u>have any idea</u> what the experimenter conducting this research is trying to prove?" rather than <u>what</u> is he trying to prove. Hopefully this tack somewhat reduced the subject's possible opinion that he <u>ought</u> to know and <u>should</u> write something. Of the 259 subjects finally used in the study, only two gave responses which included some notion of there being different versions of the media presentation other than the one they received. The remaining 257 stated nothing about the possibility of their responses being compared to other subjects receiving a different treatment, or made any references to ideas about comparisons of media.

On the other hand, over 50% of the subjects believed that the purpose of the experiment was in some way concerned with measuring their change in beliefs and over 50% felt that the experimenter expected them to change their scores on the after booklet. This would appear to leave little doubt that a large number of subjects are at least able to perceive that a before and after design means the experimenter is anticipating change. Obviously this does not invalidate the results of multiple treatment studies wherein the relative amount and direction of change are the primary measures provided the subjects are unaware of the fact that there are other treatment conditions.

Another interesting and perhaps illuminating aspect of subjects' responses to these questions was found in the qualitative "tone" of some subjects' language. This type of data is admittedly weak and open to many methodological hazzards; however, it is presented here as an indication of one approach that can be taken in the study of credibility: the use of the subject's open-ended evaluation of the purpose of the experiment as a dependent variable. Examination of individual responses revealed a number of subjects who referred to the film as "proof of the phenomenon," "evidence of its existence," "presentation of fact," etc. These subjects also tended to perceive the experiment as a test of how they would use "information" or "facts" in re-evaluating their beliefs. On the other hand, a number of tape and written subjects referred to the tape or document as "supposed fact" or used more descriptive phrases such as "stuff," or "phoney propaganda." These subjects tended to perceive the experiment as a test of how gullible they were. Unfortunately, the time available for all subjects to answer these questions was only a few minutes and the space provided for the answers was small. Most subjects

wrote brief statements and used no evaluative terms in describing the communication if they mentioned it at all. With these limitations in mind, all responses to the questions were typed verbatim and those that used evaluative terms in reference to the communication were categorized, without reference to any of their change scores, as follows: Positive Category--any reference to the communication as fact, proof or real; Negative Category--any reference to the communication as supposed fact, phoney, fake propaganda, unreal, or any reference to being tested for gullibleness.

The results of this categorization indicated that 21% of all of the film subjects used evaluative terms which were all positive. Twenty-two percent of the tape and written subjects used evaluative terms of which 14% were negative and 8% positive. The remaining large majority of subjects' responses could not be categorized.

The significant difference between the film and other media groups in all areas related to credibility has been demonstrated previously by numerous analyses and tests. Thus, this further evidence was not surprising and was not subjected to statistical testing. Such tests would also be inherently weak due to the large number of subjects excluded who did not use evaluative terms in their answers.

The possible relationship between the subjects' (who did use evaluative terms) perception of the experiment and their change on the idiot savant twins was examined for tape and written groups combined. It was found that subjects who were categorized as negative (N = 24) had a mean proportional change of .20. Subjects who were categorized as positive (N = 14) had a mean proportional change of .99 ($X^2 = 19$, $p = <.01$). Although the interpretation of this finding for the overall study is limited by

the small percentage of the total population included, when looked upon as a small and "vocal" subgroup, the implications are clear. To the extent that subjects were not simply seeking one more reinforcement for cognitive consistency, it would appear that the extreme scores in both directions originated from subjects who had rather extreme views about the nature of the experiment. At the very least, the implication of this finding is that experiments in credibility should include some means of determining the credibility of the experiment.

Gordon Allport (1962), among others, has often provided eloquent support for the wealth of information to be found in an intensive study of an individual. Social psychologists seldom have the opportunity to embark upon such an endeavor and many would consider the desire as contrary to the fundamental assumption of a "social" psychology. Within the large population of nameless individuals whose squiggles, marks and sentences represent the data of the present study, there resides a nameless young man who perhaps has potentially within him the summary of the findings about the media differences as they relate to the credibility of the experiment and the subject's perception thereof. Having read the written document, he responded to the question of the purpose of the experiment thusly: "To see if you can be swayed by some typed up garbage about to (sic) idiots to make you believe they posess (sic) this trait." It would appear that assumptions about the equivalence of media credibility, especially as they are related to experimental deceptions, are at best quite tenuous--at least with respect to college students in the middle of the United States.

CHAPTER VI

SUMMARY

The relative credibility of film, audio tape and written media, though examined extensively in mass opinion surveys, has seldom been subjected to study through controlled experimental procedures. An extensive review of the literature in many areas revealed numerous studies which focused on the credibility of an attributed source of a communication usually transmitted through one medium. Credibility in each study was always inferred from the subjects' amount of change in attitudes about various complex issues. In most instances, multiple deceptions were also used and seldom, if ever, did subjects receive a genuine communication directly from its original source. An underlying assumption in many of these studies was that the different media are essentially equivalent in basic credibility so that, for example, the results of a study of the basic psychological processes operating in determining the perceived credibility of an attributed source for a printed speech would be applicable to any other media.

Studies which compared the relative effectiveness of media in specific tasks such as classroom learning were found in great abundance; however, in these studies credibility was never a major variable. One of the major theoretical and methodological problems found in cross-media comparisons is the inherent differences in the capabilities of different

media to transmit different types of subject content to different groups of persons. Most experimental objectives have been to determine which medium is most effective in accomplishing a specific learning task or change in attitude with a particular group under specified conditions. Possible generalizations about media based upon these experiments are extremely limited.

The present study was undertaken in an attempt to approach these problems at a much more basic level through a comparatively unique experimental design. The major elements of this approach which differentiated it from past studies were: (a) the comparison of credibility across media; (b) the use of circumscribed "changes in belief in the existence of phenomena" as a dependent variable rather than the more global concept of attitude change; (c) the use of direct questions about the genuineness of the communication as a further measure of credibility; (d) the use of a genuine communication rather than a fake and the absence of multiple deceptions; (e) the inclusion of measurements to directly determine the subjects' perception of factors related to the credibility of the experiment itself.

The experiment was conducted using male and female introductory psychology students in intact randomly assigned classes at The University of Oklahoma, and subsequently cross-validated in a complete replication at Central State College. A total of 259 subjects were used in the final analysis of the data.

A genuine, unstaged film of idiot savant calendar calculating twins, an exact duplicate of the sound track of the film, and a written document containing a transcript of the sound track were separately presented to independent groups of subjects who had previously rated (on a 100mm graphic

line scale) the degree to which they believed in the existence of seven unusual phenomena, one of which was the twins. Two major types of phenomena were rated. One was cognitive and related to the subject of the media treatment (i.e., twins who calculated complex numbers utilizing ESP) and the other was physical and less related (i.e., Tarahumara Indians who run several hundred miles nonstop). After either seeing, hearing or reading the communication, subjects re-rated all of the phenomena. Two versions of each media treatment were used--one with credits attributing its production to a highly credible source and the other with no credits or source indicated.

Six major hypotheses were tested utilizing an overall analysis of variance and comparisons tests. In addition, various non-parametric statistics were employed.

Hypothesis #1: "No significant differences in credibility are found when a factual film is presented in the following forms: (a) with a high credibility source identified in credits, and (b) without the above credits." This hypothesis was supported. No significant difference in change in beliefs were found between the groups seeing the different versions of the film. The results indicate that the credibility of a realistic film which deals with unknown and unbelievable phenomena is not dependent upon its attributed high credibility source. The significance of this finding was slightly diminished, however, by the fact that under conditions of overall low credibility, utilizing tape and written media, the effects of an attributed source were also not significant.

Hypothesis #2: "Significant differences in credibility are found when the same basic factual information presented in the film is presented in the following forms: (a) audio tape recording with credits indicating

a highly credible source, (b) audio tape recording with no credits, (c) written document with credits indicating a highly credible source, and (d) written document with no credits." Although the difference in subjects' changes in beliefs when compared across credits and no credits conditions for tape and written media were greater than those found for film media credit vs. no credit subjects, the differences were not found to be statistically significant. The possibility that subjects may have relied on a secondary source--the experimenter--in the absence of an attributed source was discussed. It was further observed that the results of many high vs. low credibility attributed source experiments may have been secured only by virtue of the obvious cues available to subjects when extremely low credibility sources were used.

Hypothesis #3: "The credibility of the communications vary significantly from highest to lowest in the following order: (a) film, (b) audio tape recording, and (c) written document." This hypothesis was supported partly in that the overall credibility of the film was found to be significantly greater than the tape and the written document. However, differences between the tape and written were not found to be significant. The latter finding was considered unusual and was interpreted in terms of the perceived "fakeability" of tape. Data on the subjects' ratings of the probability of the different media being fakes confirmed this view. In addition to this, over 80% of the subjects who heard the tape also indicated that the "idea" of it being a fake had occurred to them. These results were interpreted as casting serious doubt on Hovland et al.'s (1953) contention that the mediating psychological processes which determine communicator credibility can be considered equivalent for all media when conducting experimental studies.

Hypothesis #4: "Changes in beliefs about related phenomena are greater for persons viewing the film than for those hearing the tape or reading the written document." This hypothesis was supported by the finding that subjects who viewed the film significantly changed their beliefs about related cognitive phenomena as compared to tape and written groups subjects who did not. Various possible interpretations of these results were presented, such as the role of an "if this has proven to be true, anything could be true" response set and the contribution of cognitive consistency motives.

Hypothesis #5: "Subjects rate the media presentations as costing more and being more difficult to produce from highest to lowest in the order of film, tape and written document." This hypothesis was partially supported by the finding that the film presentation was rated as costing more and being more difficult to produce than the tape or written presentations. Although the written presentation was rated lowest on this dimension, its rating was not significantly different from that of the tape. The limitations of the possible interpretations of these results due to their being secured after the media treatment and testing of beliefs were discussed. A heuristic model based upon the ratio of perceived cost plus difficulty to perceived communicator gain, labeled the Mission Impossible Effect," was also presented and discussed.

Hypothesis #6: "Subjects rate the probability of the media presentation they experience as being a fake from lowest to highest in the order of film, tape and written." This hypothesis was supported by the results secured in response to direct questions about the probability of the communication being a fake and the "idea" of it being a fake having occurred. Additional confirmation was secured from a descriptive analysis of sub-

jects' responses to open-ended questions about the purpose of the experiment. The results of these different measures provided clear evidence that subjects were highly suspicious of the genuineness of the written and tape communications.

In conclusion, it is believed that the primary contributions of this research to the study of media credibility are:

1. The development of a unique experimental approach to the study of credibility in communication through (a) the use of a genuine, unstaged message; and (b) the use of beliefs in the existence of phenomena as a dependent variable, both of which reduced many confounding factors which have seriously limited cross-media comparisons.

2. The empirical demonstration of significant differences in the basic credibility of film, audio tape and written media which are independent of attributed source.

3. The raising of the issue of the credibility of the deceptions which have been an inherent part of most experimental studies in communication and persuasion.

4. The development and initial exploration of a potentially significant parameter of media credibility which is amenable to future experimental analysis--namely, the ratio of perceived cost and difficulty of production to the perceived gain of the communicator.

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APPENDIX A

Test Booklets

The "Before" booklet contained the following cover sheet and paragraphs, each on a separate 5 1/2 x 8 1/2" page, stapled together in random order, with the exception of the cover sheet. Immediately under each case, the 100mm line scale, labeled "False Nonexistent" on the left and "True Existent" on the right, appeared. The "After" booklet contained the same paragraphs in random order with the addition of the questions (which appeared in Chapter III) at the end of the booklet. The cover sheet for the "After" booklet contained only the blanks for birthdate, sex, college year and major field.

Cover Sheet:

Birthdate_____ College Year_____
Sex_____ Major Field_____

The purpose of the study you are participating in is to secure data on what people believe to be the capabilities of human beings in various areas. On the following pages you will find brief paragraphs describing different things performed by various individuals or groups. What is stated in each paragraph may be a true account or it may be fictitious. Your contribution to our research is not to demonstrate your knowledge of the subjects or to demonstrate your ability to guess which are true or false. We are more interested in your beliefs regarding the existence of the things described in the paragraph. In other words, you are being asked, "Do you believe that the persons or groups presented in these paragraphs actually exist and are able to do what is described?"

After each paragraph you will find a line as illustrated below:

False True
Nonexistent _____ Existent

You are to place a small vertical mark on the line at a spot which indicates your belief about the thing described in the paragraph. Thus, if you believe it to be completely false and nonexistent, you would make your mark on the extreme left end of the line. If you believe it to be completely true and existent, then you would place your mark on the extreme right end of the line. If you believe it to be true but with some very minor doubt, then you would place the mark not quite as far to the right, and so on.

George and Charles are 27-year-old identical twins who are presently institutionalized at an Eastern state hospital. Both twins have well below normal intelligence with IQs in the 60-70 range. Neither twin is able to perform simple arithmetic problems such as multiplying four times seven or determining how much change one should get back from a five-dollar bill if one buys a three-dollar shirt. On the other hand, both twins are able to rapidly calculate complex calendar dates. For example, they can correctly answer questions such as "What day of the week will July 19 in the year 132,470 fall on?" within two seconds. The twins are also able to answer questions such as "In the third century, in what years did February 2nd fall on a Tuesday?" within a few seconds. Their answers are almost always correct. When asked how they accomplish these feats, their answer is invariably, "We just do," and they are unable to provide any further information. As of 1968, no satisfactory explanation of this phenomenon has appeared in the scientific literature.

Samuel is a 14-year-old boy with average intelligence, who possesses the ability of "total recall." Upon reading any magazine article or chapter of a book up to approximately 40 pages in length, he is immediately able to repeat what he has read word for word with over 90% accuracy. Formal testing reveals that his accuracy endures for an average of 25 days. After this time, Samuel will only repeat those paragraphs of particular interest to him. His ability to repeat conversations, providing accurate recall of each person speaking, is at a higher level and testing demonstrates over 90% accuracy for up to 45 days. Conversations of particular interest to him which occurred five years ago are repeated, although in these instances no confirmation of accuracy is possible. Samuel can repeat the complete dialogue of at least 20 dramatic series television programs viewed up to three years previously which, when checked with recordings, proved to be completely accurate, both in terms of content and the pacing of the dialogue.

David and William are identical twins with IQs in the 40-50 range. David is able to multiply and divide 6-digit numbers correctly within 30 seconds without the use of pencil and paper. William has never shown any interest or ability in calculating. On the other hand, if David is given a problem written out on a card and is asked not to speak the answer, then his brother William (located in an adjoining room), who has not heard the problem and who cannot see the card, responds verbally with the answer, usually within one minute. His answers are correct 68% of the time.

Elliot, at the age of seven, is of below-normal intelligence but not considered mentally retarded. At the age of three he began to draw complex geometric shapes with great precision. He also became compulsively interested in riddles and demonstrated an unusual ability at solving them. At the present time he is able to quickly solve complex problems in symbolic logic within a few seconds. The same problems, when given to graduate philosophy students, required an average of eight minutes to solve. When questioned about the methods that he uses in working out a problem, he is evasive and the few recorded explanations secured are considered basically meaningless.

The fastest that man has ever traveled under his own power with mechanical assistance is by bicycle. Speeds in excess of 120 miles per hour over a race course have been recorded for professional bicyclists riding a standard racing bike. A racing car paces the cyclist in front and serves to reduce wind resistance. The official speed record of 127 miles per hour was recorded by a cyclist who was 50 years of age at the time.

In a very remote canyon region of Northwest Mexico there is a large tribe of primitive Indians who live in caves and small huts. Although the death rate of children from diseases and nutrition problems is extremely high, and the adults live on a marginal diet, the tribe is noted for its members' unusual athletic abilities. They have extreme endurance as long-distance runners and regularly participate in non-stop races over two-hundred and fifty miles long. A typical race which may last two or more days requires the participants to kick a wooden ball accurately along a trail through woods and up and down steep canyons as they run, through daylight and total darkness. Many of those not racing will run along for miles with the runners carrying wooden torches to assist their favorites. A team of researchers from a Midwestern university recently observed a spontaneous race of 27 miles in the middle of the night run by several children between the ages of 8 and 11. Although an olympic runner is usually in a state of total collapse after the 30-mile marathon event, medical investigators found no significant signs of stress (increased breathing rate, blood pressure, etc.) in the Indian runners after a 30-mile lap of a typical race. Old men and women of this tribe have been observed jogging two-hundred miles over the mountains to the nearest city to see the sights and to beg.

Harold is a 9-year-old boy with a severe behavior disorder known as Autism. He seldom speaks and does not interact with anyone other than his parents. Although he has below-normal intelligence, he possesses superior physical agility. Since he was first able to walk, he has demonstrated a phenomenal ability to climb, balance in precarious positions, etc. Since he was seven years old, he has become compulsively interested in pouring liquids from container to container and when dinner is served he will race around the table with a water pitcher, filling each glass on the run with one quick movement. When each glass of water is examined, it is found to be filled exactly to the top with a positive meniscus so that one additional drop of water would cause it to spill.

APPENDIX B

Written Document: Transcript of Interview with Idiot Savant Twins

The transcript of the interview with the idiot savant twins was exactly the same for the credits and no credits groups, with the exception of the cover sheets (for both groups) and the summary (for the credit group only).

Cover Sheet (Credits Group):

BEHAVIORAL SCIENCES AUDIO VISUAL LABORATORY
Department of Psychiatry, Neurology & Behavioral Sciences
University of Oklahoma Medical Center

JULY 19, 132,470 IS A SATURDAY:
AN INTERVIEW WITH THE IDIOT SAVANT CALENDAR CALCULATING TWINS

Research and Teaching Document #26
Supported in Part by NIMH Grant #M3709

George and Charles are identical twins. They were 27 years old in the spring of 1967. The twins were born three months prematurely and were kept in an incubator for two months. There is evidence of central nervous system dysfunction. Originally their IQs were in the 40s and 50s. They now test between 60 and 70. The term "idiot savant" describes persons who appear to have below-normal mental abilities in most areas but dramatically excel in one special area. George and Charles excel in calendar calculating and memory for events of significance to them. Other instances of idiot savant calendar calculators have been recorded but none can match George and Charles in the extreme range of their calculation.

George, who is more adept at this than Charles, can calculate dates from the calendar year one to beyond the year one hundred thousand. They do not distinguish between the Gregorian and Julian calendars but do make adjustments for leap years. If one allows for the difference between the two calendars, their answers are almost always correct. On the following pages is an exact transcript of an interview which was conducted by Dr. William Horwitz, Assistant Director of the New York Psychiatric Institute, where the twins are being studied. During this interview the twins made only one mistake in their calculations.

Cover Sheet (No Credits Group):

AN INTERVIEW WITH THE IDIOT SAVANT CALENDAR CALCULATING TWINS

On the following pages is an exact transcript of an interview which was conducted by the psychiatrist who is the Assistant Director of the Institute where the idiot savant twins are being studied.

Summary Sheet (Credits Group Only):

The calendar calculating abilities of George and Charles have been verified on numerous occasions. As of February 1968, no completely satisfactory explanation for this phenomenon has appeared in the literature. The unique abilities of George and Charles represent a challenge to all scientists concerned with the relationships between brain, mind, and behavior.

Dr.: Boys, can you tell me when did you first see me.

George: In 1962. On May 24th. Up in Letchworth Village.

Dr.: You've got to talk a little bit louder.

Geo. & Ch.: May 24th, 1962, up in Letchworth Village.

Dr.: Who was in charge of the clinic up there that day?

Geo. & Ch.: Dr. Stimpson.

Dr.: What kind of day was it?

George: It was cloudy in the morning and got sunny in the afternoon. I'll never forget that day.

Dr.: Now when did you come to the Psychiatric Institute?

Geo. & Ch.: April 15, 1963.

Dr.: Now, I'm going to ask you some questions about dates which you are pretty good at. I'm going to ask George first and then you Charles. What day is Friday the first in 1940?

George: March 1st and November 1st.

Dr.: March 1st, November 1st. All right...in 1940, the 3rd Wednesday in September, 1940. What day is that?

George: The 18th.

Dr.: March 1st on a Friday. What years does that come in?

George: 1901, 1907, 1912, 1918, 1929, 1935.

Dr.: That's enough. Now in the 1800s.

George: 1805, 1811, 1816, and 1822.

Dr.: That's enough. Now Charles, you tell us after 1822 what comes after that?

Charles: 1822, 1833, 1840.

Dr.: After 1840?

Charles: 1846.

Dr.: 1846. George, is he right?

George: March 1st 1840 was on a Sunday.

Charles: That's right.

Dr.: It comes on a Sunday.

Charles: Am I right?

Dr.: Well, George says you are right. Now, I'm going to ask you some questions in years ahead. July 19th in the year 6,870. What day is that?

George: July 19 in 6,870. That will be on a Saturday.

Dr.: Charles, what do you say?

Charles: That will be on a Saturday.

Dr.: All right. July 19th in the year 9,440.

George: July 19 in ninety-four forty. That will be on a Sunday.

Dr.: We are going to check these dates later on. July 19 in the year ninety-two thousand...

George: July 19th in ninety-two thousand?

Dr.: ...and eight hundred and sixty. There it is.

George: July 19th in 92,860. That will be...92,860...that will be ...July 19, 92,860...that will be on a Monday.

Dr.: On a Monday. All right, now July 19th in the year 132,470. Figure this one out.

George: July 19th? That will be on a Saturday.

Dr.: Saturday. All right. Now, I want to ask you some other questions. How many days in the year?

Geo. & Ch.: 365.

Dr.: Is it more than 365 or exactly 365.

George: In a leap year it's 366.

Dr.: How many days in the week?

George: Three hundred...umh...seven.

Dr.: How many months in the year?

George: Twelve.

Dr.: How many hours in the day?

George: 24.

Dr.: How many minutes in an hour?

Geo. & Ch.: 10 minutes.

Dr.: How many seconds in a minute?

George: 10 seconds.

Dr.: Ten seconds? Are you sure it's not more than ten?

George: I'm sure.

Dr.: You're sure. All right. How much is four times seven?

George: Four times seven? I don't know.

Dr.: You don't know? Come on...McBride taught you for months.

George: Remember, remember?

Dr.: Remember when McBride taught you? What day was that he taught you on?

George: In 1964.

Dr.: What month?

George: In February.

Dr.: What ward?

George: Ward five.

Dr.: Right. Now four times seven is how much?

George: Is it twenty-one?

Dr.: Twenty-one? It couldn't be more?

George: Couldn't be more.

Dr.: How much is fourteen and eleven?

George: Fourteen and eleven is 25.

Dr.: How much is...if you buy a shirt and you go in a store and the shirt cost four dollars and you gave the man a ten-dollar bill. How much change will you get back?

George: I don't know how much change.

Dr.: Tell me. How much change will you get back?

George: Forty cents.

Dr.: Forty cents. Now, when was President Kennedy born?

George: 1917 on May 29th.

Charles: On May 25th...May 29th.

Dr.: 1917 on May 29th?

George: Yeah.

Dr.: What day of the week was that?

Geo. & Ch.: On a Tuesday.

Dr.: What day did he die?

Geo. & Ch.: November 22nd in 1963.

Dr.: Who shot him?

Geo. & Ch.: Oswald.

Dr.: Yes. And what kind of day was that?

George: It was cloudy in the morning and got sunny in the afternoon. One o'clock in the afternoon. It was a warm and sunny day.

Dr.: Now, how old was he when he died?

Geo. & Ch.: 46.

Dr.: 46. If he lived to 2000, the year 2000, how old would he be?

George: If he lived to the year 2000?

Dr.: If he lived up to the year 2000. How old would he be?

George: If he lived right now?

Dr.: If he kept living until the year 2000 how old would he be?

George: Fifty...forty-nine.

Dr.: That's to right now to the year 1966, ah 1967.

George: He would have been fifty.

Dr.: But if he had lived up to the year 2000, how old would he be...George?

George: On May 29th, 2000? He would have been 83.

Dr.: 83. All right. Now George Washington was born on what day?

Charles: On a Friday.

George: On a Friday in 1732.

Dr.: And what day did he die?

George: December 14th, 1799.

Charles: That's right.

Geo. & Ch.: He died on a Saturday.

Dr.: If he lived up to this year, how old would he be?

George: He would have been 235.

Dr.: Now, Charles, let me ask you a few questions and George you keep quiet for a few minutes and let Charles answer. What day of the week is January 22, 1909?

Charles: On a Friday.

Dr.: On a Friday. And January 22, in 1897?

Charles: That was on a Friday too.

Dr.: That was on a Friday too. And January 22, 1797.

Charles: 1797. That was on a Wednesday.

Dr.: Is he right?

George: No. It was on a Sunday.

Charles: It was on a Sunday, a Sunday.

Dr.: George is a little bit more accurate going back that far. Charles is equally as good in the weather. What other date can you remember on the weather?

Charles: On a Sunday... I'm staying here forever.

Dr.: Yes, you are staying here forever if you want to stay here forever. I want to ask you, both of you, where did you learn to do the things about the calendar?

George: When I was six years old.

Charles: When I was six.

Dr.: You were six years old.

George: Yes I was.

Dr.: Now I want Charles to answer this time. Who taught you?

Charles: My mother.

Dr.: Your mother.

Charles: Yes.

Dr.: And who did it first, you or George?

Charles: I did it first.

Dr.: You did it first...and how did you learn to do it?

Charles: When I was six.

Dr.: How, I want to know how you did it.

Charles: Like January 1, 1940 was on a Monday.

Dr.: January what?

Charles: 1940.

Dr.: Yeah...Did you learn from a book, did you learn from your mother, from your father, from your sisters?

Charles: I learned from my father too.

Dr.: Your father too. What did your father teach you?

Charles: Dates.

Dr.: Dates.

Charles: Yeah.

Dr.: Your father once brought you a calendar...but actually I checked and it was not a perpetual calendar and these boys don't know how to use a perpetual calendar...but you learned from your mother and your father?

Charles: Yeah.

Dr.: George, who learned first?

George: I think I learned first and Charles learned second.

Dr.: You think you learned first and he learned second.

Charles: He learned first and I learned second.

Dr.: How did you learn to remember the weather?

George: Like August 1st, 1947.

Dr.: How did you learn to remember that a certain day was sunny?

George: I know January 1st, 1946 was a cloudy day.

Dr.: Remember when you came to the hospital you would also smell people a lot?

George: Yeah.

Dr.: Do you still smell people?

George: Yes I do.

Charles: Yes I do, both of us.

Dr.: Why do you smell them?

George: Because they smell different odors.

Dr.: Do they smell nice? Do they smell bad?

George: They smell nice.

Dr.: All people? Ever smell bad?

George: When they get dirty they smell bad.

Dr.: What do they smell like when they smell dirty?

George: Perspiration.

Dr.: Perspiration. Do you like that?

George: No I don't.

Dr.: What kind of smell do you like?

George: Clean smells like bleached smells and sweet smells.

Dr.: All right, you're doing very well now and you like it here.

Charles: We like it here.

Dr.: And you say the day you are going to heaven is what day?

George: December 4, 2,039.

Charles: That'll be on a Sunday.

Dr.: Are you both going on the same day?

George: We might.

Dr.: You might, you might go different days?

George: We might go different days.

Dr.: Which would you prefer?

George: I prefer to the year 2020.

Dr.: 2020. Why 20?

George: 2,039, on December 3.

Dr.: And what year would you prefer to go to heaven?

Charles: 2,039.

Dr.: How about 3,039?

Geo. & Ch.: I'll be up in heaven already.

Dr.: How do you know you'll be up in heaven already?

George: I'll be dead pushing up the daisies.

Charles: Pushing up daisies.

APPENDIX C

Raw Data

WRITTEN WITH CREDITS (O.U.)

Subj. #	Before and After Scores												Questions[a]				
	George/ Charles		Sam		David/ William		Elliot		Harold		Tara-humara		Bike		1	2	3	4	5
1	1	8	1	9	7	8	10	9	9	9	1	4	8	9	9	5	y	4	8
2	2	2	7	3	8	3	1	8	3	3	1	1	2	1	8	9	y	5	6
3	4	10	4	9	1	5	8	7	1	10	9	7	2	4	8	6	y	2	4
4	1	10	8	10	1	2	3	10	8	10	10	10	9	10	10	10	n	1	10
5	3	10	2	10	6	3	9	9	9	10	9	9	10	10	6	6	n	4	2
6	2	2	10	3	1	2	6	3	3	3	2	1	10	10	9	10	y	1	2
7	1	10	8	6	3	10	6	10	1	1	1	1	9	8	10	2	n	3	6
8	1	9	4	10	1	2	10	10	9	9	6	5	4	9	10	2	y	3	6
9	1	10	8	7	4	9	3	9	8	2	1	1	10	10	10	2	y	1	1
10	1	6	10	10	10	10	9	10	1	1	4	2	5	4	8	5	y	9	2
11	2	7	8	9	8	7	4	7	2	4	3	3	10	10	6	1	n	4	3
12	1	5	7	10	1	1	7	9	1	4	6	9	3	2	9	7	y	6	3
13	3	10	10	10	1	8	1	8	7	9	9	10	7	10	5	2	n	1	7
14	3	10	10	10	10	10	9	10	8	10	1	1	3	8	1	2	y	4	9
15	1	10	10	10	9	10	3	10	7	10	8	3	1	3	2	1	y	1	1
16	4	9	10	10	1	8	9	10	10	9	9	9	9	10	9	3	y	1	2
17	4	9	6	10	7	7	4	8	4	5	6	8	2	7	7	6	n	5	9
18	1	2	9	3	1	1	8	1	1	1	3	8	8	4	10	10	y	7	5
19	1	2	10	10	8	8	8	8	10	10	9	8	3	3	10	10	n	3	2
20	1	10	1	1	10	10	10	9	10	10	10	10	1	1	10	1	y	1	7
21	1	4	9	9	1	2	1	1	4	3	3	2	2	2	10	10	y	2	5
22	3	6	8	9	1	3	8	2	1	2	7	8	3	2	9	5	y	1	1

[a]1 = Possibility of fake; 2 = Probability of fake; 3 = Idea of fake: y=yes, n=no; 4 = Difficulty of fake; 5 = Cost of producing media

WRITTEN WITHOUT CREDITS (O.U.)

Subj. #	Before and After Scores												Questions				
	George/ Charles		Sam		David/ William		Elliot		Harold		Tara-humara		Bike		1	2	3	4	5
1	1	5	7	8	9	7	6	5	8	8	5	5	3	1	10	5	y	8	2
2	1	5	6	8	1	1	1	1	3	5	1	3	1	1	10	9	y	1	7
3	4	7	10	9	4	1	9	6	8	8	1	1	1	1	10	8	n	1	2
4	2	10	5	5	3	5	5	7	8	6	9	9	10	10	6	5	y	6	5
5	1	10	10	10	10	10	5	10	9	7	1	1	9	10	10	10	n	1	1
6	3	1	1	1	1	1	1	1	6	5	6	5	1	1	10	10	y	2	1
7	2	10	8	10	8	9	2	10	10	10	1	2	1	3	9	8	y	1	7
8	1	1	1	1	1	1	3	2	1	1	1	1	3	1	9	10	y	3	1
9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	10	10	y	1	1
10	1	5	10	10	10	10	10	10	1	1	1	1	1	1	10	10	y	1	2
11	1	5	3	2	1	1	3	2	9	9	2	2	9	9	10	5	y	1	1
12	1	10	3	2	1	1	10	10	3	2	1	2	8	10	8	8	y	3	2
13	1	10	7	10	10	10	3	10	10	9	9	9	8	3	7	1	y	1	5
14	2	10	9	10	4	7	10	9	1	10	9	10	10	10	9	6	y	2	3
15	2	2	8	8	6	5	1	1	7	8	9	9	1	1	8	2	n	5	1

TAPE WITH CREDITS (O.U.)

Subj. #	Before and After Scores														Questions				
	George/ Charles		Sam		David/ William		Elliot		Harold		Tara- humara		Bike		1	2	3	4	5
1	1	7	5	7	4	1	9	6	9	3	7	7	10	8	5	5	y	3	4
2	1	1	10	1	1	1	1	1	1	1	1	1	1	1	10	10	y	1	1
3	4	8	4	6	3	5	3	5	9	7	2	1	1	2	9	3	y	2	2
4	2	1	10	10	1	1	10	10	8	8	1	3	10	10	10	10	y	2	4
5	1	2	9	10	1	2	9	7	1	1	2	4	5	6	10	10	y	1	1
6	1	2	2	1	1	1	2	1	8	5	1	2	3	1	10	9	y	1	1
7	1	1	8	9	2	1	5	6	5	1	9	9	10	10	10	10	y	1	1
8	1	1	5	5	9	10	9	8	10	10	1	1	3	1	10	10	y	1	3
9	1	7	3	5	10	10	5	5	10	3	1	2	1	1	10	10	y	1	1
10	1	10	9	1	10	10	10	10	1	1	10	10	1	1	10	1	y	10	1
11	3	10	10	10	7	10	7	10	4	4	10	10	8	10	7	1	y	6	1
12	1	7	10	10	6	2	10	10	10	10	6	7	1	1	10	6	y	8	3
13	1	10	1	3	9	5	2	5	4	2	1	1	1	2	3	1	n	9	3
14	1	9	7	7	3	9	1	7	7	9	1	3	2	3	6	8	y	8	3
15	2	10	9	9	6	9	6	9	4	5	5	8	8	8	5	5	n	6	4

TAPE WITHOUT CREDITS (O.U.)

Subj. #	Before and After Scores														Questions				
	George/ Charles		Sam		David/ William		Elliot		Harold		Tara-humara		Bike		1	2	3	4	5
1	1	4	3	3	1	1	4	3	1	2	9	7	6	6	7	5	y	3	1
2	1	7	4	1	1	1	1	1	1	1	1	1	10	7	10	9	y	2	4
3	3	10	1	9	4	2	9	10	4	3	2	6	8	10	10	6	n	1	1
4	1	1	6	5	1	1	2	2	1	1	4	3	6	6	10	10	y	3	1
5	1	10	10	9	1	2	1	4	2	1	1	1	9	9	10	2	y	2	3
6	1	10	10	10	10	10	10	9	9	9	10	10	2	2	10	4	y	7	1
7	4	10	8	6	6	6	3	3	2	2	8	7	3	3	1	1	n	1	7
8	1	2	8	8	2	2	2	4	9	8	5	7	6	2	10	10	y	8	4
9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	10	10	y	10	5
10	1	9	8	8	2	4	5	8	9	7	1	2	3	2	10	3	y	1	2
11	1	10	4	10	4	10	1	10	2	10	2	10	2	10	2	8	n	1	1
12	2	2	2	1	6	7	1	2	5	7	2	2	1	1	6	3	y	1	1
13	1	1	1	1	10	8	7	4	1	7	4	5	7	7	10	7	y	6	8
14	3	10	8	10	3	2	2	2	8	9	8	9	6	7	5	2	y	9	6
15	2	10	1	1	1	1	8	7	2	10	10	9	10	9	9	2	y	10	3
16	3	10	9	10	10	9	9	10	2	7	2	7	10	10	10	5	n	2	4
17	4	10	9	10	1	7	7	9	4	8	5	7	10	10	6	4	y	7	6
18	1	8	8	9	8	9	6	8	3	3	10	8	1	2	10	5	y	2	3
19	1	2	7	9	1	2	8	10	1	8	8	8	1	3	9	9	y	1	2
20	2	5	8	7	2	2	2	3	9	9	2	2	4	2	10	5	y	1	2
21	2	9	6	6	5	5	3	3	8	7	8	8	4	6	9	3	y	3	3
22	2	9	8	9	3	8	4	8	7	8	3	2	6	8	5	4	n	4	3
23	1	10	7	9	3	2	9	10	2	2	10	8	7	8	9	1	y	9	1
24	1	1	10	10	1	1	2	10	1	1	10	10	10	10	10	10	y	1	2
25	3	7	8	9	3	2	1	7	7	3	8	7	1	3	6	3	y	3	2
26	1	1	2	1	1	1	5	4	5	4	4	2	8	5	10	5	y	1	1
27	1	1	9	9	1	1	1	1	1	1	1	1	1	1	10	10	y	1	2
28	2	9	2	3	1	2	7	8	2	2	9	9	7	7	9	5	y	2	3

FILM WITH CREDITS (O.U.)

Subj. #	Before and After Scores														Questions				
	George/ Charles		Sam		David/ William		Elliot		Harold		Tara-humara		Bike		1	2	3	4	5
1	2	10	8	10	2	2	2	2	8	10	8	10	10	10	3	2	n	7	7
2	2	10	3	2	4	1	7	7	1	1	7	6	1	1	5	1	n	1	2
3	1	10	2	1	1	1	10	10	10	9	3	10	9	10	7	1	n	7	5
4	1	2	7	6	3	3	5	1	1	1	1	1	8	6	5	10	y	2	7
5	4	10	8	9	1	2	7	6	3	1	1	1	10	10	7	4	n	3	3
6	1	2	4	5	1	10	6	9	1	2	3	7	1	1	8	10	n	5	7
7	1	10	8	10	1	9	1	4	2	4	2	9	4	9	5	5	y	5	7
8	1	10	8	10	1	2	8	10	3	1	1	1	3	2	10	6	y	1	5
9	2	10	4	9	10	10	5	7	1	3	1	2	8	9	1	1	n	10	5
10	2	10	1	1	3	1	6	6	1	1	6	7	6	9	9	3	y	6	3
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14	1	10	8	10	1	1	1	1	1	1	1	1	10	10	3	5	n	9	5
15	1	10	8	10	1	8	8	10	3	10	1	1	9	9	10	6	y	1	10
16	1	10	1	7	1	3	3	8	8	3	1	1	8	8	8	4	y	4	7
17	1	10	1	1	2	2	1	10	1	1	1	1	10	10	2	1	n	10	7
18	2	10	10	10	5	9	1	9	5	10	9	10	5	8	9	4	n	10	7
19	1	10	5	5	6	5	4	10	9	5	8	10	1	1	10	2	n	3	3
20	1	10	10	10	1	2	9	9	4	6	8	7	2	2	7	4	y	7	5
21	1	10	4	2	6	8	6	8	2	8	7	9	10	9	1	1	n	1	9
22	1	10	9	10	9	6	10	10	7	7	7	8	1	1	10	5	y	1	7
23	1	10	10	2	8	5	3	10	10	2	1	1	1	4	4	10	n	10	7
24	4	10	10	10	4	4	3	2	9	6	1	6	10	6	6	8	n	1	5
25	1	10	4	8	9	7	8	10	6	3	9	7	5	4	1	1	n	10	7
26	1	10	10	10	1	4	1	8	8	1	1	1	10	10	5	1	n	2	8

FILM WITHOUT CREDITS (O.U.)

Subj. #	Before and After Scores												Questions				
	George/ Charles		Sam		David/ William		Elliot		Harold		Tara- humara		Bike		1	2	3	4	5
1	1	10	10	10	9	10	9	10	1	2	1	8	2	1	10	8	y	10	4
2	1	8	10	9	6	5	6	8	3	2	8	9	10	9	10	7	y	3	3
3	4	6	7	8	1	1	10	6	10	10	8	10	9	9	10	10	y	1	4
4	1	10	10	9	1	10	1	10	1	10	9	1	8	9	10	1	n	10	10
5	1	8	5	5	1	3	3	6	7	7	10	10	8	10	9	2	y	8	7
6	4	10	10	10	6	9	4	10	1	6	1	1	10	10	10	4	y	1	6
7	3	10	10	10	1	1	10	10	10	10	10	10	10	10	10	10	y	1	10
8	1	10	8	8	1	5	1	7	7	5	5	1	3	1	10	10	n	1	3
9	1	9	8	10	2	2	1	1	8	9	1	8	2	1	2	1	n	10	5
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12	3	10	1	3	2	7	6	8	10	8	2	3	1	10	10	1	n	1	6
13	1	8	3	8	2	4	2	5	1	5	1	2	1	1	2	2	n	9	8
14	3	10	8	4	1	5	2	5	6	6	4	3	1	1	6	3	y	6	5
15	3	10	7	8	3	3	7	7	5	4	8	8	4	7	3	4	n	8	8
16	1	10	10	9	6	7	9	7	10	9	10	9	1	2	7	5	n	10	6
17	1	10	10	1	1	1	7	8	1	8	1	1	1	1	10	10	n	10	7
18	3	10	3	9	7	10	3	10	9	10	2	10	7	10	6	3	y	9	3
19	3	10	8	8	8	10	8	10	7	9	1	5	1	7	1	1	n	10	6

WRITTEN WITH CREDITS (C.S.C.)

Subj. #	Before and After Scores														Questions				
	George/ Charles		Sam		David/ William		Elliot		Harold		Tara-humara		Bike		1	2	3	4	5
1	1	2	2	2	1	2	2	10	2	2	1	7	3	1	8	9	y	2	8
2	1	10	10	10	1	1	1	2	10	10	1	1	1	1	10	7	n	1	1
3	1	10	9	10	6	7	1	8	7	9	3	1	10	10	10	2	n	2	2
4	1	10	10	10	10	10	1	10	1	10	10	10	10	10	10	10	n	1	1
5	1	2	1	3	1	1	3	1	1	2	1	2	6	7	10	7	y	6	1
6	1	1	1	1	1	1	1	1	6	6	1	1	1	1	10	7	y	1	5
7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	10	10	y	1	3
8	1	1	1	1	1	1	1	1	1	1	1	1	1	1	10	10	y	1	2
9	1	1	1	1	3	1	10	8	2	3	1	1	10	10	10	10	y	1	3
10	1	10	7	10	10	10	9	10	5	1	9	10	1	5	5	2	n	1	10
11	2	10	1	4	1	1	3	8	2	7	1	1	10	10	10	4	n	10	3
12	3	9	1	1	1	5	9	8	5	2	7	10	1	1	5	9	y	1	8
13	3	6	9	8	2	1	8	3	1	2	10	10	5	2	7	8	y	2	2
14	1	1	1	1	1	1	1	1	3	1	1	1	1	1	10	10	y	1	2
15	1	10	9	9	4	5	6	4	10	8	5	1	1	1	4	5	n	1	1
16	1	10	4	1	8	10	4	10	6	10	10	10	5	10	5	1	y	6	9
17	1	9	1	2	1	1	1	2	1	1	2	2	1	2	10	7	y	2	6
18	2	2	2	2	2	4	9	7	9	10	6	7	7	7	10	10	y	3	4
19	2	10	10	10	1	1	10	10	10	10	1	1	10	10	6	7	y	10	9
20	3	1	1	1	6	6	1	2	1	1	4	7	4	4	10	10	y	1	6
21	3	7	9	8	8	7	3	7	9	8	6	4	9	10	10	6	y	4	3
22	4	9	3	8	1	1	10	1	10	9	9	9	1	1	6	5	n	1	1

WRITTEN WITHOUT CREDITS (C.S.C.)

Subj. #	Before and After Scores												Questions				
	George/ Charles		Sam		David/ William		Elliot		Harold		Tara-humara		Bike		1	2	3	4	5
1	1	10	6	6	4	5	6	5	1	2	1	1	5	9	10	9	n	1	2
2	1	2	2	1	1	1	9	10	8	10	4	1	5	1	10	10	y	7	2
3	1	1	8	8	1	1	1	1	8	7	1	1	10	10	10	5	y	3	4
4	1	1	7	8	1	2	9	8	5	5	2	2	1	2	10	10	y	3	1
5	2	2	2	6	1	1	8	7	7	6	7	8	1	6	6	5	y	1	5
6	1	1	8	2	1	1	5	1	6	2	9	8	9	9	10	10	y	3	3
7	1	3	1	1	3	1	1	1	5	2	1	1	1	1	10	10	y	1	1
8	1	10	6	1	9	2	3	5	1	9	2	3	9	10	10	5	n	1	1
9	2	2	1	4	1	1	8	1	9	3	1	1	1	1	6	9	y	2	5
10	2	8	6	10	6	6	10	8	1	3	8	10	3	1	10	3	y	3	5
11	3	1	2	7	10	9	10	10	9	10	4	4	1	1	10	10	y	1	1
12	4	8	7	5	1	1	3	7	1	1	1	1	3	3	8	5	y	2	7
13	1	8	10	10	2	1	7	10	3	9	10	10	9	10	7	4	y	2	3
14	1	10	7	10	1	10	9	9	5	10	9	10	1	1	10	10	y	1	2
15	1	10	10	10	10	10	1	10	1	2	1	1	1	1	10	8	y	8	6
16	1	10	10	10	7	10	10	10	2	1	10	10	6	8	10	1	n	5	5
17	1	10	1	10	10	10	1	10	9	10	10	10	9	10	10	2	n	9	4
18	2	10	9	10	1	1	8	10	10	10	7	10	10	10	9	2	y	1	1
19	3	7	7	7	1	4	9	8	9	10	3	6	7	7	10	5	y	1	3
20	4	9	7	8	2	5	6	9	6	6	6	5	5	5	5	5	y	6	4
21	4	7	4	8	5	4	9	6	5	5	8	7	8	9	10	5	y	5	4

TAPE WITH CREDITS (C.S.C.)

Subj. #	Before and After Scores														Questions				
	George/ Charles		Sam		David/ William		Elliot		Harold		Tara-humara		Bike		1	2	3	4	5
1	1	10	1	1	1	1	10	10	1	1	9	1	10	10	10	10	y	1	8
2	1	10	4	5	5	5	10	8	1	1	8	8	2	1	10	5	y	1	1
3	1	10	8	9	10	10	10	10	3	1	7	3	10	10	10	2	n	1	8
4	1	10	9	5	1	2	5	7	5	4	5	8	1	2	6	1	n	1	1
5	1	10	10	10	1	10	1	1	1	1	1	1	10	10	10	1	y	1	9
6	1	3	9	9	3	8	9	8	1	2	9	10	4	2	9	10	n	1	1
7	1	10	1	5	1	5	10	10	1	5	1	1	7	10	2	2	y	10	8
8	1	1	5	2	6	1	1	1	1	1	1	1	1	1	10	10	y	1	3
9	2	5	5	5	1	3	10	7	2	1	3	1	1	5	5	5	y	3	4
10	3	8	6	5	6	5	6	7	5	7	6	7	3	2	6	4	y	6	6
11	3	8	10	10	8	5	10	10	5	6	6	7	10	10	10	5	y	8	5
12	3	10	10	10	10	8	8	10	1	1	1	1	1	1	10	1	n	5	5
13	3	10	9	10	3	4	4	2	1	4	10	8	2	2	10	7	y	1	5
14	4	10	7	9	8	6	2	4	1	1	2	1	1	1	10	6	n	1	6
15	4	10	1	9	2	5	1	6	1	2	1	7	1	8	9	2	n	9	8
16	1	10	10	10	1	1	4	10	2	3	10	10	1	1	10	1	y	5	6
17	1	10	1	10	1	10	9	10	1	10	1	1	1	1	10	7	y	8	3
18	1	10	10	10	10	1	1	1	1	1	10	10	10	10	1	1	n	4	5
19	1	10	9	10	2	5	5	10	4	2	5	4	1	2	3	1	n	5	6
20	1	10	5	7	7	9	4	7	8	7	9	8	7	1	6	6	n	6	4
21	1	10	9	9	10	10	10	6	2	4	10	10	2	3	10	2	y	6	1
22	1	9	5	6	2	1	1	1	10	9	6	6	5	6	9	5	n	1	2
23	1	2	9	9	10	9	1	1	5	9	2	1	10	10	10	10	y	7	3
24	2	2	2	2	10	10	2	9	2	2	8	2	9	9	9	5	y	1	2
25	3	9	10	10	3	2	9	8	10	9	7	9	10	9	10	5	y	8	5
26	3	9	10	10	6	9	10	10	8	9	8	9	1	2	10	3	y	1	4
27	4	5	5	5	7	6	6	5	5	6	3	3	3	5	7	7	y	4	8

TAPE WITHOUT CREDITS (C.S.C.)

Subj. #	Before and After Scores														Questions				
	George/ Charles		Sam		David/ William		Elliot		Harold		Tara- humara		Bike		1	2	3	4	5
1	1	1	9	9	1	1	2	1	1	1	1	1	10	10	10	8	y	1	1
2	1	1	8	7	7	8	9	9	7	7	6	8	8	10	10	10	y	1	2
3	1	10	10	8	9	7	8	6	1	3	5	8	1	1	8	9	n	1	1
4	1	8	8	8	4	1	9	10	6	5	8	7	10	10	6	4	n	1	5
5	1	10	8	9	3	2	10	10	3	1	7	9	10	9	3	1	n	10	4
6	1	10	10	10	1	1	10	10	9	10	10	10	10	10	10	10	y	1	5
7	1	10	5	5	3	1	3	6	3	5	4	4	9	8	10	1	n	4	4
8	1	9	7	7	4	6	6	7	1	6	4	7	3	4	7	7	y	6	2
9	1	10	2	1	1	1	10	2	1	2	2	1	2	10	3	1	y	10	2
10	2	3	9	7	6	6	6	8	4	1	10	10	2	4	10	7	y	1	7
11	2	3	3	1	7	7	8	7	8	8	3	2	9	9	8	2	y	3	3
12	3	1	1	9	1	1	4	2	6	1	4	5	1	1	10	10	y	2	6
13	3	1	7	5	1	1	6	4	2	2	5	1	1	1	6	6	y	2	4
14	1	10	9	10	1	8	10	10	9	9	9	10	9	10	10	6	y	9	1
15	1	9	2	2	1	1	4	3	1	3	1	1	3	7	10	9	y	2	3
16	1	10	10	10	3	1	1	9	1	5	6	10	5	1	9	3	n	2	5
17	1	7	10	8	1	2	6	5	6	8	9	9	3	2	7	4	y	3	3
18	1	6	10	7	6	6	8	6	6	6	5	6	1	5	8	3	y	2	2
19	1	4	8	7	1	2	4	5	8	3	6	7	4	4	4	4	y	2	2
20	2	10	1	8	2	2	1	8	1	3	4	2	1	2	8	5	y	4	4
21	4	10	3	8	1	8	1	5	1	2	4	3	7	9	5	8	n	7	4

FILM WITH CREDITS (C.S.C.)

Subj. #	Before and After Scores												Questions				
	George/ Charles		Sam		David/ William		Elliot		Harold		Tara-humara		Bike		1	2	3	4	5
1	1	4	3	5	10	9	3	9	8	7	5	9	10	10	10	10	y	3	8
2	1	9	8	7	2	1	8	4	6	8	1	1	10	10	10	2	y	1	4
3	1	8	1	8	1	5	8	8	2	8	8	10	1	4	8	7	y	10	9
4	1	10	9	10	1	9	6	8	1	1	6	6	1	1	2	1	n	1	10
5	2	10	8	10	10	10	9	10	8	10	10	10	1	1	10	1	n	2	4
6	3	10	9	9	1	2	7	9	7	7	8	8	3	7	7	4	n	7	8
7	4	10	4	9	9	9	7	8	3	1	8	10	10	10	10	5	y	1	5
8	1	7	6	8	1	2	1	3	9	8	1	1	8	7	10	5	y	3	5
9	1	2	10	10	1	7	2	8	10	8	10	10	10	10	7	8	y	8	6
10	1	10	1	1	1	10	1	10	1	10	1	1	10	10	5	1	y	1	8
11	1	10	10	10	1	1	10	10	10	10	1	1	10	10	1	1	n	10	8
12	1	9	10	6	1	1	1	10	10	10	10	10	1	1	1	1	n	10	8
13	1	10	10	10	1	10	1	10	10	10	1	10	10	10	1	1	n	10	8
14	1	10	8	8	2	2	8	7	1	7	6	6	8	8	1	1	y	9	4
15	1	10	10	10	10	10	1	1	1	8	10	10	8	8	1	1	n	10	7
16	1	10	10	10	10	10	1	10	10	10	10	10	1	1	10	10	n	1	7
17	1	10	9	10	8	10	1	10	2	2	9	9	1	2	1	1	n	10	6
18	4	10	10	10	4	5	1	7	5	5	6	9	2	3	2	4	n	1	4

FILM WITHOUT CREDITS (C.S.C.)

Subj. #	Before and After Scores														Questions				
	George/ Charles		Sam		David/ William		Elliot		Harold		Tara-humara		Bike		1	2	3	4	5
1	1	9	1	1	3	1	8	8	10	10	8	7	1	7	3	2	n	4	8
2	1	1	10	10	1	1	1	1	1	1	1	1	10	10	5	2	y	8	6
3	1	1	1	8	1	1	10	8	8	1	7	1	1	1	10	10	n	1	3
4	1	10	4	10	6	10	1	10	1	9	1	9	9	9	10	5	n	1	5
5	1	10	8	8	9	10	1	8	2	7	8	1	9	9	2	4	y	9	4
6	1	1	10	1	1	1	1	1	10	1	1	1	1	1	10	10	y	1	2
7	1	10	5	10	4	1	6	6	8	9	1	7	5	4	6	6	y	4	8
8	1	10	2	1	10	10	4	1	8	8	5	10	1	1	5	5	n	1	3
9	1	10	1	9	8	9	9	10	10	9	9	1	1	2	1	1	n	7	5
10	1	8	10	9	1	1	6	4	4	1	1	1	10	10	7	5	y	3	2
11	2	1	2	1	10	10	10	1	1	1	10	10	8	2	10	9	n	6	1
12	2	10	1	2	1	1	10	8	10	10	9	10	10	10	3	3	n	2	4
13	3	6	1	1	1	1	1	2	5	5	1	1	5	5	10	7	y	3	5
14	3	4	2	3	6	7	3	7	1	6	8	8	8	6	6	5	y	4	9
15	4	10	6	10	4	8	7	10	8	10	4	8	2	5	4	2	y	4	3
16	4	10	9	10	8	4	1	3	1	1	10	10	10	10	8	2	n	10	2
17	1	10	6	10	1	10	10	10	10	10	5	3	2	3	10	5	n	1	4
18	1	10	10	9	9	8	1	7	9	4	1	1	1	1	5	1	n	8	9
19	1	10	10	10	1	1	10	10	5	6	5	5	1	10	7	1	n	1	5
20	1	10	10	10	1	1	10	10	10	10	10	10	1	1	1	1	n	10	8
21	1	10	10	10	10	10	9	9	2	1	1	1	1	1	1	1	n	10	3
22	1	10	10	10	1	10	4	10	1	10	9	10	2	10	1	1	n	10	8
23	2	8	10	9	1	1	9	10	7	3	1	1	8	7	1	1	n	10	7
24	2	10	10	9	2	9	2	8	5	6	10	9	1	1	10	6	n	1	1
25	2	10	2	10	10	10	10	8	7	1	1	5	7	6	4	5	n	8	2