

PRODUCTION AND EVALUATION OF A FILM-BASED VIDEOTAPE  
AND TAPE-SLIDE SHOW AS ADJUNCTS TO AN "S.C.I." LESSON

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## ABSTRACT

### PRODUCTION AND EVALUATION OF A FILM-BASED VIDEOTAPE AND TAPE-SLIDE SHOW AS ADJUNCTS TO AN "S.C.I." LESSON

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A five-minute super-8 film-based videotape and a 20-minute tape-slide show were produced as adjuncts to an introductory high school "Science of Creative Intelligence" course. Student attitudes towards the subject matter, and the quality and suitability of each production for the intended audience were evaluated.

After pilot tryout, formative evaluation and revision, the productions were shown to 20 volunteers aged 13-17, in a separate-sample post-test only control group design. The dependent variables were the interval scores obtained from a Likert scale questionnaire. Nominal moderator variables were defined as age, language, instruction versus non-instruction in T.M. (Transcendental Meditation), and practicing versus non-practicing meditators.

The productions were rated highly by the audience, however there were no statistically significant differences ( $p < .05$ ) between Treatment and Control groups. Meditator attitudes were statistically significantly more positive than non-meditators'. The strongest positive differences between Treatment and Controls were those of non-meditating groups ( $p < .07$ ). Treatment groups in general were more positive towards the subject matter. In-context formative evaluation suggested that both productions were most effective when accompanied with introductions and discussion.

A videotape was submitted as a part of this thesis equivalent.

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## I. Introduction

This thesis-equivalent consists of the production and evaluation of a 20-minute tape-slide program and a 5-minute, color, film-based videotape designed as adjuncts to the teaching of Lesson 4 of the "Science of Creative Intelligence" (S.C.I.) course.\*

The effectiveness of the messages in the two media in reinforcing positive attitudes or in changing negative attitudes towards the course and the lesson content was investigated. Conclusions are intended as possible guidelines for future S.C.I. productions with affective objectives.

### 1.1 Rationale for the Project

Curriculum coordinators at Maharishi International University (Abravnel, Note 1; Beckwith, Note 2) expressed a need, in personal correspondence, for audio-visual support materials for the course. Several commercially produced natural science films had been reviewed and found fairly appropriate, but none directly achieved the lesson objectives. As only charts had been produced for the course, I was urged to proceed with my plans for audio-visual production in view of possible reproduction for use by S.C.I. teachers in North American schools. Films were considered most appropriate.

Studies with high school students taking the S.C.I.

\* Developed by Maharishi International University, Fairfield, Iowa, 1974.

(Shecter, 1975; Levin, 1975) and interviews with meditating students indicated that it is often difficult for adolescents to maintain a regular routine of meditation, usually because they feel self-conscious about breaking up social activities to go and meditate.

Research has shown that students who practice T.M. regularly as compared to irregular, beginning, or non-meditators are more likely to achieve the S.C.I. course objectives of (1) utilizing more of their mental potential as indicated by faster intelligence growth rate (Tjoa, 1972, 1975); improved intellectual performance, greater creativity, and better academic results (Shecter, 1975); (2) developing more stable, more adaptable, happier personalities (Davies, 1975; Lazar, Farwell, & Farrow, 1975; Levin, 1975; Nidich, Seeman, & Seibert, 1975; Shapiro, 1975; Shecter, 1975; Stern, 1975); (3) strengthening physical health and reducing stress. No specific study compares regular to irregular meditators in the area of health but several studies point to improved health with the practice of T.M. (Honsberger & Wilson, 1973; Glueck & Stroebel, 1975; Zamarra et al., 1976).

Since regularity was found to be an essential factor in the success of the course, it was felt that it was important not only to establish in the first lessons a strong positive attitude towards the course but in particular to motivate the students to meditate regularly in order to gain maximum benefit from the course. The value of motivation at the onset of a course or lesson is already well established (Taba, 1962).

### 1.2 Proposed Solutions: The Audio-Visual Program

It was hypothesized that the correct use of the tape-slide and videotaped film program could aid the teacher in:

- a) increasing motivation to meditate more regularly (or to start T.M., as in the case of non-meditators);
- b) creating a more favorable attitude towards the study of the qualities of creative intelligence, especially in nature.

Factors such as educational theory, research on media and attitudes, cost, and convenience were considered in the decision to produce the program to achieve the affective objectives of the lesson. Each factor is discussed in detail in the literature review. The scripts are to be found in Appendix A.

The program used in the project is described as follows:

- 1) Tape-slide show: The use of modeling ("testimonials" of personal results with regular vs. irregular meditation by teenage subjects) in a 20-minute tape-slide show designed principally to motivate students to meditate more regularly.
- 2) Super-8 film-based videotape (color): A 5-minute "non-directive", open-ended film on cycles of growth and the progressive and evolutionary aspect of nature, designed principally to create a more favorable attitude towards the study of the qualities of creative intelligence.

### 1.3 Statement of the Evaluation Problem

The summative evaluation problem can be stated as follows:

Is the use of researched pedagogical principles in this tape-slide program and film-based videotape effective in reinforcing positive attitudes of potential S.C.I. students towards:

- a) T.M.
- b) S.C.I.
- c) T.M. meditators
- d) Regular meditation
- e) Starting T.M. (non-meditators)?

### 1.4 Potential Significance of the Study

This study may provide a basis for future S.C.I. productions which may be internationally distributed for high school courses.

## II. Literature Review

### 2.1 Course Content

Content of the productions was guided principally by the standard Science of Creative Intelligence text (Maharishi International University, 1974) for the first year course. Some analogies and illustrations were derived from the writings of Maharishi Mahesh Yogi in The Science of Being and the Art of Living (1966) and from notes taken

personally at various S.C.I. courses at the introductory, advanced, and teacher-training levels (1972 to 1978). Scientific information was crosschecked with physics, biology, astronomy, and psychology texts.

The "Science of Creative Intelligence" is a three-year high school course recently developed by Maharishi International University and approved by the Quebec Ministry of Education. It may be given as a credit course provided the criteria for credit courses is met according to the judgement of the Ministry on each individual case.

The S.C.I. aims to develop not only a strong intellectual basis for interdisciplinary studies but also to develop the full mental, physical, and emotional potential of the individual. The academic aspect of the course in the first two years focuses in particular on imparting a clear intellectual understanding of personal and environmental evolution. The first year involves study of the qualities of creativity and intelligence as found in nature, the students' lives, and in the lives of great persons (example: adaptability and stability, gentleness and strength). Lesson Four examines the progressive and evolutionary qualities of "creative intelligence". (For more detail, see Appendix G.)

The lab work for the course at all levels is the practice of the Transcendental Meditation (T.M.) technique twice daily. The T.M. technique is an effortless mental practice that permits the mind to systematically experience increasingly subtle aspects of a thought until the thought itself



is transcended and a "state of least excitation of consciousness" is experienced. Regular practice is reported to have beneficial effects on individual physiology and psychology (see Appendix G).

There exists a growing theoretical basis for the incorporation into educational curriculum of techniques and subject matter aimed at developing the individual to the fullest possible extent (Taba, 1962), as the S.C.I. aims to do. Leading educational theorists are seriously considering the possibilities of techniques to decrease tension and increase self-knowledge (Bruner, 1960, Murphy, 1952). Projecting educational directions for the eighties, Tuckman (1980) wrote:

My third and last nominee (for educational innovations in the eighties) falls in the area of the psychosocial self and combines self-image with altered states of consciousness. Much school behavior, particularly of the disruptive variety, seems motivated by tension. Many teachers as well as students seem all wound-up. A theory that relates relaxation techniques, for example, meditation, to self-image and thereby to learning might enjoy some popularity and success. (p. 10)

Although there are differences of opinion about the scope of human potentiality, certain philosophers, psychologists and educational theorists suggest that human potentialities far exceed those actualized under present conditions (James, 1902; Maslow, 1962, 1969; Plato, 1956; Taba, 1962). Murphy (1952) proposes that human capabilities are limitless, provided that culture and education recognize those possibilities and encourage individual efforts at self-development. Both he and Benedict (1946) suggest that imposed cultural limits curtail human potential. In other

words, one rarely exceeds one's objectives, and these objectives are usually culturally imposed and limited.

There is enough evidence and conceptual educational theory to suggest that the Science of Creative Intelligence, together with the Transcendental Meditation technique, can fulfill a real need and bring about a creative solution to some problems in today's educational system. Thus it would appear that an attempt to make the course more effective through the use of media can be considered a worthwhile contribution to education. (See Appendix G).

## 2.2 General Principles of Learning and Attitude Change

### Applied

The audio-visuals produced to accompany the S.C.I. lesson were intended to be used by the teacher in an integrated manner in the teaching context of a two-hour lesson. Learning and design theory are thus applied to the lesson as a whole, with the audio-visual documents serving certain limited purposes.

The audio-visual program design concurs with Tyler's (1980) opinion that media should aid, not displace, the teacher, and are better applied to solving learning problems that a teacher alone cannot solve effectively or easily. In reviewing the place of media for the eighties, he writes:

Today, sound motion pictures occupy a useful but modest place among instructional aids, but there is little or no use now of films that are designed to furnish the complete instruction for a course. The use of radio ... has followed a very similar pattern. (p. 11)

The major principles relevant to the design of this lesson as a whole (cognitive and affective aspects) emerge from the research of Bandura (1971), Fishbein (1975), Gagne (1974), Hunter (1974), Martorella (1972), Satz (1971), Taba (1962), and Tyler (1980). Since attitude change is closely related to understanding and/or belief (Fishbein, 1967) the conditions for cognitive learning have also been considered, though to a lesser extent, in the design of the audio-visual program.

Theories of attitude change. As it would appear that general attitude theory should apply to mediated attitude change as well as to face-to-face communications (Bandura, 1971), general principles favoring attitude change have been applied, particularly in the tape-slide program.

Simonson (1980) emphasizes the importance of defining attitude before attempting to measure it. For purposes of this study I will use Fishbein's (1975) definition of attitude and of attitude components, which concurs with that used by Simonson in his review of media-related attitude studies.

Fishbein states that although specific definitions vary, most attitude theorists would agree that "attitude can be described as a learned predisposition to respond in a consistently favorable or unfavorable manner with respect to a given object" (Fishbein, 1975, p. 6). His own concept of attitude includes four components: affect (favorable or unfavorable emotional response, or evaluative aspect of a belief); cognition (beliefs about or knowledge of an object);

behavioral intentions towards the object; and overt behavior towards the object.

Research indicates the most favorable conditions for attitude change are as follows (Fishbein, 1967):

- 1) when suggestion for change meets existing personality needs or drives;
- 2) when the suggestion is in accord with valued group norms and loyalties;
- 3) when the source of the suggestion is viewed as trustworthy or expert;
- 4) when the message follows certain rules of rhetoric regarding order of presentation, organization, etc.;
- 5) use of mass-media together with face-to-face communication is more effective than either alone;
- 6) when the suggestion is accompanied by change in other factors underlying belief and attitude;
- 7) when deliberate intention on the part of the communicator to produce change is not readily apparent;
- 8) when the communicator is perceived as being "one of us" in the case where the recipient is highly involved and the issue is clear;
- 9) when explicit conclusions are drawn for less intelligent people or if material is complex, unfamiliar or impersonal. However, when the issue has deep personal meaning for the subject,

this is not necessary;

- 10) one-sided communication is effective with those already favorable to a position (as in the case of the meditating audience), whereas two-sided communication is better for those initially opposing the position, provided only well-known opposing factors are covered;
- 11) when arousal of need is followed by need satisfaction.

Points number "3" and "8" both involve the use of models for imitation. "Modeling" effects have been investigated by Bandura (1971), whose social learning theory has attempted to account for the social influence of example ("modeling") in both the development and regulation of human behavior.

A study by Bandura, Ross and Ross (1963a) was designed to test for delayed imitation of deviant (aggressive) models in the absence of these models. Children viewing aggressive models exhibited a great number of precisely imitative responses whereas control- or non-aggressive-model-groups did so rarely. Film-mediated models also appeared to be equally as effective as real-life models.

It was found that consequences (from behavior) to a model also influenced viewers' responses to the model. Positive consequences reinforced imitative responses, whereas negative consequences inhibited them (Bandura, Ross, & Ross, 1963b).

Other mediating factors in learning from models may be:

- a. discriminability of modeling stimuli (student's attending to recognizing and differentiating distinctive features of the model's response;
- b. rate, number and complexity of stimulus-input conditions;
- c. meaningfulness (familiarity) of modeled configurations (Gerst, 1971).

Theories of cognitive learning. A substantial body of research indicates that learning and retention of cognitive material are significantly improved under specific conditions. Those which are most relevant to the program are cited below:

1. When motivation is aroused at the outset of the lesson (Gagne & Briggs, 1974; Taba, 1962):  
The importance of an audio-visual "opener" becomes evident in the light of the above principles, as its primary aim is to create in the students a favorable attitude towards the lesson content, and to give a "taste" of the concepts to be learned. Taba (1962) suggests that such an opener, together with feedback from the students, would provide the teacher with an important diagnostic tool for identifying difficulties and sensitivities or probing attitudes towards the subject;

2. when intention to learn is established, particularly with regard to learning of less familiar materials (Satz, 1971); (in this lesson, the teacher establishes intention;)
3. when attention is directed to the important aspects of the material to be learned by reducing the number of irrelevant attributes and making important attributes dominant (DeCecco, 1968);
4. when the learning task is pleasant and intrinsically or extrinsically rewarding. Waldfogel (cited in Hunter, 1963) found that 50% of childhood recollections are pleasurable while only 30% are unpleasant and 20% are neutral. This would indicate that the goal of the production to make the lesson more enjoyable is highly relevant to the learning outcome.

The emphasis in the introductory section (the videotaped film) is on the questioning, or "discovery" approach, which according to some studies, such as that of Worthen (1968), creates advantages for retention and transfer of rules which are learned (Gagne & Briggs, 1974).

Bruner (1960) contends that it may be of "first importance to establish an intuitive understanding of materials before we expose our students to more traditional and formal methods of deduction and proof" (pp.58, 59).

A synthesis of the thinking of DeCecco, Frayer, Gagne and others by Martorella (1972) suggests that materials

developed to aid learning of specific concepts are more effective when they incorporate the following:

- 1) concepts to be learned are operationally delineated;
- 2) explicit examples and non-examples are provided, especially through some audio-visual media;
- 3) criterial attributes of the concepts are featured.

### 2.3 Selection of Media

General considerations. Educational research (Martorella, 1972) has indicated that often multi-media approaches may be the most effective for the greatest number of students, not only because such an approach would compensate for the limitations of one medium in conveying specific types of concepts or information, but should also average out individual differences in media receptivity which cause some persons to retain more from one type of media than from another.

While "no single level of the independent variable is consistently superior and ... often the variable is, in fact, inoperative" (Levie & Dickie, 1973, p. 859) (in obtaining cognitive objectives), Baker and Popham (1965) found that although addition of visual aids does not necessarily and consistently increase learning, it does add to enjoyment and appreciation. This latter consideration led to the decision to incorporate audio-visuals to aid the attainment of the affective objectives of this lesson. Sewell (1980),



in a review of the literature, concluded that where enjoyment is a factor, cartoons or audio-visual presentations should be considered in curriculum design. Olson (1977/78) found that individuals have more positive physiological responses when viewing film and video material than when reading print or listening to audio material.

S.C.I. curriculum coordinator, B. Abravnel, had urged me to develop films in particular; however, in the short run, it was more economical to produce a short film to illustrate the more abstract concepts requiring a sense of time passing, motion, and a more abstract organization of content, together with a longer tape-slide program to investigate the application of the main ideas to the students' own lives. Since the content of the interviews for the tape-slide show was the main point of interest, I felt the audio tape accompanied by slides would do the job almost equally well, if not as well, as a more expensive film.

S-8 film-based videotape. Super-8 film was originally chosen over 16mm film or video-tape because of its greater flexibility, availability of time-lapse attachments, and initial low cost. The videocassette turned out to be the most convenient format, as all T.M. and S.C.I. centers are equipped with videocassette machines but not with S-8 projectors, as earlier trends had indicated would be the case. For this reason the S-8 film was transferred to videocassette, which also happens to be a more economical format for reproduction, especially as several short films can be

contained in a one-hour tape.

Although any one medium is not consistently superior in attaining cognitive objectives, the use of film usually does improve learning and retention better than other media under the following conditions, which guided the selection of content to be treated in the film-based videotape:

1. when film is used to depict motion and change:  
all dynamic items such as sequences of events  
(Wells et al., 1973);
2. when animation and/or humor is added to the design  
(Hall & Cushing, cited in Hoban, 1970) - (not  
suitable to this particular theme);
3. when films are used to present highly abstract  
and complex ideas (Loveless, Brebner, & Hamilton,  
1970). Their theory was that the visuals help  
to "round up" and "sort out" the complex stimuli.

Mielke (1970) proposed that television can more effectively convey affective material than cognitive material, a conclusion which is supported by early research indicating that attitudes learned through motion pictures tend to be retained over a period of time (Peterson & Thurstone, 1933). (According to Salomon (1980), motion pictures use essentially the same symbol coding system as television.) When a film is liked, it was found, it tends to produce a positive opinion change; however, the opposite effect occurs when a film is disliked (Hoban, 1960).

That part of the lesson requiring a more abstract treatment was selected for film treatment. The particular

ability of film (or television) to evoke an affective response was intended to effect an improvement in student attitudes and feelings towards the study of creative intelligence in nature. City children who have been largely unexposed to the country may lack sensitivity and appreciation of the subject of natural phenomena. I felt a light, poetic visual approach with appealing music could help to sensitize such children to the beauty and value of nature.

The videotaped film is a simulated experience of the essence of the cycles existing in nature, symbolized by the rhythms of rest and activity in the seasons and accentuated by sunsets (endings). The film begins with a restful period (winter cycle), suggests the passing of the seasons from silence through activity (spring and summer), to slowing down of activity in the fall, then silence in winter, and ends with a lively period of growth in spring. The overall intent is to illustrate the regenerative power of nature (theme: "dynamic activity follows deep rest"; "nature is progressive and evolutionary"). The concluding music is in lively contrast to the subtle blend of guitar, string ensemble, and flute accompanying the fall and winter scenes, and continues until the end of the titles with the implication that "life goes on".

As a whole the film, which is accompanied by music only (no voice), introduces in an open-ended way the main ideas to be covered in greater detail in the tape-slide, show and by the teacher who will use the film as a tool to

elicit students' interpretations of the main ideas. To permit greater use of the feelings and intuition rather than the intellect during viewing, the film is purposely non-dogmatic and subtle enough so that it can be interpreted differently by different people. It may prove useful to give a repeat showing of the film after the lesson, as interpretations are bound to be more fruitful after the organizing concepts have been acquired.

Tape-slide. The slide film was used for concepts which do not require a special rhythm or illustration of movement, as research had indicated film had no advantage over tape-slide format under such conditions.

Simonson (1980) concluded from a review of research on media designed to influence attitudes that mediated instruction does contribute to desired attitudinal changes in learners, especially when the instruction is designed to produce specific attitudes or attitude changes. Although according to Simonson no specific guidelines can be formulated for media-produced attitude change, some research indicates that the technique of live or on-camera modeling may be one of the more effective techniques for producing attitude change or reinforcement (Bandura, 1971; Gagne, 1977; Nugent et al., 1980; White & Rosenthal, 1974).

Because live models who have been meditating several months or years are not easily available for beginning S.C.I. classes, I chose the technique of taping authentic statements by "models" aged 11-17 years to elaborate on

briefly stated points made by a narrator. The narrative serves to review certain concepts essential to the understanding of the lesson, and to relate new concepts to familiar experiences. Slides were synchronized to the sound track to provide greater liveliness and credibility.

#### 2.4 Production Variables

General considerations. Many studies have been conducted on production variables and their effects. Few clearcut production tips can be gleaned from the research, mainly because most research investigates the more easily measureable attributes and effects (e.g., cognitive) of media and does so in a piecemeal way. Research on media and attitudes, therefore, has scarcely begun to scratch the surface.

In a review of the effects of special production treatments, Coldevin (1976) concluded that although due to inconsistencies in research design and goals, "we have only a fragmentary knowledge of the effects of varied production techniques" (p. 92), certain empirical "rules of effectiveness" have emerged for both cognitive and affective objectives.

Illustrating the complexity of the problems for research-based educational media production, Salomon (1979) suggests that learning does not result from media, but from a combination of media "attributes", learning tasks, and learning abilities. He theorizes that the most important attributes of media are their "symbol systems",

and their coding of the instructional information (e.g., cartography, verbal language, mathematics, printing, etc.). Learning, he argues, is based on "internal symbolic representations." His contention is that the more closely symbols for instruction correspond with our individual internal representation, the more learning is enhanced, and that in consequence no one medium can be best for representing any particular event.

Taking into account Salomon's most recent work and past research, Clark (1980) sums up the task for the educational media producer as follows:

Those who produce instructional programs are ... always going to have to deal with a greater range and variety of factors than can comfortably be dealt with in any specific theory. The distance between ... preliminary theoretic notion and a finished instructional media program is far indeed, but can be made more tolerable with the use of formative research methods and the growing number of excellent instructional techniques designed to gain control over dysfunctional amounts of stimulus and subject variety. (p. 66)

It is not possible to altogether separate cognitive from affective objectives, since attitudes depend to some degree on cognitive learning (Krathwohl et al, 1964); both production variables which have been successfully applied to cognitive as well as to affective learning have been used where appropriate and aesthetically viable in the media for the S.C.I. lesson. These are as follows.

Color. Although studies have indicated that color is not superior to black and white for teaching of facts and certain concepts, students seem to have a greater

affective response to color film than to black and white film (Booth, 1973; Chute, 1980; Kanner, 1968; May & Lumsdaine, 1958; Peterson & Thurstone, 1933).

It would seem that nature photography, which constitutes the bulk of the presentation in film, is much easier to discriminate when presented in color. Kanner's review of 18 studies specifically revealed that color watchers included more emotional content in their descriptions. As the principal objective of the media used in this lesson is to involve the subjectivity of the student, it follows that only the most powerful subjective elements such as color should be used.

Narrative. In keeping with Bruner's (1960) and Taba's (1962) argument, that the intuition and abstract thinking should be aroused before more formalized methods are applied in instruction, it seemed that the omission of narrative during the film (videotaped) introducing the lesson should help to awaken non-verbal, intuitive skills. The practical value of the non-narrative approach may be postulated in view of one case study (Miller and Booth, 1974).

Miller and Booth showed two film productions to elementary school students, and found that the film with no narrative generated nearly twice as many incidences of significance on affective and cognitive measures than did the narrated film.

Attitude-related variables. Simonson (1980) in his review of studies related to media and attitude change

concluded that attitude change was most likely to be successful as a result of mediated instruction when:

1. follow-up activities are implemented;
2. the design includes maximum use of realistic types of media with as many nondistracting, noncontradictory visual cues as possible.

Procedures least likely to produce desired attitude change are:

1. inclusion of extraneous information and cues;
2. presentation of unrealistic, highly symbolic information in visual media;
3. presentation of conflicting situations with no solutions.

The videotaped film in this thesis uses realistic nature images in a symbolic way. It may be that the symbols will not be properly decoded if Salomon's (1980) theory that non-notational (e.g., filmic as opposed to printed) information is often shallowly interpreted by the viewer; however, I preferred to test my own and Taba's (1962) conviction, as well as Salomon's contention that learners need to exercise more of their intuitive, non-verbal skills to penetrate to deeper levels of educational messages.

Duration of successive auditory and visual cues. The guidelines inferable from research on rate of visual presentation suggest that for items with low complexity and meaning, faster rates are preferable, and for high-complexity items, slower rates (from 2 to 7 seconds) are more



effective (Fleming & Sheikhan, 1972; Gordon, 1968; Schlater, 1970; Van Mondfrans & Travers, 1964).

Shots. Some studies suggest that close-up camera shots (CU's) should be used for selection, and then only when the subject matter is inherently interesting (Williams, 1968). However, Cobin and McIntyre (1961) found that subjects showed a preference for the close-up.

Cue summation. Severin (1968) found that:

1. when additional non-redundant cues are present in either channel (aural or visual) greater learning takes place;
2. for recognition learning, visual cues are superior to audio cues;
3. presentation of irrelevant cues in either channel causes loss of learning in the other channel.

Chu and Schramm (1967) concluded that the presentation of visuals with aural messages improves learning in tasks where visual images facilitate association processes.

## 2.5 Evaluation Methods and Instruments

The questionnaire. For general guidance in developing attitude tests, I referred to Bloom (1974), Gagne and Briggs (1974), and Tuckman (1972). Likert scales were used for the attitude questionnaire, as they have been recommended for their reliability and ease of construction (Barclay & Weaver, 1962; Travers, 1973). Edwards (1957), Likert (1967), and Oppenheim (1966) provided specific techniques of attitude

scale construction and evaluation.

Most studies indicated that while beliefs about an object or issue can be changed or reinforced through media presentation, such change is more significant when discussion and follow-up activities are incorporated into the lesson design (Simonson, 1980). Krathwohl et al (1964) point out that the deeper aspects of attitude change (involving not only a willingness to act, but actual behavioral change resulting from an increase in the strength of a conviction) are more likely to take place over time. For this reason, and because sample constraints do not permit control for moderating variables linked to discussion and follow-up, the questionnaire will measure only the first three levels of attitude change according to Krathwohl et al (1964).

Most attitude scales obtain their estimates of attitude through a consideration of a set of the respondent's beliefs about an object and the evaluative aspects of those beliefs. This is based on the theory that beliefs about an object modify attitude, such that attitude change is a function of the individual's initial attitude (and thus of a set of beliefs) interacting with the number, strength, and evaluative aspects of new beliefs he learns. Thus according to the theory, measurement should be of beliefs about a communication, not recall of content (Oppenheim, 1966).

Fishbein (1967) cautions that belief about an object may modify the attitude but belief is not strictly correlated with attitude, and behavioral intentions do not always correlate with attitude measurements. He feels therefore

that behavioral intentions as well as beliefs should be viewed as independent phenomena. For this reason the components on the attitude test measuring belief and behavioral intention are to be analyzed separately as well as a whole.

The questioning sequence suggested by Gallup (cited in Oppenheim, 1966) is loosely followed in the attitude questionnaire: general questions followed by specific questions and then questions related to strength of commitment. Factual questions about the student's exposure to and practice of T.M. are posed last, as recommended by Oppenheim, as these may create an initial uncomfortable feeling (guilt or resentment or a feeling of lack of experience in T.M., etc.). The structure of the questionnaire is fairly loose, as it consists of five attitude components (T.M., S.C.I., meditators, regularity of meditation, starting T.M. (for non-meditators)) which have been scrambled to render the intention of the questionnaire less apparent. A change in attitudes towards T.M. and meditators in general were considered to be possible underlying factors in changes of attitude towards meditating regularly or towards starting T.M. (non-meditators). In recruiting volunteers to view the program, the audio-visual productions were described as representative of the type of content covered in one S.C.I. lesson. Thus, the "S.C.I." component of the questionnaire would in theory reflect in part the students' general reactions to the productions, as their knowledge of S.C.I. as a course would still be somewhat vague.

The media evaluation instruments. In addition to informal observation of and discussion with the viewers, the media were evaluated formally through written responses to separate questionnaires for the tape-slide and for the videotaped film productions. Students answered Osgood-type (Osgood, 1967) questionnaires adapted to the purposes of this study and designed to probe their opinion of the technical, the aesthetic, the cognitive and the affective aspects of both productions. S.C.I. teachers responded to a modified version of the EFLA form developed by Guss (1966, Note 3) at Indiana University in the Department of Educational Technology. Modifications were based on two year's personal experience with evaluation using the EFLA form in a school commission and an interchange of ideas with the Quebec Ministry of Education personnel also involved in evaluation of educational media (Desy & Trottier-Robillard, 1972, Note 4; Fournier, 1972, Note 5).

Existing evaluations on films for S.C.I. The only studies done on materials for the S.C.I. are reviews of several commercially available films by curriculum developers. Six EBEC films, Amphibian Embryo (1963), Chick Embryo (1973), Fish Embryo (1963), Growth of Plants (1962), How Pine Trees Reproduce (1964), and Monarch Butterfly Story (1950), were rated "very good". Isaac Newton (1959) and Quest for Freedom (1963) of Coronet were rated "very good" and "excellent" respectively. As mentioned previously, although these are good science films, they do not meet the S.C.I. objectives as well as the curriculum developers.

would like (Beckwith, Note 2).

Statistical analysis. Guidance for statistical analyses came from Ferguson (1971), Tuckman (1972), and Siegel (1956). The Statistical Package for the Social Sciences manual (Nie et al., 1977) was used for computer analyses, (Pearson Product-Moment Correlations).

### III. Goals and Design of Program

#### 3.1 Educational Objectives

The objectives of using the media in the context of the traditional teaching of the lesson fall within Levels III and IV according to Taba's (1962) analysis, and Levels 1.2, 1.3, 2.2, 2.3, and 3.1, according to Krathwohl's (1964) taxonomy. They are:

1. To make the lesson more lively, more enjoyable and relevant in a way that will motivate the student to desire to learn more about the qualities of creative intelligence (S.C.I.).
2. To reinforce the student's understanding of the value of the practical aspect of the course - the T.M. technique - such that he/she will be more likely to choose to meditate regularly (and in the case of non-meditators, to choose to learn the technique of T.M.).
3. To reinforce a positive attitude in the student towards people who meditate and towards T.M. and S.C.I. in general. (This is actually a sub-

objective, as it concerns the mediating process in attainment of the first two objectives.)

### 3.2 Intended Audience

North American high-school students aged 13-16 years who are following the first year S.C.I. course. These students either practice or are about to begin the practice of the T.M. technique.

### 3.3 Production Design

<u>Media</u>	<u>Description and Design Principle Applied</u>
Videotape (opener &/or wrap-up)	Natural life scenes suggesting but not explaining the main concepts which the students are to discover. (Intuitive "discovery" approach; perspective of whole.)
Tape-slide	<p>Natural life photography relating natural phenomena to individual life. (Establishing relevance and supplying examples.)</p> <p>Student and parent comments about their personal experience with T.M., with emphasis on the differences in results with regular vs. irregular practice; narrator introduces each point and provides continuity.</p> <p>(Modeling technique; supplying examples and non-examples; directing attention; periodic review; spaced repetition; realism; nondistracting and noncontradictory visuals; low duration of slides for simple communication, longer for complex communication; a few cartoons; subtle treatment of suggestion to practice T.M. regularly; models are mainly peers or parents, therefore "close" and "trustworthy"; solutions provided; one-sided communication; need satisfaction; explicit conclusions, relating familiar to unfamiliar.)</p>

Film-based videotape. The film base for the videotape was shot in super-8 with a Minolta camera. An intervalometer was attached for several time-lapse segments (seedlings growing, a rose and a lily unfolding, the sun setting). Shooting ratio was about 5:1 after a few unsuccessful starts (an attempt at animation was abandoned when results proved not sophisticated enough for a high school audience, and the original 15-minute film was lost during moving). Rough editing was done using Kodak tape splices and the film was then dubbed on to videotape.

There were technical problems resulting from the transfer. Color reproduction was unbalanced, some shaking occurred, and there was a slight framing problem in one segment due to the shake occurring when a splice went through the machine. Studio monitors were not properly adjusted for color, so it was impossible to judge exactly how the film color reproduced on video.

The music was improvised by three musicians instructed to bring out specific feelings for each season illustrated. It was recorded in the Concordia University sound studio as the musicians viewed the film. The sound track was then recorded on a one-inch master videotape and the unedited master assembled to match the music. Next the original sound track was synchronized with the final video track, and both were dubbed on 3/4" videocassette.

Tape-slide. The interviews for the tape-slide show were recorded in a private home on a Sony mono tape recorder.

in 1978. One of the original interviewees was re-interviewed in 1980. The interview technique was open-ended and objective, and leading questions were avoided. Students were asked to be honest about their experiences.

A total of five hours of audio tape was edited down to about 13 minutes. Long pauses and irritating "um's" and redundant phrases were edited from selected items.

The narration and music were recorded separately in Concordia's sound studio, then interviews, narration and music were dubbed onto a master tape which was then dubbed onto cassette tape and pulsed using a Wollensak cassette recorder. The music was recorded on two tracks, one for the recorder (mouth flute) and the second for the guitar (a dubbing of the musician accompanying himself).

### 3.4 Formative Evaluation and Redesign

Both the film and the tape-slide show underwent numerous changes during the process of formative evaluation. The productions were shown to small groups (1-5 persons at a time, totalling 19 persons) including eight meditating students, three parents, four teachers of the S.C.I., two meditating artists, and two Concordia University faculty (educational technology).

An adaptation of the Osgood (1967) semantic differential was used to evaluate (student) audience response to image, sound, music, narration, and interviews (for the tape-slide production), and overall effect of the media.



S.C.I. teachers filled out separate forms. Viewers were asked to note weak and strong points of the media, and the evaluator orally asked questions regarding pacing, specific scenes or slides, etc., to pinpoint hidden weaknesses in the design. In some cases the media were introduced and main ideas were outlined, in others not, and viewers were asked to write down their impressions of what the film or tape-slide show were trying to say.

Changes were made in both the evaluation instruments, the media, and the objectives, on the basis of feedback after each of the seven showings. To make this section more readable, the process is outlined in point form and some of the more useful findings are summarized.

<u>Evaluation Session &amp; Media</u>	<u>Recommendations for change.</u>	<u>Changes made</u>
1. Film: 15 min. (n=3) 1977	Shorten, simplify, eliminate ambiguities.	Complex asso- ciations were edited; film was lost.
2. 20 min. tape- slide (n=3)	Need for clearer narration to help viewer link inter- views with lesson objectives. (Narration was mainly open- ended.)	New script with more explicit narrative was written.
3. 20 min. tape- & slide (n=7)	Pace of some slides too fast; music a bit tinny in quality; need for smoother transitions between nature scenes and inter- views; some ideas needed clarifying; some slides in- appropriate; cut down on length and number of inter- views; simplify; edit con- flicting views where no	Rate of slide changes reduced to 4-5 seconds;  script short- ened and clarified;  slide changes during

<u>Evaluation Session &amp; Media</u>	<u>Recommendations for change</u>	<u>Changes made</u>
	solution is presented; change of slides during narration is distracting.	narration were reduced to a minimum.
5. Tape- slide in context of lesson (n=2)	Adolescent found pacing fine whereas adult found it a bit fast; reactions were very positive.	No changes.
6. Tape- slide (n=2) Faculty	Improve graphics and make more visually dynamic; shorten interviews; improve sound quality; adjust 1-2 slides.	Graphics redone and reshot on Kodalith then stained; some slides redone; interviews shortened.
4. Film (S-8) 3 min. (n=3)	Need for clearer transition between seasons; stronger suggestion of "growing" and more "rest"; when simple static shots were too long (over 2-3 seconds) viewer tended to lose the feeling for the theme, reporting being caught up in the beauty of individual images.	Static shots edited to two seconds;  shots reassembled.
5. Film (S-8) (n=2)	No suggestions for change but adult expressed pre- ference for the tape-slide show because there were people in it.	Film dubbed and edited on videotape.
6. Video- tape 5 min. (n=2) Faculty	Time-base corrector created problems; reduce shake, improve color.	Master re- assembled and music re-syn- chronized and dubbed on 3/4"; color slightly improved; shake could not be changed.
7. Video- tape of T/S (n=3)	Color and photography not as beautiful on video; sound quality poor.	Chose T/S version.

<u>Evaluation Session &amp; Media</u>	<u>Recommendations for change</u>	<u>Changes made</u>
7. Video- taped film (n=2) Students	A couple of scenes were found unclear, but viewer did not mind.	

### 3.5 Conclusions Drawn from Formative Evaluation

Conclusions derived informally from formative evaluation were applied to revisions, which produced more favorable feedback for these productions.

The productions were shown with and without introductions and post-discussions, within and out of context of the lesson. Response was the highest when the media were presented in context. When main ideas were outlined and specific themes brought out by the media were explained before presentation, comprehension and affect seemed higher. Addition of post-discussion and questions seemed more effective and more satisfying for the teacher as well as for the students.

It was found that teenagers, particularly the brighter ones, tolerated ambiguity in the presentations (ambiguity did not seem to reduce enjoyment substantially), whereas adults over 25 years expressed a greater need for clarity of exposition and for explicit introductions and conclusions.

Tape-slide. The more explicit the narrative became, the higher the adults rated the tape-slide show. Adults had difficulty with the more abstract beginning segment

of the presentation, which used sequences of images to suggest ideas hinted at in the narrative, (i.e., the viewer was required to use more internal decoding skills). The teenagers, however, expressed enjoyment of that segment and seemed to have little difficulty in interpreting it.

Both young and old mentioned they were distracted when image did not match the audio channel in such a way as to complement, illustrate, or otherwise clarify the sound track. When audio information was a little unfamiliar or complex, slide changes during narration were found to cause loss of either visual or audio information, especially if the visual information consisted of a sequence of images developing a concept. (This requires more attention and effort from the viewer.) These findings are consistent with Severin's (1968) cue summation theory.

One person found the cartoons contrasted with the rest of the production, but other viewers said they found the change (variety) pleasant. Some noted that the graphics helped to direct their attention to the narrative.

Adults required a slower pace of change in visuals, whereas teenagers tolerated a faster pace. A comfortable pace was found to be about four seconds for simple, static images (no narration) and five to ten seconds for those parts where the audio channel was intrinsically interesting or more complex (dense). Although ordinarily a faster pace of image change is desirable in tape-slide programs, slides were changed slowly during interviewee comments, as this

audience specifically expressed a high degree of interest in the interviewee comments, and seemed to prefer the slides of the adolescents to last longer or to remain at the same pace. One person mentioned that she liked to see the expression in the eyes of the students speaking because they seemed sincere (i.e., visuals helped credibility).

Almost all viewers of the intended age group (with two exceptions) expressed high interest in the students' comments and were not bored with longer comments, nor did they find the program too long. Adolescents were able to identify with their peer models, they said. Meditators enjoyed hearing about others' experiences because (they mentioned) they had little opportunity to meet or talk to other teenage meditators.

One student who had stopped meditating one year previous to the presentation decided to start again after seeing the tape-slide show. Most of the students indicated a desire to meditate more regularly than they had been doing; however, without controls it was not possible to tell whether that came from a natural desire to improve on present behavior, or whether the program had the desired effect. The three who saw the media and filled out an attitude questionnaire responded that they thought the S.C.I. course would be "quite" or "very" interesting and that they would like to attend more sample lessons.

Film-based videotape. Most students who viewed the film expressed a high degree of appreciation. Those who viewed the film after viewing the tape-slide program or who

received organizing information beforehand rated it slightly higher than those who did not.

Teenagers were tolerant of ambiguity in the symbolism, whereas some adults found it irritating. Viewers in general preferred more dynamic images such as flowers opening and the sun setting, and particularly liked the music and the way it harmonized with the image.

The teachers of S.C.I. in general mentioned a need for a greater clarity of message, and a few found the out-of-focus (intended as "soft-focus") segments annoying. A scene of a dried and seeded garden in the fall reproduced quite poorly on videotape, and many viewers found it difficult to recognize the objects within (the overall tone was a little too gray) and the purpose of that scene. The student population again did not seem to mind the lack of technical excellence.

Questionnaires. In sessions five and seven the attitude questionnaire was administered. Items were examined individually, as they stood in the context of the set of responses, and as they stood in relation to responses of different respondents. Those items which were unclear in meaning, which seemed redundant, or which did not reflect the general tendency of respondents on the different dependent variables, were improved or deleted.

The media evaluation form for the students was changed to a seven-point scale to better reflect differences between groups of viewers (e.g., those having pre-viewing

organizing information versus those who did not). Those items which yielded the highest variability and which were clearest to respondents were selected for the final questionnaire. Items which seemed to duplicate each other were deleted. The edited versions were clearer, shorter, and easier to compile than the original questionnaires.

#### IV. Methods and Global Evaluation Procedure

##### 4.1 Hypothesis

The hypothesis can be stated as follows:

Use of the multi-media "kit" to introduce and develop a high school S.C.I. lesson should prove effective in improving attitudes towards the T.M. technique and the Science of Creative Intelligence in general, towards persons who practice the technique, and towards the value of regular meditation. Non-meditators should be motivated to learn the practice of T.M.

Independent variables. There is one nominal independent variable with two levels:

1.1 Presentation of an S-8 film-based videotape and a tape-slide show.

1.2 No treatment.

Dependent variables. There are five dependent variables, all of which are measured by student responses on a Likert scale questionnaire:

1. Student's attitude toward T.M. in general.  
(Level 2.3)
2. Student's level of motivation indicated by the direction and strength of his choices regarding learning more about S.C.I.  
(Level 1.2, 1.3, 2.2)
3. Student's attitude towards meditators.
4. Student's acceptance of the value of the practical aspect of the course (T.M.) indicated by the direction and strength of his choices regarding regularity in meditation.  
(Level 3.1)
5. For non-meditators: Student's choices regarding learning the practice of T.M.

Intervening variables. Previous knowledge of T.M. and S.C.I., parental attitudes.

Moderating variables. There are three nominal moderating variables with two to three levels each:

1. Age of the students
  - 1.1 13-14 years
  - 1.2 15-17 years
2. Degree of regularity (meditators)
  - 2.1 Practicing
  - 2.2 Non-practicing (stopped)
3. Meditation practice
  - 3.1 Meditator (instruction in the T.M. technique)



3.2 Non-meditator (no instruction in T.M. technique)

4. Language

4.1 English

4.2 French

Control variables. All students are volunteers and have either been instructed in the T.M. technique or have friends who practice it.

4.2 Subjects

The subjects for the global evaluation were two separate groups of volunteer high school students aged 13-17 years. Two groups were necessary because only eight of the 150 students phoned turned up for the first showing (these comprised all the known anglophone students practicing T.M. in Montreal). The second group involved francophone students who were participating in a summer festival and who came to the viewing on a volunteer basis.

May 17 and 18 showing. Eight Montreal area anglophone students, four of whom arrived on May 17 and 18 respectively, viewed the productions in a T.M. center. The May 17th (Treatment) group included one practicing meditator, one non-practicing meditator (children's technique), and two non-meditators. The May 18th (Control) group included three practicing meditators and one non-practicing meditator. Students chose the viewing day on the basis of their own convenience. An attempt at randomization was made;

however, the video equipment in one classroom caused problems and rather than keep half (two) of the group waiting for an hour, the four students were all assigned to one group.

June 21st showing. One anglophone and 11 francophone students from across Quebec chose to view the productions rather than view arts and crafts displays at a T.M. festival. Volunteers were randomly assigned to Treatment and Control groups. The Treatment group included four non-practicing meditators and two practicing meditators. The Control group consisted of one non-practicing meditator, one meditator, and four non-meditators.

#### 4.3 Methods

Treatment groups (n=4 plus 6) were given a brief introduction to the S.C.I. and T.M., viewed the tape-slide show and film, filled out evaluation forms after each viewing, and then responded to an attitude questionnaire.

Control groups (n=4 plus 6) were given the same introduction (read out loud by the teacher), filled out the attitude questionnaire, and then viewed the media. Media evaluation forms were filled out after each viewing.

The five-minute introduction consisted of an introduction to the S.C.I. and to T.M. (definition, examples, application), and the reasons for the evaluation procedure that was to be followed (for purposes of research on educational methods). All participants were told their responses

would be anonymous and that honesty was important to the study.

Two qualified S.C.I. teachers handled the evaluation sessions with this writer as observer. Anglophone and francophone groups had different teachers; francophones had a bilingual teacher who translated simultaneously the tape-slide program.

NOTE: After this procedure, anglophone groups were taught S.C.I. lesson 4 and then answered Questions 32 to 39 in the attitude questionnaire (see Appendix F).

#### 4.4 Evaluation Instruments

The evaluation instruments consisted of:

1. Film and Tape-Slide Evaluation Questionnaires
  - a. For students (7-point Osgood-type scale)
  - b. For teachers
2. Attitude Questionnaire for Students (5-point Likert scale) with five components (clusters of questions) intended to measure attitude towards:
  - a. T.M.
  - b. S.C.I.
  - c. T.M.-meditators
  - d. Regularity in meditation
  - e. Starting T.M. (non-meditators)

Questions measuring similar attitude components were dispersed throughout the questionnaires.

## V. Results

### 5.1 Data Analysis

First, as the distributions of the sample populations could not be assumed to be normal, Mann-Whitney U tests (Siegel, 1956) were done on the ranked data of the whole test (Questions 1 to 24) and for each cluster of questions, for each level of the independent and moderator variables.

Following this, means for each group were examined (Appendix D, Tables A to C), then plotted on graphs (Figures 1 to 7) to determine specific strengths and weaknesses of the programs. This investigation, together with split-half Pearson Product-Moment correlations (Tables 1 to 6) was useful in pinpointing necessary improvements in the attitude questionnaire.

Next, responses to the film-based videotape and tape-slide evaluation questionnaires were plotted on a graph (Figure 8) and answers to each of the questions quantified (Appendix D, Tables D to K). This procedure contributed to the overall analysis of the productions and subsequent recommendations for improvements.

### 5.2 Results: Mann-Whitney U Tests and Comparisons of Means

The differences in attitudes between Treatment versus Control groups towards each dependent variable (T.M., S.C.I., meditators, regularity, starting) were compared for integral groups (n=10 each) and for moderating influences

(instruction in meditation versus no instruction, or meditators versus non-meditators, and practicing versus non-practicing meditators).

There were no statistically significant differences in attitudes between Treatment and Control groups although Treatment groups on the whole scored higher (Figures 1 and 2).

There was a significant difference ( $p < .05$ ) in the way meditators responded to the questionnaires as a whole as opposed to non-meditators (meditators scoring higher), and the tendency for higher general scores for non-meditating Treatment groups over Controls was quite strong ( $p < .07$ ). The variable of age was not statistically analyzed, as the distribution was very skewed. Once no significant differences were found between anglophones and francophones (Figure 3), the separate samples (May 17, 18 and May 21) were assumed to be similar and no further analysis was done using language as a moderator variable.

A Mann-Whitney U test on Question 25 revealed no significant differences between actual routine of meditation for Treatment and Control groups, i.e., the groups appear to be similar with regard to regularity.

Because the sample population is very small ( $n=20$ ), it is worthwhile tentatively inferring from tendencies the effects of the productions on attitude, mainly for purposes of formative evaluation. The tendencies (statistically non-significant), are reported as follows.

1. Attitude towards T.M. (Figure 4)

The Treatment group as a whole scored higher on attitude-towards T.M. (plus 10%); the strongest difference is between non-meditating groups ( $p < .07$ ).

2. Attitude towards S.C.I. (Figure 5)

Only the non-meditating groups showed positive differences, with the Treatment group leading Controls by 8%. Practicing meditators in Treatment groups rated S.C.I. lower than did Controls.

3. Attitude towards T.M. meditators. (Figure 6)

Again, scores for Treatment group non-meditators were higher than those of their Controls on this measure ( $p < .07$ ), while scores for Treatment group practicing meditators differ very slightly from Controls' (plus 2%). Non-practicing meditators' scores in the Treatment group show a 6% negative difference compared to Control scores.

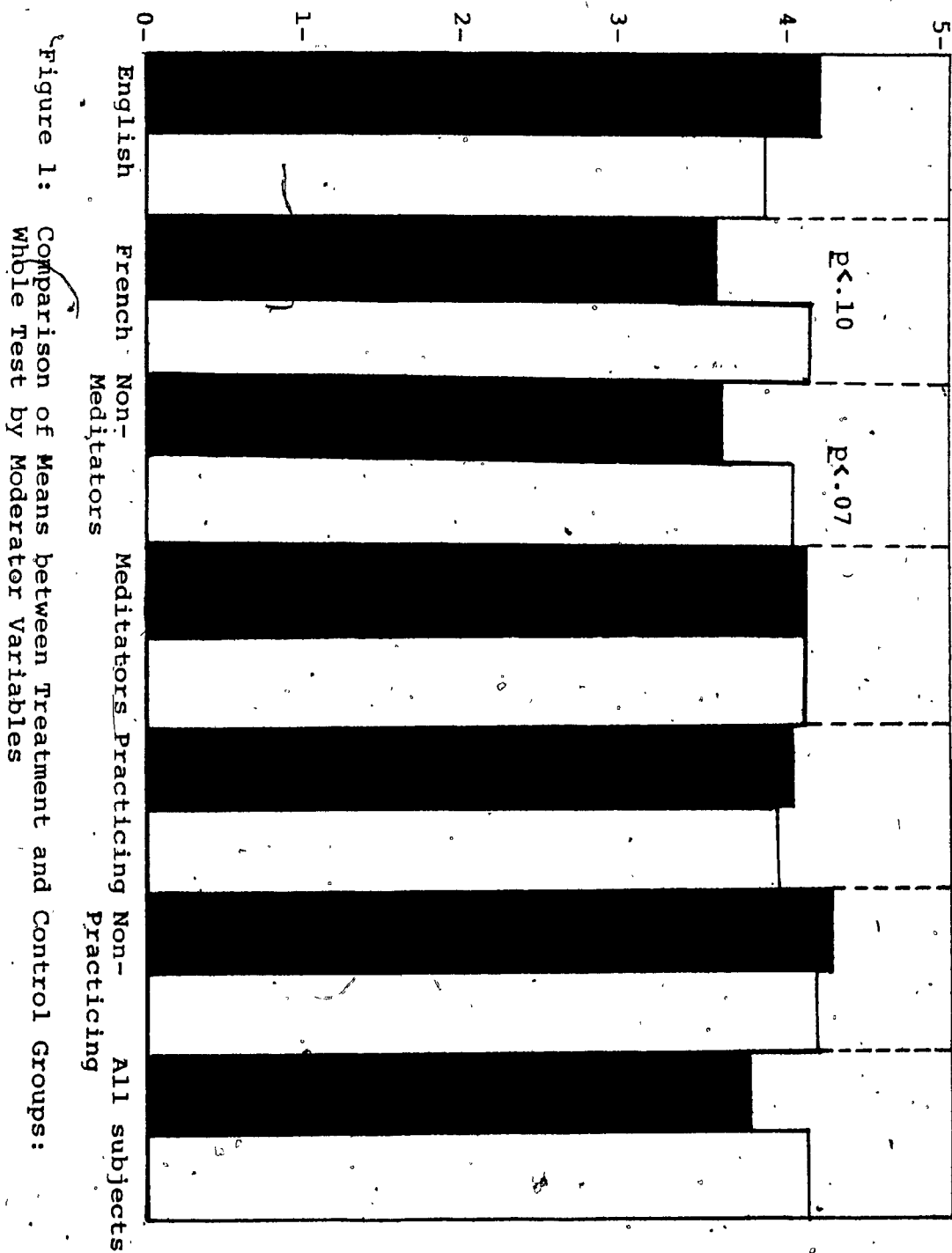
4. Attitude towards regularity.

There were slight positive differences (plus 2%) between Treatment and Control group scores for both non-meditators and practicing meditators on this measure. The two non-practicing Controls answered only half of the questions on this cluster and so no tests could be carried out for non-practioners.

Note: A new question was added to the francophone questionnaire handed out after all other questions.

# Whole Test

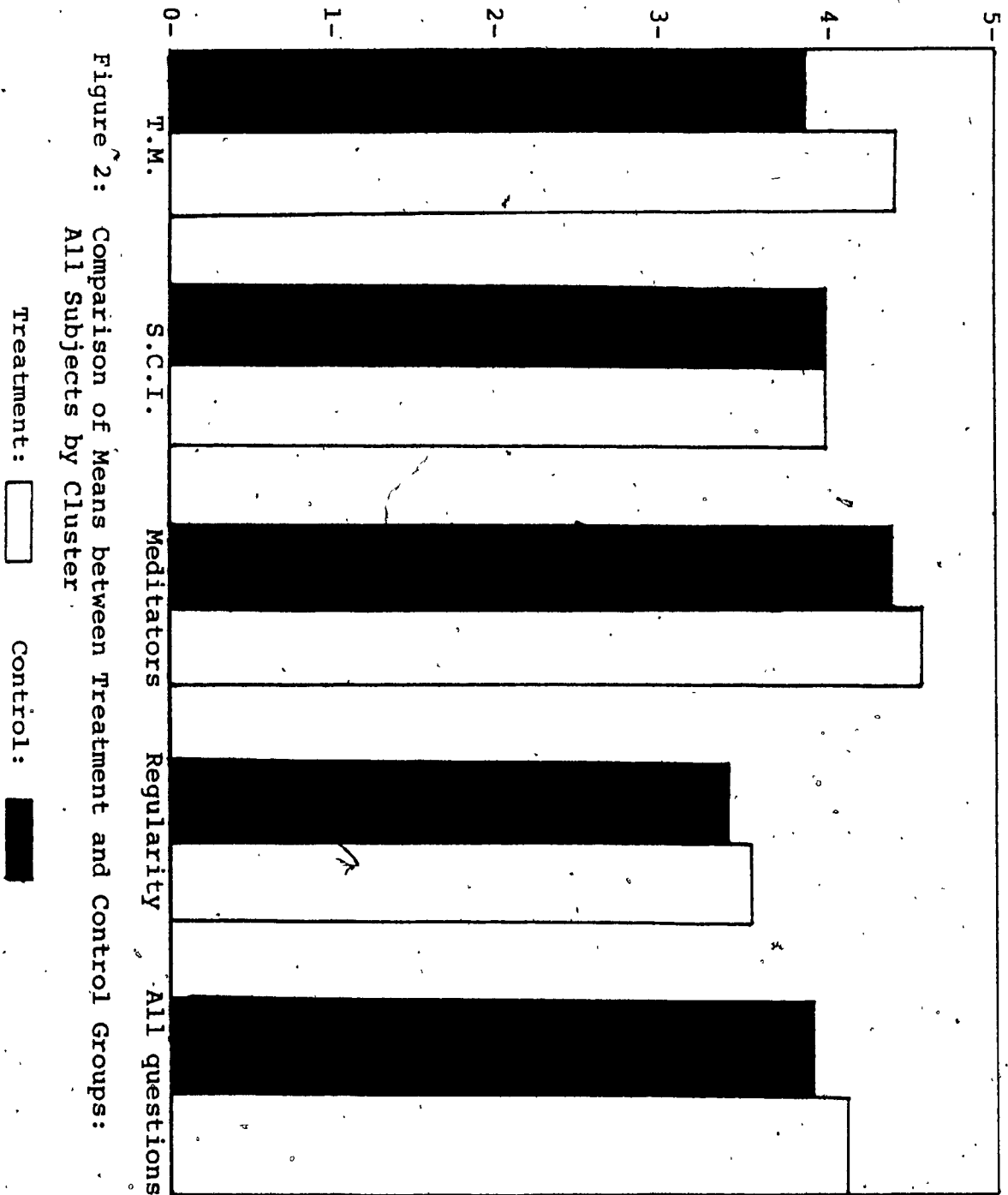
Student Means: Responses on a 5-point Likert scale



P values obtained from Mann-Whitney U analyses

# Clusters

Student Means: Responses on a 5-point Likert scale





# Whole Test

Student Means: responses on a 5-point Likert scale

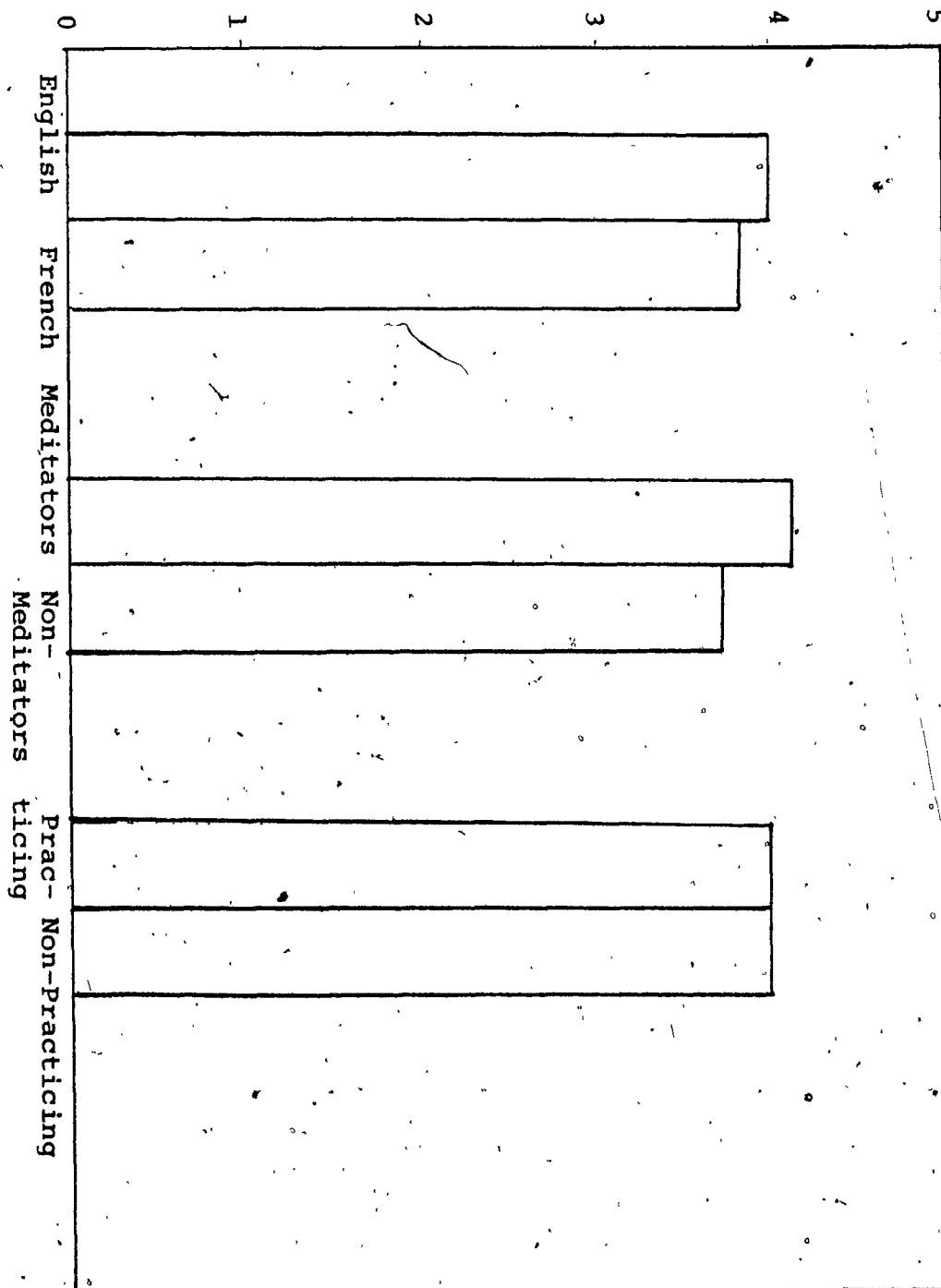
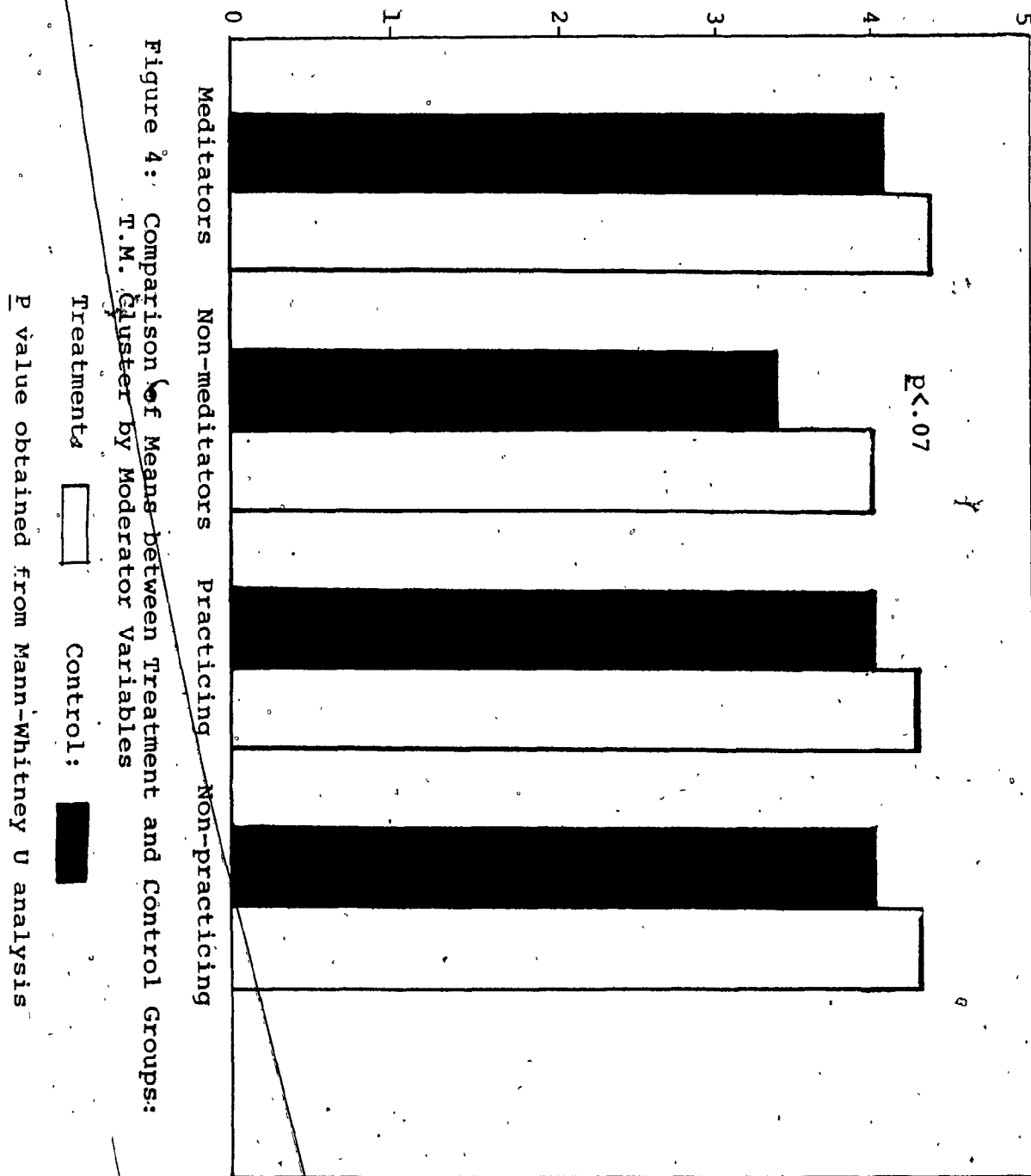


Figure 3: Comparison of Means between Moderator Variables: Whole Test by Treatment and Control Groups Combined

# T.M. Cluster

Student Means: Responses on a 5-point Likert scale



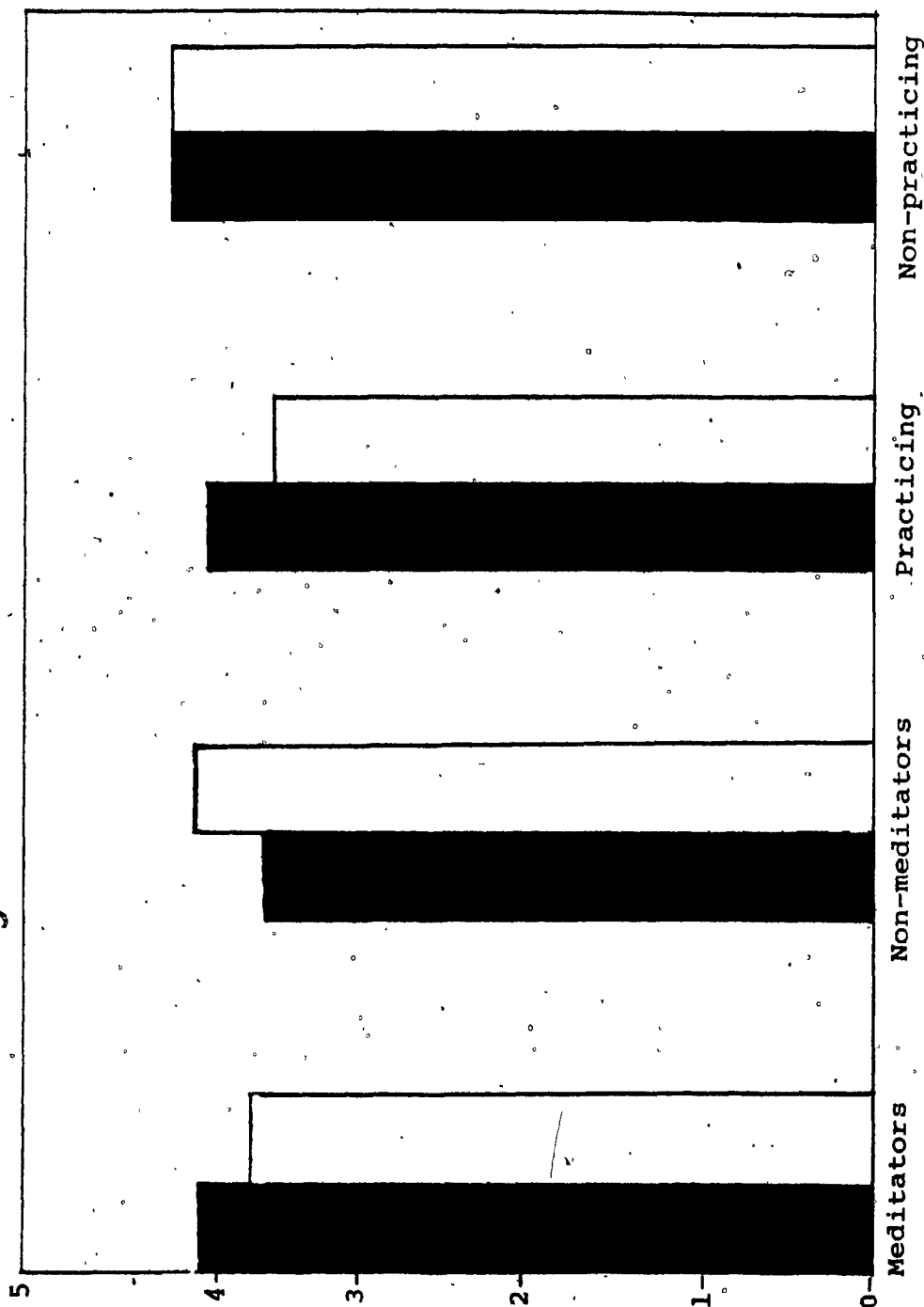


Figure 5: Comparison of Means between Treatment and Control Groups:  
S.C.I. Cluster by Moderator Variables

Treatment:  Control:

S.C.I. Cluster  
Student Means: Responses on a 5-point Likert scale

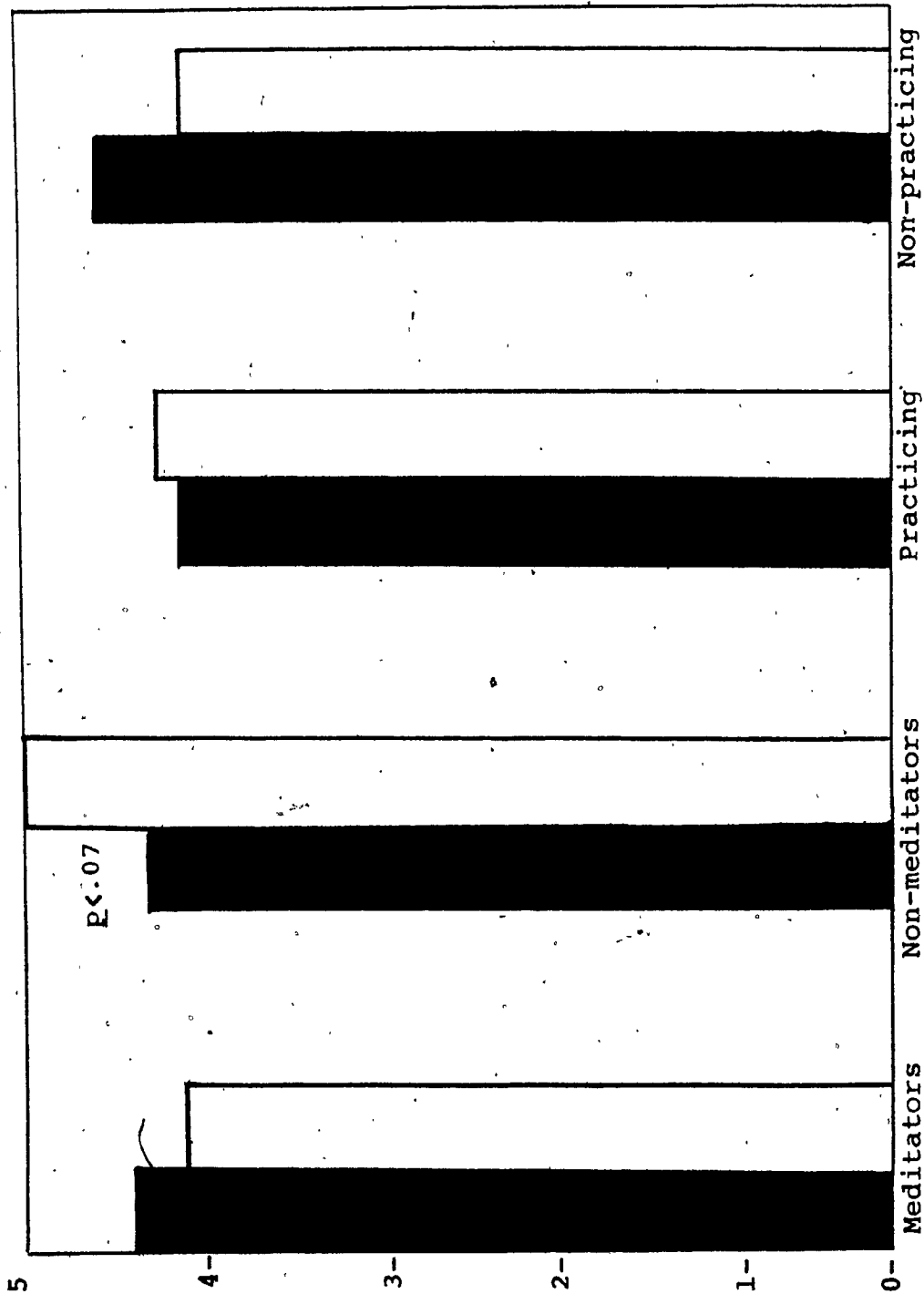


Figure 6: Comparison of Means between Treatment and Control Groups:  
Mediator Cluster by Moderator Variables

p value obtained from Mann-Whitney U analysis

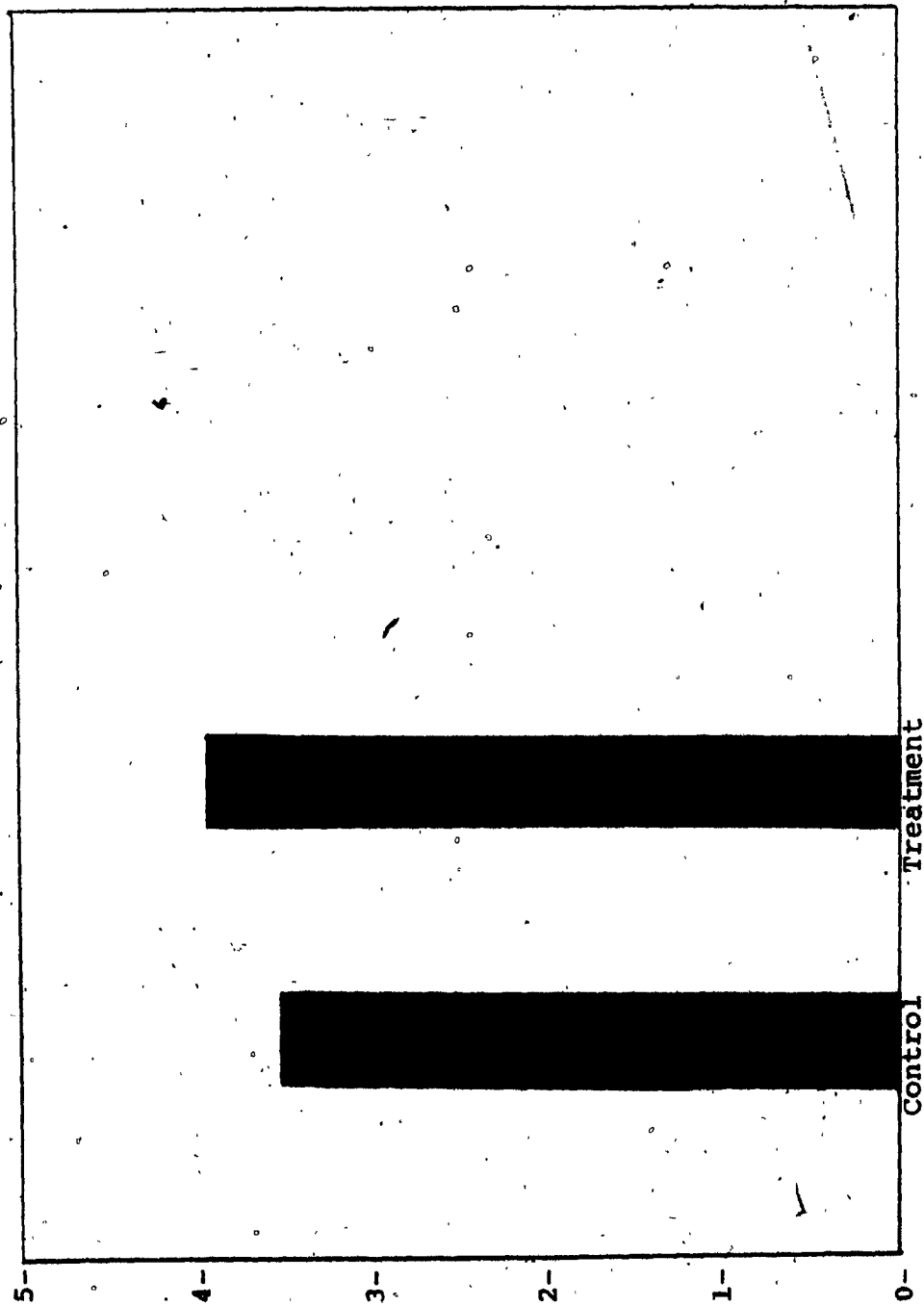


Figure 7: Comparison of Means between Treatment and Control Groups:  
Starting T.M. Cluster by Non-Meditators

Student Means: Responses on a 5-point Likert scale

Starting T.M. Cluster

had been completed.

The question (26) was worded:

Est-ce que cette présentation vous a donné le goût de méditer plus régulièrement? OUI \_\_\_\_ NON \_\_\_\_

(Has this presentation given you the desire to meditate more regularly? YES \_\_\_\_ NO \_\_\_\_) Five students out of six responding to this question (all meditators) replied "yes".

#### 5. Attitude towards starting T.M. (Figure 7)

Here non-meditating Treatment groups show an +8% difference over Controls.

### 5.3 Analysis of the Attitude Questionnaire

The attitude questionnaire (Appendix C) was analyzed statistically for split-half reliability (Pearson Product-Moment correlations and Spearman-Brown corrections, Tables 1 and 2) and each item was examined for discriminability, clarity, and for the degree to which it served the purpose of the product evaluation. On this basis, recommendations for improvements in the test instrument are made at the end of this section.

While separate groups within the sample population could not be assumed to be normally distributed, the whole sample, ( $n=20$ ), could be, as all were volunteers typical of potential S.C.I. students (also volunteers). Siegel (1956) is wary of the assumption that Likert scales yield true interval scores for purposes of accepting or rejecting

the null hypothesis. However, Tuckman (1972) mentions that it is fairly common practice to assume that the Likert scores are interval and to use them in parametric statistical analyses. The distinction does not appear to be crucial for verification of test reliability. Tuckman states that item analyses are not as crucial for the refinement of questionnaires as they are for refinement of cognitive tests. He says, "Questionnaire items are usually reviewed for clarity and distribution of responses without necessarily running an item analysis" (Tuckman, 1972, p. 199). For maximum refinement of the questionnaire, however, both Tuckman's suggested approach and Pearson Product-Moment correlations were used in this investigation.

It did appear that most items had sufficient clarity and discriminability. Responses to all questions but numbers 1, 12, and 15 ranged from at least 3 to 5.

As mentioned earlier, the attitude questionnaire is composed of five "clusters" within 24 questions. Within each cluster of questions, different levels of attitude are probed (Levels 1, 2 and 3 according to Bloom's continuum). Thus it was not expected that all questions within a cluster should be highly correlated (Fishbein, 1967). In fact, only two clusters (the T.M. and S.C.I. groups) had reasonably high correlation coefficients (see Table 1). The T.M. and S.C.I. clusters (Table 2) correlated well with each other and with those measuring attitude towards meditators. The S.C.I. cluster correlated well with the regularity cluster as well.

Table 1  
Internal Consistency of  
Attitude Questionnaire Within Clusters

Split-half reliability (Pearson)	Whole test reliability (Spearman-Brown)
* <u>T.M.</u> : Correlations of Q's 1,4 with Q's 2,6 $r_1 = .37$ $p = .05$	$r_2 = .54$ $p = .01$ $df = 18$
* <u>S.C.I.</u> : Correlations of Q's 9,14,18,20 with Q's 13, 17,19,21 $r_1 = .43$ $p = .03$	$r_1 = .60$ $p = .01$ $df = 18$
* <u>Meditators</u> : Correlations Q's 8,12 with Q's 11,15 $r_1 = .09$ $p = .35$	$r = .16$
* <u>Att. Regularity</u> : Correlations of Q's 5,23 with Q's 22,24 $r_1 = .07$ $p = .39$	$r = .13$
* <u>Start</u> : Correlation of Q 3 with Q 7 $r_1 = .30$ $p = .26$	$r = .46$



Table 2

Internal Consistency of  
Attitude Questionnaire Across Clusters:  
T.M. and S.C.I. with Others  
(df=18)

	T.M. with others		S.C.I. with others	
	Pearson Product-Moment Correlation	Spearman-Brown Correction	Pearson Product-Moment Correlation	Spearman-Brown Correction
S.C.I.	$r = .43$ $p = .03$	$r = .60$ $p = .01$	N/A	N/A
Meditators	$r = .16$ $p = .002$	$r = .28$ $p > .05$	$r = .61$ $p = .002$	$r = .73$ $p = .01$
Regularity	$r = .55$ $p = .005$	$r = .71$ $p = .01$	$r = .46$ $p = .02$	$r = .63$ $p = .01$
T.M.	N/A	N/A	$r = .43$ $p = .03$	$r = .60$ $p = .01$

The analysis of each cluster is as follows:

Table 3

Attitude towards T.M.

Question	Pearson Product-Moment Correlations	
	Q 2	Q 6
Q 1	.29	.49 ( $p = .001$ )
Q 4	.21	.47

Question 4 may be ambiguous. The word "regularly" may be confusing (i.e., who meditates regularly?) It may be that the association between claims made and the goodness of T.M. "for me" is not clear enough in the tape-slide production. Question 1 should be revised to obtain greater scoring variability.

Table 4

Attitude towards S.C.I.

Pearson Product-Moment Correlations

Question	Q 13	Q 17	Q 19	Q 21
Q 9	.07	.44 ( $p=.02$ )	.19	.57 ( $p=.004$ )
Q 14	.28	.10	-.19	.21
Q 18	.23	.33	.80 ( $p=.001$ )	.16
Q 20	.36 ( $p=.06$ )	.63 ( $p=.001$ )	.62 ( $p=.002$ )	.57 ( $p=.004$ )

All questions but 13 and 14 are fairly well correlated. Questions 13 and 14 refer to a specific component of the lesson (nature) as opposed to the other questions, which refer to attitude towards the S.C.I. course itself. This may account for a low correlation between these and other items. If about two more items were added to Questions 13 and 14, these could be considered a separate cluster of questions which should better reflect the effect of the film-based videotape. It may be, however, that

attitudes towards nature would be very difficult to change with a 5-minute film alone, as these attitudes have been building up over a lifetime, whereas those towards T.M. and S.C.I. are either entirely or relatively new.

Table 5  
Attitude towards Regularity

Pearson Product-Moment Correlations		
Question	Q 22	Q 24
Q 5	-.28	-.13
Q 23	-.06	.25

A glance at Figure 2 (page 44) will show that the scores for the regularity cluster were considerably lower than those for other clusters. This would probably be due to the fact that this cluster measures a higher level of attitude (Krathwohl et al, 1964). This cluster has a low reliability quotient (.13). More items with higher reliability quotients should be generated for this cluster.

As Fishbein (1967) has found, belief is not necessarily correlated with behavior, or in this case, belief about T.M. (T.M. cluster) was found to correlate poorly with choices of behavior based on belief about T.M. (regularity cluster).

Each question implies a different level of commitment to regularity. Question 23 assesses the strength of commitment to the response to Question 22. There should be a higher correlation between Question 5 and Questions 23

and 24. It may be that the values assigned to responses to 22 need to be adjusted to match the strength of overall responses to 24. Question 16 (left out of this matrix) was found to be measuring something not taught in the productions: a definition of regularity, and therefore could be considered invalid. The rather confused manner in which students responded to this question (responses did not reflect any correlation with other attitudes measured for these or any of the other 23 questions) would tend to confirm this conclusion.

Question 24 was analyzed for internal consistency as it consisted of 13 components all measuring different strengths of commitment to regularity. All items but (k) and (d) were fairly well correlated with two to four other items.

Table 6

Pearson Product-Moment Correlations  
between Questions on Attitude towards Meditators  
and Other Questions on Attitude towards T.M. and S.C.I.  
 (cases with  $p < .05$ )

Question	Q 8	Q 11	Q 12	Q 15
Q 2		$r = .47$		
Q 5			$r = .42$	
Q 9			$r = .42$	
Q 10		$r = .56$		$r = .49$
Q 18				$r = .48$
Q 20				$r = .42$

It was hypothesized that a favorable attitude towards meditators in general would influence a favorable attitude towards T.M., S.C.I., and regularity. Although there is low correlation among cluster items for attitude towards meditators, Questions 11, 12 and 15 do correlate with some measures of attitude towards T.M. and S.C.I., but not with attitude towards regularity.

Discriminability was low for Questions 12 and 15 and possibly for Question 11: on the Likert scores the range for Questions 12 and 15 is 4 to 5 and for Question 11 only one score is below 4. In addition, overall scores for all questions in this cluster for meditating Controls are too high (4.5) to permit a valid comparison between Treatment and Control groups.

To improve this cluster, discriminability and correlation should be raised with revisions of Questions 11, 12 and 15; in Question 8 (which doesn't correlate with any of the other questions), the word "strange" should be changed to be more realistic and "regularly" should be dropped, as it may be causing confusion.

Table 7

Attitude towards Starting T.M.

Pearson Product-Moment Correlation

Question	Q 7
Q 3	$r = .30$

Question 3 is quite general ("acceptance"). Question 7 implies commitment (choice of action) and is therefore at a higher level on the Bloom attitude continuum.

#### 5.4 Recommendations for Improvements: Attitude Questionnaire

In reconstructing the questionnaire I would keep the following items (questions correlating with two or more other items):

a) Attitude towards T.M.:

Questions 4 and 6.

b) Attitude towards S.C.I.:

Questions 9, 17, 18, 19, 20, and 21.

c) Attitude towards regularity:

Questions 5, 22, 23 and 24.

That these items don't correlate doesn't mean they are unreliable. But the test does need pairs of like items to measure internal consistency. I would modify values given to choices in Question 22 to correlate with Question 24 averaged.

Question 23 could be combined as one question with 22 (choice of action/strength of commitment).

d) Attitude towards meditators:

Questions 11, 12 and 15.

As items 11, 12 and 15 correlate with items both on T.M. and on S.C.I., they do serve the purpose of this test, however they should be modified to improve discriminability.

e) Attitude towards starting T.M.:

Questions 3 and 7.

Perhaps these questions could be used as pilot items in a new test, and two to three other items with matching attitude levels (cf. Bloom) could be generated for comparison.

5.5 In-Context vs. Out-of-Context Presentations of the Productions

The theory that media presentations are more effective in producing attitude change when accompanied with discussion was investigated in what was called an "in-context" supplementary teaching procedure and formative evaluation. (See Appendix F for the procedure and questionnaire used).

In the anglophone (May 17-19) groups (n=8) time permitted teaching of S.C.I. Lesson 4 after the groups had completed activities related to the main evaluation question stated in the hypothesis.

As formative evaluation had predicted, it was found that use of the technique of outlining the lesson as a whole and then breaking it up into two subsections, each with introductions, a) to bring out the idea of the progressive and evolutionary aspect of nature using the film as a point of focus and discussion, and b) to treat the theme of "rest and activity" as the steps of progress, using the tape-slide program as a focal point for discussion, was more effective than showing both productions before discussion

and development. Both the teacher and students expressed greater satisfaction with the "in-context" lesson (one wanted to bring a friend for an introduction; another verbally expressed high interest and an active desire to take the S.C.I. course). Students from this group looked brighter and more enthusiastic and a questionnaire (Questions 32 to 39) measured stronger affect (+10%, or a difference of .6 between mean scores,  $p=.17$ ) towards S.C.I. than the group which saw the media out of context and then participated in the lesson. The teacher noted she had a greater rapport with the in-context group.

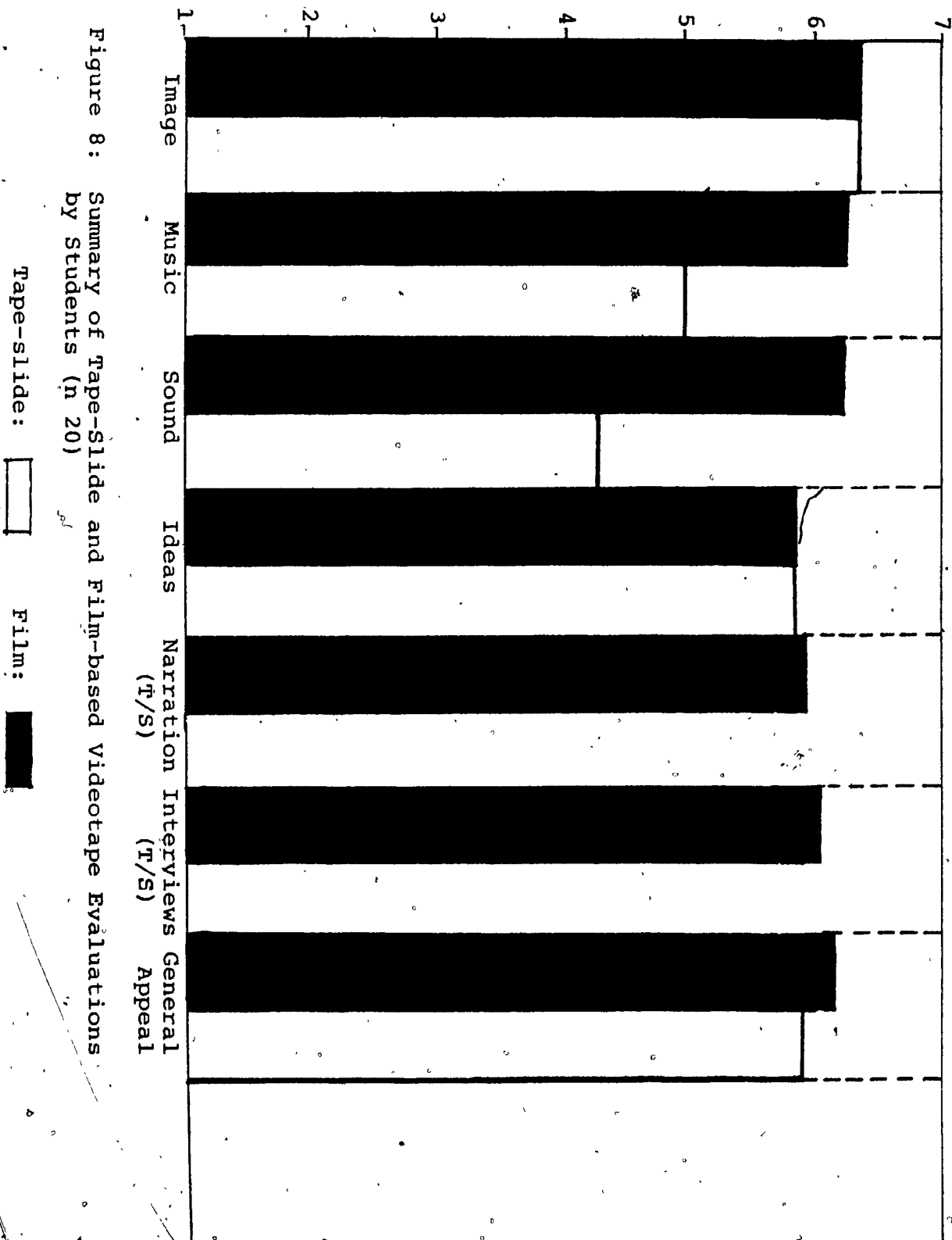
#### 5.6 Evaluation Questionnaires: Summary of Results

Treatment groups saw the audio-visual productions before filling out an attitude questionnaire, whereas Control groups answered the attitude questionnaire first. After presentation of each audio-visual production, evaluation questionnaires were administered to S.C.I. teachers and to students. Their comments and quantified responses are summarized in this section (see Figure 8). The detailed tabulation of responses is to be found in Appendix E.

It is evident that students responded quite favorably to both productions, and rated the film-based videotape higher than the tape-slide program. Most S.C.I. teachers were more favorable towards the tape-slide program which they felt could be "very good" for use with both meditators and non-meditators, in or out of context of S.C.I. The



Averaged Rating on Evaluation Form (7-point scale)



film was rated "good" in this regard, however, time did not permit a thorough explanation of the role and use of the film in the S.C.I. lesson for which it was produced, and the S.C.I. teachers weren't sure how they would interpret and use the film as it is so open-ended. Thus their response may be partly interpreted as coming from a lack of familiarity with techniques of "discovery" learning using audio-visuals.

Film-based videotape. Student opinion of the film-based videotape was on the average very positive (about 6.1/7 on a 7-point scale). The highest number of positive comments centered on their appreciation of the dynamic time-lapse features of the film and of the music and the way it harmonized with the visuals. Weak points mentioned were: lack of clarity in the message and repetition of key images. There were 26 favorable comments as opposed to 11 unfavorable comments volunteered about the production, despite the fact that viewing conditions for the May 21st showing were not at all conducive (interruptions, loud noises from exterior, poor color balance on T.V. monitor). One student (who had expressed a negative opinion of the tape-slide program) was verbally very enthusiastic about the film. Six out of eight students responded they would very much like to see another S.C.I. film (7/7).

On the other hand, response to the film-based videotape by S.C.I. teachers was less positive. The teachers (who were unfamiliar with the plan for the film in the context of the lesson design) felt that the message in

the film should be more explicit. Two suggested titles, another, narration. Some were irritated by "soft-focus" segments which they interpreted to be out of focus. Opinion of the production as a whole averaged 3.5/5 (between "good" and "very good"), and opinion of the value of the production for use in S.C.I. averaged 3.7/5. The teacher who actually read the lesson plan and used the film in context felt it was more useful (4/5, or "very good") than those who hadn't.

Tape-slide. Student response to the tape-slide program was quite positive (averaging 5.9/7) also. Eleven out of 20 mentioned that the strongest aspects of the production were the interview segments and six mentioned liking the nature photography in particular. Three non-meditators felt the need for more explanations, and a few comments pointed to the need for fewer and more varied interviews (more different faces). Many students found the sound clarity lacking (especially the francophones, who heard the tape under the voice of the translator), both for the voices of the interviewees and for the music. Credibility of the interviews was fairly high (averaging 5.8/7), with only one student giving credibility a negative rating. More students rated interviews as being highly interesting as compared to narration. Seventeen out of 20 students rated the program either 6/7 or 7/7 on "enjoyable"-ness, and thirteen responded they would like to see another.

S.C.I. teachers were quite positive about the value of the tape-slide program for the S.C.I. (3.8/5). Opinion

of the production as a whole averaged 4/5 ("very good"). Four commented that it was inspirational; one person mentioned the production could be shorter, and another that the flow of ideas could be clearer. Once again, comments were made regarding sound clarity.

## VI. Conclusions and Recommendations

### 6.1 Discussion of Results: Data Analysis

As differences for educational objectives are not significant, the null hypothesis is assumed to be true under the present circumstances.

Treatment groups show a slight but insignificant improvement over Controls on measures of attitude towards T.M., meditators, regularity, and starting T.M. There is no difference between groups in attitude towards S.C.I., (positive and negative poles averaging out).

It seems that for all dependent variables but that of regularity, the productions had a stronger positive effect on non-meditators ( $p < .07$ ), who had a minimum of exposure to T.M. and S.C.I. prior to treatment, and therefore before viewing (judging by Controls) had attitudes closer to neutral than did meditators. This would seem to concur with the theory that attitude is easier to change when there is lack of knowledge about a subject prior to communication (Fishbein, 1975).

It would seem that meditators had a high positive

attitude to begin with (averages for both Treatment and Controls are over 4 on a 5-point scale, except for regularity [average 3.5/5]). This would make attitude improvement more difficult to produce and thus statistical results are more difficult to assess.

A factor to consider here is that students reported strong positive affect towards the productions and a desire to see more, and five out of six meditators questioned responded that the productions had given them the desire to meditate more regularly (Question 26), indicating that 1) either the "regularity" questionnaire cluster may not be reflecting the impact of the tape-slide program on viewers -- note also that this cluster was not highly reliable; or 2) the students were not strongly committed to the response to Question 26. Hoban's (1960) findings are that when students like a (film) production they tend to have more positive attitudes towards the subject matter, indicating that the first proposition may be the correct one, and the cluster of questions on regularity should be revised and repiloted.

The non-difference in attitudes towards S.C.I. may also be due to the fact that those students who volunteered their free time had been convinced by the recruiter that they would assist at an interesting lesson. Meditators, who rated S.C.I. lower than controls, may have felt that the viewing did not meet with their expectations, whereas non-meditators who probably came out of curiosity, rather

than conviction, were favorably impressed.

## 6.2 Recommendations for Improvements

Film-based videotape. The film-based videotape could be refilmed in 16mm provided all editing is done on video to avoid "shaking" and framing problems. Color balance and reproduction would also be better if all film used is of the same type and speed. Dissolves would solve the problem of using out-of-focus segments for transitions (no dissolves were possible with the S-8 equipment used for this production). Dissolves would be more appropriate than fades for edits within seasons; however, fades are probably best for sunsets and season "endings". The same or similar music could be adapted and synchronized with the film.

Transitions between seasons need to be clearer, and the balance of silence and activity more evident. To this end more peaceful winter scenes suggesting silence (perhaps a long, slow pan on snow drifts, or snow falling) could be incorporated. The process of snow melting, rain falling and seedlings growing could also be more explicit, with more use of the dynamics of film such as time-lapses and images of moving things. The contrast between spring and summer should be stronger: more soft-focus, tiny green things for spring, then a well-known spring flower such as a tulip opening, and strong, bright colors for summer flowers. Fall scenes should include more color, and perhaps the mime is not altogether necessary. Rather

than repeat the same images to suggest a new beginning of the seasonal cycle, parallel but different scenes could be used.

Tape-slide program. A version for non-meditators could include more introductory information and fewer supporting comments (interviews) could be used. For a meditating audience, the tape-slide program could be edited to 15 minutes so that more time is devoted to the discussion on "regularity" and fewer comments are made in support of benefits claimed. The number of interviewees supporting each point made by the narrator could be reduced, as could the number of points made. The concluding sector should be clearer in relating the experience of meditators to cycles in nature. Although not entirely necessary, it would add to interest if a few different interviewees could replace some of those who are shown more than once. These measures would help to eliminate possible distracting redundancy and to strengthen understanding of the basic S.C.I. concept.

Ideally, all interviews should be recorded in studio, but as this is no longer possible (the students have matured or moved) it may be preferable to splice in original interview tape with narrator comments and edit directly on the original instead of on a copy, as was done for this production. This would reduce hiss and improve quality. The music should be re-recorded as the levels were probably improperly adjusted the first time.

Evaluation design. Feedback from formative evaluation suggested that the productions were considerably more effective when shown with introductions and followed up with discussion and clarification. It was evident that the circumstances and small available population (n=20) permitted a very limited evaluation of the productions in a context quite different to the intended teaching context. If another sizeable group could be found (perhaps in another province or state), Simonson's (1980) conclusions indicate that it would be worthwhile to investigate the difference between teaching the lesson using the productions as adjuncts (discussion-starters, review and/or introduction) and teaching it without the productions.

### 6.3 Cost-Benefits Analysis

Production expenses are outlined in Tables 8 and 9, (pages 70 to 73).

It would be difficult to justify production expenses on the basis of the statistical analysis of the effect of the two productions on attitude towards T.M. and S.C.I.

On the "benefit" (gain in positive attitude) side, certain other factors must be taken into consideration:

1. The productions were intentionally designed as adjuncts to the teaching of a lesson incorporating discussion and follow-up activities.
2. Attitudes towards S.C.I. as measured by a



Table 8Film-based Videotape Production Cost

	<u>This Production</u>	<u>Actual Cost (Univ. rate)</u>
<u>Software:</u>		
Videotape:		
1 inch master.	--	60.00
Videocassette	32.00	32.00
Eight S-8 cassettes at \$6.00-\$9.00 each (includes development)	50.00	50.00
35 mm. film (Kodalith) for graphics	10.00	10.00
Cardboard and lettering	7.00	7.00
<u>Hardware:</u>		
S-8 camera rental at \$7.00/day for 30 days	--	210.00
Tripod	35.00	35.00
Intervalometer (purchase)	--	50.00
Photographic lights (3200 K) and stands	30.00	30.00
<u>Studio Equipment and Personnel:</u>		
S-8 projector, editor and viewer	--	75.00
Editing facilities at \$25.00/hour for 8 hours	--	200.00
Film dubbing onto video \$18.00/hour for 1 hour	--	18.00
Sound synching at \$20.00/ hour for 1 hour	--	20.00
Operator at \$10.00/hour for 16 hours	--	160.00

	<u>This Production</u>	<u>Actual Cost (Univ. rate)</u>
Sound studio at \$20.00/hour for 8 hours. (Recording of music - jam session and actual recording.)	--	160.00
Operator for sound studio at \$10.00/hour (final recording only) for 1 hour	--	10.00
Use of entire studio for videotaping of graphics and slides (\$70.00/hour for 2 hours)	--	140.00
Operator at \$10.00/hour for 4 hours	--	40.00
<u>Transportation and Lodging:</u>		
(Countryside, weekend camping, etc.)	100.00	100.00
<u>Personnel</u>		
General research, scripting, and production work at \$10.00/hour for approximately 300 hours	--	3,000.00
Three musicians at \$10.00/ hour each for 8 hours	--	240.00
<u>Total Cost</u>	\$ 264.00	\$ 4,647.00

Probable cost if producted at M.I.U. or  
an associated Academy (minus equipment  
rental and with \$5.00/hour cost for  
personnel): \$ 1,994.00

To cover costs under M.I.U. production conditions,  
27 copies of the film must be sold at \$75.00 per  
copy.

Table 9Tape-slide Production Cost

	<u>This</u> <u>Production</u>	<u>Actual Cost</u> <u>(Univ. rate)</u>
<u>Software:</u>		
35 mm. slide film and developing: Kodalith: \$5.00 X 3	15.00	15.00
160 ASA (color): \$12.00 X 10	120.00	120.00
Reel-to-reel tapes at \$4.00 X 8	32.00	32.00
Cassette tapes \$2.00 X 5	10.00	10.00
Graphics (lettering, felt pens, paper, cardboard)	10.00	10.00
Splicing tape (S-8, sound, and opaque tape)	10.00	10.00

Hardware: Studios and Equipment

35mm. camera rental at \$5.00/day 30	--	150.00
Tripod	--	30.00
Reel-to-reel mono tape recorder at \$2.00/day 30	--	60.00
Cassette-tape recorder at \$2.00/day 20	--	40.00
35mm. carrousel projector at \$2.00/day 20	--	40.00
35mm. carrousel trays at \$6.00 2	12.00	12.00
Copy stand at \$5.00/day 3	--	15.00
Sound studio at \$10.00/hour 50 hours	--	500.00

	<u>This Production</u>	<u>Actual Cost (Univ. rate)</u>
<u>Transportation and Lodging:</u>		
(Countryside, interviews, etc.)	100.00	100.00
<u>Personnel</u>		
Sound studio operator, \$10.00/hour X 9	--	90.00
Research, conception, interviewing, scripting, organizing, editing, revising etc. \$10.00/hour X 600	--	6,000.00
Musician \$10.00/hour X 5	--	50.00
<u>Total Cost</u>	<u>\$ 309.00</u>	<u>\$ 7,284.00</u>

Probable cost if produced at M.I.U.  
or an associated Academy (minus  
equipment costs and \$5.00/hour for  
personnel):

\$ 3,379.00

To cover costs under M.I.U. production conditions,  
43 sets of the tape-slide program must be sold at  
\$80.00 each set.

questionnaire administered at the end of the anglophone lessons were more positive (+10%) when the productions were used with "organizing" introductions and discussion.

3. Media-related attitude change (according to research) is more likely to occur when the media are integrated in a lesson context with discussion and follow-up activities (Simonson, 1980).
4. Treatment groups in general showed a higher positive change in attitude than did Control groups (however, the changes were statistically insignificant). The practicing meditator Treatment groups showed a greater tendency to choose to meditate regularly, and five out of six responded that the productions had made them want to meditate more regularly.
5. The students on the whole liked the productions.

Although results are positive, certain conditions would have to be met before the audio-visual productions could be recommended for reproduction for use in S.C.I. classes:

1. The production and the evaluation instrument should be revised according to recommendations previously outlined.
2. There should be another evaluation session using the media in context as advised by Simonson (1980), with clear introductions, discussion

and follow-up activities versus teaching of the lesson without the audio-visuals. Results should be significant at the  $p < .05$  level.

Once these conditions are met, expense of production could be justified when the S.C.I. becomes more widely taught in high schools. Costs could be shared by many schools using them at the purchasing price of \$15.00/minute (\$75.00) for the color film-based videotape, and \$80.00 for the tape-slide show.

If the M.I.U. curriculum development committee should decide to produce other films or tape-slide programs for S.C.I., costs will be considerably lower than commercial rates and again lower than typical university rates, as much of the staff works on a tuition-room-and-board credit basis. Thus estimated costs of the media evaluated as part of this thesis are based on current university studio and personnel rates; costs for M.I.U. audio-visual productions could be considerably lower if all equipment, studios and personnel were to come from within M.I.U., which is already equipped and geared to producing a great deal of educational material.

#### 6.4 General Conclusions

No significant differences were found between groups viewing and groups not viewing a film-based videotape and a tape-slide program designed to reinforce or improve attitudes of high school students towards T.M., S.C.I.,

meditators, regularity, and starting T.M. (non-meditators).

There were, however, positive changes in integral Treatment groups (n=10 each) on all indices but that of S.C.I. Non-meditators' opinions in the Treatment group were the most positive on all measures as compared to their Controls (p<.07), indicating that the productions had a positive effect on their attitudes and that they could be most useful in motivating non-meditators to start T.M. and possibly take S.C.I.

The separate roles of the two productions in reinforcing different aspects of student attitude were not clear, although it would seem that the longer and more comprehensive tape-slide program played a major role.

Results indicated that the role of the film-based videotape was inadequately measured in the attitude questionnaire. It could be noted here that the Treatment group scored 10% higher than Controls on the question: "I feel close to nature" (Question 13), and the 20 students did volunteer a large number of positive comments (26) about the nature scenes and the way they reacted to the film. In order to better analyze the role of the film-based videotape, more questions concerning attitude towards nature or natural law should be generated.

Formative evaluation feedback indicated that the productions were more effective in creating positive affect towards S.C.I. when shown in context of S.C.I. lesson 4 and used to stimulate discussion and give illustrations

and/or provide for review. The productions were designed to be shown in such a context in keeping with Tyler's (1980) recommendations.

It is recommended that technical weaknesses in the productions such as sound (tape-slide) and clarity of image (film-based videotape) be strengthened before the materials be considered for reproduction and distribution to schools teaching S.C.I. A shorter 15-minute version of the tape-slide program would be more economical and would probably achieve similar results with possibly a gain in attitude for those viewers who may have found it long and containing too many similar messages.

In order to justify the expense of production and possible reproduction, further research with larger populations is needed on the role of the film-based videotape in mediating attitude change, if any, and on the effect of both productions shown in the context of S.C.I. lesson 4 as compared to the effect of the same lesson without the productions. Because both student and teacher evaluation of the tape-slide program was high, in the event that the more expensive and time-consuming recommendations are not possible, the least expensive and simplest change would be to splice in and edit the original interview tapes for the tape-slide program and eliminate some of the less crucial interviews. The film, although liked very much by students, would need to be reshot and dubbed and edited on videotape and structured so as to be more easily interpreted and



used by S.C.I. teachers before it would be suitable for distribution.

The evaluation of the film-based videotape did not support the theories that a more abstract, intuitive approach to learning is best before a concrete, linear, explicit approach (Bruner, 1960; Taba, 1962), as it was found informally that the four students who received prior organizing information such as that recommended by Gagne (1974) and Martorella (1972) (outlines of broad objectives and main ideas) were not only more positive towards the film, but more positive towards S.C.I. as well.

The small available population and consequent limited scope for evaluation in this research points to the importance of obtaining large enough sample audiences to evaluate educational media from several different angles.

In sum, positive trends indicate that four and part of the fifth objectives were met to some extent, although differences for the whole group were too small to conclude with confidence that the observed differences were not due to chance or error. More specifically, the film-based videotape and the tape-slide show designed as adjuncts for S.C.I. lesson 4 appear to be somewhat effective in reinforcing positive attitudes towards T.M., meditators, regularity, and starting T.M. for this Treatment group as a whole; and in reinforcing positive attitudes towards S.C.I. in this non-meditating Treatment group. It may be inferred with greater certainty that the productions

were effective in mediating positive attitude reinforcement towards T.M., S.C.I., meditators, and starting T.M. in non-meditators ( $p < .07$ ).

Further research using improved productions with a larger population would be desirable. In this research, more conclusive results may be obtained by examining four levels of the independent variable:

1. presentation of the audio-visuals alone;
2. no presentation;
3. presentation of the audio-visuals in context of lesson 4;
4. teaching of lesson 4 without presentation of the audio-visuals.

Reference Notes

1. Abravnel, P. Personal communication, September 13, 29, 1976. (Abravnel was the chief curriculum developer for the first year S.C.I. course.)
2. Beckwith, L. Personal communication, September 19, October 4, 1976.
3. Guss, C. Selection department: An outline of operational activities, audio-visual center. Unpublished manuscript, Indiana University, 1966.
4. Desy, M., & Trottier-Robillard, L. Evaluation de documents audio-visuels: Guide d'utilisation des formules d'evaluation. Montreal, Quebec: Service General des Moyens d'enseignement, 1972.
5. Fournier, C. Service General des Moyens d'enseignements evaluation. Montreal, Quebec: Service General des Moyens d'enseignements, 1972.

### References

- Abrams, A.I. Paired-associate learning and recall: A pilot study of the Transcendental Meditation program. In D.W. Orme-Johnson & J.T. Farrow (Eds.), Scientific research on the Transcendental Meditation program: Collected papers (Vol. 1). West Germany: Maharishi European Research University Press, 1976.
- Anderson, C.M. In search of a visual rhetoric for instructional television. Audio-Visual Communication Review, 1972, 20(4), 43-64.
- Baker, E.L., & Popham, W.J. Value of pictorial embellishments in a tape-slide instructional program. Audio-Visual Communication Review, 1965, 13(4), 397-404.
- Bandura, A. Psychological modeling; Conflicting theories. Chicago: Aldine-Atherton, 1971.
- Bandura, A., Ross, D., & Ross, S.A. Imitation of film-mediated aggressive models. Journal of Abnormal and Social Psychology, 1963a, 66, 3-11.
- Bandura, A., Ross, D., & Ross, S.A. A comparative test of the status envy, social power, and secondary reinforcement theories of identificatory learning. Journal of Abnormal and Social Psychology, 1963b, 67, 527-534.
- Banquet, J.-P. Spectral analysis of the EEG in meditation. Electroencephalography and Clinical Neurophysiology, 1973, 35, 143-151.
- Barclay, J.E., & Weaver, H.B. Comparative reliabilities and ease of construction of Thurstone and Likert attitude scales. Journal of Social Psychology, 1962, 58, 109-120.
- Benedict, R. Patterns of culture. London: Penguin Books, 1946.
- Benson, H., & Wallace, R.K. Decreased drug abuse with Transcendental Meditation: A study of 1,862 subjects. In C. Zarafonitis (Ed.), Drug Abuse: Proceedings of the International Conference. Philadelphia: Lea & Febiger, 1972.

Bloomfield, H.H., Cain, M.P., Jaffe, D.T., & Kory, R.B.  
TM: Discovering inner energy and overcoming stress.  
 New York: Dell, 1975.

Brautigam, E. Effects of the Transcendental Meditation  
 program on drug abusers: A prospective study.  
 In D.W. Orme-Johnson & J.T. Farrow (Eds.), op. cit.

Brown, M. Higher education for higher consciousness:  
 A study of students at Maharishi International  
 University. Unpublished doctoral dissertation,  
 University of California at Berkeley, 1976.

Bruner, J.S. The process of education. Boston: Harvard  
 University Press, 1960.

Chute, A.G. Effect of color and monochrome versions of  
 a film on incidental and task-relevant learning.  
Educational Communication and Technology Journal,  
 1980, 28(1), 10-18.

Clark, R.E. (Review of Interaction of media, cognition,  
 and learning by G. Salomon.) Educational Communication  
 and Technology Journal, 1980, 28(1), 62-66.

Cobin, M.T., & McIntyre, C.J. The development and application  
 of a new method to test the relative effectiveness of  
 specific visual production techniques for instructional  
 television. Urbana, Ill.: University of Illinois  
 Press, 1961.

Coldevin, Gary. Comparative effectiveness of T.V. production  
 variables. Journal of Educational Television and other  
 Media, 2(3), 1976, 87-93.

Collier, R.W. The effect of the Transcendental Meditation  
 program upon university academic attainment. In  
 D.W. Orme-Johnson & J.T. Farrow (Eds.), op. cit.

Davies, J. The Transcendental Meditation program and pro-  
 gressive relaxation: Comparative effects on trait  
 anxiety and self-actualization. In D.W. Orme-Johnson  
 & J.T. Farrow (Eds.), op. cit.

DeCecco, J.P. The psychology of learning and instruction.  
 Englewood Cliffs, N.J.: Prentice-Hall, 1968.

Edwards, A.L. Techniques of attitude scale construction.  
 New York: Appleton-Century-Crofts Inc., 1957.

Ferguson, G.A. Statistical analysis in psychology and education (3rd ed.). New York: McGraw-Hill, Inc., 1971.

Ferguson, P.C., & Gowan, J.C. Transcendental Meditation: Some preliminary findings. Journal of Humanistic Psychology, 1976, 16(3), 51-60.

Fishbein, M. A behavior theory approach to the relations between beliefs about an object and the attitude toward the object. In M. Fishbein (Ed.), Attitude theory and measurement. New York: John Wiley & Sons, Inc., 1967.

Fishbein, M. Attitude and the prediction of behavior. In M. Fishbein (Ed.), op.cit.

Fishbein, M., & Ajzen, I. Belief, attitude, intention and behavior: An introduction to theory and research. Reading, Mass.: Addison-Wesley, 1975.

Fleming, M., & Sheikhian, M. Influence of pictorial attributes on recall memory. Audio-Visual Communication Review, 1972, 20(4), 423-441.

Frew, D. Transcendental Meditation and productivity. Academy of Management Journal, 1974, 17, 362-368.

Friend, K.E. Effects of the Transcendental Meditation program on work attitudes and behavior. In D.W-Orme-Johnson & J.T. Farrow (Eds.), op.cit.

Gagne, R.M. The conditions of learning (3rd ed.). New York: Holt, Rinehart & Winston, 1977.

Gagne, R.M., & Briggs, L.J. Principles of instructional design. New York: Holt, Rinehart & Winston, 1974.

Gerst, M.S. Symbolic coding processes in observational learning. Journal of Personality and Social Psychology, 1971, 19, 9-17.

Glueck, B.C., & Stroebe, C.F. Biofeedback and meditation in the treatment of psychiatric illness. Comprehensive Psychiatry, 1975, 16, 303-321.

Gordon, M.C. Some effects of stimulus presentation, rate, and complexity on perception and retention. American Journal of Mental Deficiency, 1968, 73, 437-445.

Heaton, D.P., & Orme-Johnson, D.W. The Transcendental Meditation program and academic achievement. In D.W. Orme-Johnson & J.T. Farrow (Eds.), op.cit.

Hjelle, L. Transcendental Meditation and psychological health. Perceptual and Motor Skills, 1974, 39, 623-628.

Hoban, C.F. The useable residue of educational film research. In W. Schramm (Ed.), New teaching aids for the American classroom. Stanford, Calif.: Stanford University Institute for Communications Research, 1960.

Hoban, C.F., & Van Ormer, E.B. Instructional film research, 1918-1950. New York: Arno Press/New York Times, 1970.

Honsberger, R.W., & Wilson, A.F. Transcendental Meditation in treating asthma. Respiratory Therapy: The Journal of Inhalation Technology, 1973, 3, 79-80.

Hunter, I.M.L. Memory (Rev. ed.). London: Penguin Books, 1964.

James, W. The varieties of religious experience, a study in human nature. New York: The Modern Library, 1936.

Kanner, J.H. The instructional effectiveness of color in T.V.: A review of the evidence. Stanford, Calif.: ERIC Clearinghouse on Educational Media and Technology, 1968.

Kory, R., & Hufnagel, P. The effect of the Science of Creative Intelligence course on high school students: A preliminary report. In D.W. Orme-Johnson & J.T. Farrow (Eds.), op. cit.

Krathwohl, D.R., Bloom, B.S., & Masia, B.B. Taxonomy of Educational Objectives. Handbook two: Affective Domain. New York: David McKay, 1964.

Kubie, L.S. The psychiatrist considers curriculum development. Teachers College Record, 1949, 50, 241-246.

Lazar, Z., Farwell, L., & Farrow, J.T. The effects of the Transcendental Meditation program on anxiety, drug abuse, cigarette smoking, and alcohol consumption. In D.W. Orme-Johnson & J.T. Farrow (Eds.), op. cit.

Levie, W.H., & Dickie, K.E. The analysis and application of media. In R.M.W. Travers (Ed.), The second handbook of research on teaching. Chicago: Rand McNally & Co., 1973.

Levin, S. The Transcendental Meditation technique in secondary education. Unpublished doctoral dissertation, University of California at Berkeley, 1976.

Likert, R. The method of constructing an attitude scale.  
In M. Fishbein (Ed.), op.cit.

Lipton, L. The Super-8 book. San Francisco: Straight  
Arrow Books, 1975.

Loveless, N.E., Brebner, J., & Hamilton, P. Bisensory  
presentation of information. Psychological Bulletin,  
1970, 73(3), 161-199.

MacCallum, M.J. The Transcendental Meditation program  
and creativity. In D.W. Orme-Johnson & J.T. Farrow  
(Eds.), op.cit.

Maharishi International University. Science of Creative  
Intelligence. Livingston Manor, N.Y.: MIU Press, 1974.

Maharishi International University. Perfect health and  
immortality. Livingston Manor, N.Y.: MIU Press, 1980.

Maharishi Mahesh Yogi. The science of being and the  
art of living. Los Angeles: SRM Publications, 1966.

Martorella, P.H. Concept learning: Designs for instruction.  
Scranton, N.J. Intext Educational Publishers, 1972.

Maslow, A.H. Motivation and personality (2nd ed.). New  
York: Harper & Row, 1970.

Maslow, A.H. Religions, values, and peak experiences.  
Markham, Ont.: Penguin Books, 1976.

May, M.A., & Lumsdaine, A.A. Learning from films. New  
Haven, Conn.: Yale University Press, 1958.

Mielke, K.W. Media-message interactions in T.V.  
Viewpoints (Indiana School of Education), 1970, 46,  
15-32.

Miller, H.R., & Booth, G.D. Effectiveness of monochrome  
and color presentations in facilitating affective  
learning. Audio-Visual Communication Review, 1974,  
22(4), 409-422.

Miskiman, D.E. Performance on a learning task by subjects  
who practice the Transcendental Meditation technique.  
In D.W. Orme-Johnson & J.T. Farrow (Eds.), op.cit.



Murphy, G. Human potentiality. Supplement to the Journal of Social Issues, 1953, 7(4), 5-19.

Nidich, S., Seeman, W., & Dreskin, T. Influence of Transcendental Meditation: A replication. Journal of Counselling Psychology, 1973, 20, 565-566.

Nidich, S., Seeman, W., & Seibert, M. Influence of the Transcendental Meditation program in state anxiety. In D.W. Orme-Johnson & J.T. Farrow (Eds.), op.cit.

Nie, N., Hull, C.H., Jenkins, J.G., Steinbrenner, K., & Bent, D.H. Statistical package for the social sciences (2nd ed.). Toronto: McGraw-Hill, 1977.

Nugent, G.C., Tipton, T.J., & Brooks, D.W. Task, learner, and presentation interactions in television production. Educational Communication and Technology, 1980, 28(1), 30-38.

Olson, M.C. A study of physiological response to film, video, audio, and print. International Journal of Instructional Media, 1977/78, 5, 87-93.

Oppenheim, A.N. Questionnaire design and attitude measurement. London: Heinemann Educational Books Ltd., 1966.

Orme-Johnson, D.W., & Farrow, J.T. (Eds.). Scientific research on the Transcendental Meditation program: Collected papers (Vol. 1). West Germany: Maharishi European Research University Press, 1976.

Osgood, C.E., Suci, G.J., & Tannenbaum, P.H. The measurement of meaning. Urbana, Ill.: University of Illinois Press, 1967.

Otis, L.S. If well-integrated but anxious, try T.M. Psychology Today, 1974, 7(11), 45-46.

Penner, W.J., Zingle, H.W., Dyck, R., & Truck, S. Does an in-depth Transcendental Meditation course effect change in the personalities of the participants? Western Psychologist (Canada), 1974, 4, 104-111.

Peterson, R.C., & Thurstone, L.L. Motion pictures and social attitudes of children. New York: Macmillan, 1933.

Plato. [The republic] (A.D. Lindsay, Trans.). London: Dent, 1976.

Rigby, B. Higher states of consciousness through the Transcendental Meditation programme. A literature review. Journal of Chronic Disease and Therapeutic Research (New Delhi), 1977, 1.

Salómon, G. Interaction of media, cognition, and learning. San Francisco: Jossey-Bass, 1979.

Satz, E. Cognitive bases of human learning. Illinois: Dorsey Press, 1971.

Schenkluhn, H., & Geisler, M. A longitudinal study of the influence of the Transcendental Meditation program on drug abuse. In D.W. Orme-Johnson & J.T. Farrow (Eds.), op.cit.

Schlater, R. Effect of speed of presentation on recall of television messages. Journal of Broadcasting, 1970, 12(2), 207-214.

Seeman, W., Nidich, S., & Banta, T. Influence of Transcendental Meditation on a measure of self-actualization. Journal of Counseling Psychology, 1972, 19, 187-198.

Severin, W. The effectiveness of relevant pictures in multiple-channel communications. Audio-Visual Communication Review, 1967, 15(4), 386-401.

Sewell, E.H., Jr., & Moore, R.L. Cartoon embellishments in informative presentations. Educational Communication and Technology, 1980, 28(1), 39-46.

Shafii, M., Lavelly, R.A., & Jaffe, R.D. Meditation and marijuana. American Journal of Psychiatry, 1974, 131, 60-63.

Shapiro, J. The relationship of the Transcendental Meditation program to self-actualization and negative personality characteristics. In D.W. Orme-Johnson & J.T. Farrow (Eds.), op.cit.

Shacter, H. The T.M. program in the classroom: A psychological evaluation of the Science of Creative Intelligence. In D.W. Orme-Johnson & J.T. Farrow (Eds.), op.cit.

Siegel, S. Nonparametric statistics for the behavioral sciences. New York: McGraw-Hill, 1956.

Simonson, M.R. Media and attitudes: A bibliography - Part 2. Educational Communication and Technology, 1980, 28(1), 47-61.

- Stern, M. The effects of the Transcendental Meditation program on trait anxiety. In D.W. Orme-Johnson & J.T. Farrow (Eds.), op.cit.
- Taba, H. Curriculum development - Theory and practice. New York: Harcourt, Brace & World Inc., 1962.
- Tjoa, A. Meditation, neuroticism and intelligence. [Behavior: Journal of Psychology] Gedrag: Tijdschrift voor Psychologie, 1975, 3, 167-182.
- Tjoa, A. Some evidence that the Transcendental Meditation program increases intelligence and reduces neuroticism as measured by psychological tests. In D.W. Orme-Johnson & J.T. Farrow (Eds.), op.cit.
- Travers, R.M.W. (Ed.). The second handbook of research on teaching. Chicago: Rand McNally & Co., 1973.
- Tuckman, B.W. Conducting educational research. New York: Harcourt, Brace, Jovanovich Inc., 1972.
- Tuckman, B.W. A retrospective and prospective on technology in education: The saw-tooth curve and the process of change. Educational Technology, 1980, 20(1), 7-10.
- Tyler, R.W. Utilization of technological media, devices and systems in the schools. Educational Technology, 1980, 20(1), 11-15.
- Van Mondfrans, A.P., & Travers, R.M.W. Learning of redundant material presented through two sensory modalities. Perceptual and Motor Skills, 1964, 19, 743-751.
- Wallace, R.K., & Benson, H. The physiology of meditation. Scientific American, 1972, 226, 64-90.
- Wells, R.F., Van Mondfrans, A.P., Postlethwait, S.N., & Butler, D.C. Effectiveness of three visual media and two study formats in teaching concepts involving time, space, and motion. Audio-Visual Communication Review, 1973, 21(2), 233-242.
- White, G., & Rosenthal, . Demonstration and lecture in information transformation: A field experiment. The Journal of Experimental Education, 1974, 43(4), 90.
- Williams, R.C. Film shots and expressed interest shots. Speech Monographs, 1968, 35(2), 166-169.

Worthen, B.R. Discovery and expository task presentation in elementary mathematics. Journal of Educational Psychology Monograph, 1968, 59 (1, Pt. 2).

Zamarra, J.W., Besseghini, I., & Wittenberg, S. The effects of the Transcendental Meditation program on the exercise performance of patients with angina pectoris. In D.W. Orme-Johnson & J.T. Farrow (Eds.), op.cit.

APPENDIX A

Script for Tape-slide Show

"Red Light, Green Light"

Script for Film-based Videotape

"Cycles"

"Red Light, Green Light"VIDEOAUDIOSlide number & image

1	Black slide	
2-6	Titles: SCI H.S. Course Lesson 4 Progressive and Evolutionary Qualities of Creative Intelligence, Red Light, Green Light	MUSIC (15 secs.)
7	Dawn	NARRATOR: (7) Cycles exist at every level of creation... in the daily rhythm of our lives, in the rising and setting of the sun, the seasonal changes... (8-11)
8	Daisy	MUSIC (18 secs.) 1 slide per
9	Country 5:00 a.m.	3.6 secs.
10	Tree 5:00 p.m.	Guitar.
11	Fall reflections	NARRATOR:
12	Leaves - fall	(12) Not only does change create beauty and liveliness but it's also essential for evolution, and growth. (13)
13	Dill seed	MUSIC (8 secs.) 1 slide per
14	Dandelion seed	4. secs.
		NARRATOR:
15	Winter scene	(14) Evolutionary changes takes place in a predictable pattern: (15) first, a silent or resting period, and then an active, growing period. (16-23)
16	Rose bud	MUSIC (32 secs.) 1 slide per 4
17	Daisy	secs.
18	1/4 open rose	Guitar - quiet to lively.
19	3/4 open rose	
20	Young girl	
21	3/4 open rose	
22	Full rose	
23	Young woman	

VIDEOAUDIOSlide number & image

24 Mature pink rose

25 Dead rose

26 Rose hip

27 Rose bud

28

29 Lily

30 Graphic: "Rest"

31 Terry K.

32 Graphic:  
"Activity  
Rest"

NARRATOR:

(24) It may seem to us that the story of the rose ends when it begins to shrivel and die (25) but if we continue to observe the dying flower we will see (26) that the rose hip formed in the fall time houses dozens of potential roses, all in seed form. Thus not only is energy conserved and recycled, but even when things seem to be disintegrating, (27) life is growing and evolving towards more.

MUSIC (10 secs.)

Fade out begins

NARRATOR:

(28) Let's have another look at the silent level of plant life. The seed stage is that quiet, resting period that precedes every surge of growth. (29) The fragrant blossom of the growing stage always begins in the perfect stillness of a seed.

MUSIC (10 secs.)

NARRATOR:

If in nature growth is always preceded by rest, do we, as a part of nature, have similar rhythms or cycles? (30) We do know that when we have a good night's sleep we feel more energetic, clearer and happier during the day. What happens when we don't get enough rest? (31)

TERRY KANNER:

If I don't get enough sleep, I walk around like a zombie. I'm all grouchy. (32)

NARRATOR:

Observing the seasons and cycles of rest and activity in plant life we can conclude that rest is the basis of activity. Growth follows

VIDEOAUDIOSlide number & image

- 33 Graphic:  
"More dynamic  
activity  
Deeper rest"  
from the silence of winter, from the stillness of the seed. (33)  
Similarly, in our own lives, we feel fresher and livelier when we are well rested. (PAUSE) (34)
- 34 Girl on horseback  
NARRATOR:  
If rest is the basis of activity, then clearly deep rest must give rise to more dynamic activity. (35)
- 35 Graphic:  
"Rest  
Deeper rest"  
NARRATOR:  
This is where Transcendental Meditation comes in. During T.M., both mind and body experience a very profound rest. This rest is almost twice as deep as the rest one gains through sleep. (36)
- 36 Reiford M.  
REIFORD MILLER:  
It's really deep - usually a deep rest in the mornings when I meditate. It really makes me feel good afterwards. (37)
- 37 Terry H.  
TERRY HILL:  
Doing a 16 minute meditation is like taking a three hour nap, it seems. It really helps you a lot. (38)
- 38 Ann-Marie P.  
ANN-MARIE PHELAN:  
After I come out of T.M., I feel very refreshed. Well, it makes me feel like more alive, and more, like, ready to go, and not dragging into school every morning all dreary-eyed. (39)
- 39 Meditator  
NARRATOR:  
How does T.M. give us such a deep rest? It's simple. The mind settles down, becomes very still and silent, and the body in turn settles down to a state of deep rest. (40) This silent state of the mind is the source of all thinking and creativity. The deep
- 40 Graphic:  
"Mind-Body  
P.A. D.R."



VIDEOSlide number & imageAUDIO

rest in the body provides the basis for more dynamic activity.

41 Phelan family

Now for a more practical question: (41) Does the restfulness we experience during T.M. remain with us during the day? If so, how does it affect our activity? Do meditators notice that they become more active and creative? (42)

42 Patrick P.

PATRICK PHELAN:  
I used to be a very nervous kid. Very nervous. And now since I took T.M. it's calmed me down. People have noticed... I used to be fidgety, I used to play with everything. Now I notice when I sit down I don't have to touch anything. (43)

43 Terry K.

TERRY KANNER:  
After I finish meditating, I'm not as excited as I was maybe before. Like, if I'm really excited, or something bad happened, I get over it after. My emotions come out, when I meditate. (44)

44 Sheila K.

HY KANNER:  
I find the person that has benefited the most from T.M. is my wife, actually. Sheila has really gotten into it. And I'll verify - I'll tell you that she definitely has more energy now than she did before, because I see her doing things she's never done before in her life, and at her age now she's taking on sports. (45) She was never athletic before, and she really wasn't interested in them, and she's learned to be a little more competitive, and a little more into sports.

45 Sheila and Terry jogging

NARRATOR:  
Where does all this energy come from? (46) Let's take an example from

46 Bow and arrow

VIDEOAUDIOSlide number & image

- 47 Arrow in target
- 48 Mental potential
- 49 Charles K.
- 50 Ann-Marie and Patrick P.
- 51 Graphic:  
"Mind-Body  
Coordination"
- 52 Boy catching ball
- 53 Boy with ball in hand
- 54 Terry K.
- archery. The further back we draw the arrow on the bow, the more potential energy it gains. If we pull it back as far as possible and then let go, its path is straighter, (47) it flies further... it's much more likely to hit the target. (48) In the same way, meditators find they realize their goals more easily. The potential of the mind expands, and limitations begin to dissolve. (49)
- CHARLES KIDDELL:  
I'd always had pretty low math marks up until the year I started T.M. And the next year my math marks jumped up a bit, and the next year a bit more. And they started at 55-56 and now they're 98. It was the better concentration, I think that I got from T.M. (50)
- ANN-MARIE PHELAN:  
I realized that in ballet I was quicker, like if the teacher told me to do something I'd do it perfectly and maybe have one or two mistakes. Whereas before she'd have to tell me, and maybe I did a couple of things wrong, and she'd have to tell me again. I keep things in my mind a little better. (51)
- NARRATOR:  
The regular practice of T.M. gradually dissolves fatigue and stress in the body and coordination between (52) mind, body and environment improves. These meditators found themselves becoming more (53) flexible, more adaptable, and began finding new solutions to old problems. (54)
- TERRY KANNER:  
I've been enjoying school work a

VIDEOAUDIOSlide number & image

lot because of meditation, and I've been able to concentrate much more. Like, I've been doing a lot of drawing, and it comes out pretty good. I have to concentrate, and everything. My hands don't shake anymore, only sometimes. (55)

55 Patrick P.

PATRICK PHELAN:  
Like I said the marks are going up and everything's going well. I feel more confident in sort of everything I do, you know. I won't say maybe I'll do it, maybe I'll do this; I just say I'll do it, I'll do it... and I'll do it. It's always a positive answer. (56)

56 Ann-Marie P.

ANN-MARIE PHELAN:  
I find that I've been doing things more myself and not asking other people to help me and bothering them. (57)

57 Graphic:  
"Rest and  
Activity"

NARRATOR:  
The effects of T.M. are, of course, cumulative. And like all rhythms in nature, are based on the regular alternation of rest and activity. Although we don't expect overnight transformations, we do expect that over time the good effects we feel during meditation grow and last for longer periods during the day. (58)

58 Joe M.

JOE MASON:  
I didn't know what I was doing. I just went to the Centre with my parents and started it and I thought it was really useless at first. And then I began to notice changes. Like, I was calmer and I started getting things done better.

VIDEOAUDIOSlide number & image

59 Graphi:  
"Regularity"

NARRATOR:

The longer, and the more regularly we meditate the more energy we accumulate, and in using that energy we eventually stabilize a smooth, rested, orderly feeling in activity. (59) Until we establish the habit of regular meditation we may find that we forget occasionally. But once we realize that the benefits we receive depend on how regularly we meditate, then we never miss. (60)

60 Joe M.

JOE MASON:

I guess that I've been pretty regular all the time. You know, I have good meditations, but sometimes it's pretty boring meditating. Does anybody here find it boring sometimes? (61)

61 Terry K.

TERRY KANNER:

In a way, when I started T.M., I was really excited and everything. But now it's sort of I'm used to it and sometimes I'm not so crazy about it, but most of the time I like meditating. Like when I have something to do and I have to miss it to meditate, that's when I'm not crazy about it. (62)

62 Group

SIMON KIDDELL:

I find when I meditate regularly, things are better, but it's not. - when I don't meditate regularly, it's not that I don't want to meditate, it's that I forget. It's sort of rare, really, that you have a boring meditation.

63 Simon K.

(63) That's the good thing about meditation, it's so quick, so fast ... but when I do have specific problems, let's say, exam time, I'll just, because of my nervousness, I'll remember. (64)

VIDEOAUDIOSlide number & image

- 64 Terry H. and Charles K. TERRY HILL:  
Yeah, you can feel the difference when you stay regular. You notice like, the change, the difference of how you feel, how you relax, how you get along with people. (65)
- 65 Terry H. Like, there was one time when I hadn't done it for quite awhile, and nobody in my family had. And things just went snap! And none of us got along and everything was really going bad. And then - my mom - she makes it sound like a punishment, you know: "Go meditate, you'll feel better." Then afterwards everything would be just great, we'd all get along better. (66)
- 66 Simon K. SIMON KIDDELL:  
Well, I do feel much better when I'm regular. I feel better, I feel more energetic but at the same time more relaxed. (PAUSE) (67)
- 67 Graphic:  
"Fulfillment" NARRATOR:  
With regular practice we begin to accomplish more. Satisfaction increases, and this in turn produces more happiness, (68) more strength and confidence. The inner harmony we feel is naturally reflected in our relations with others. (69)
- 68 Radiant couple
- 69 Terry K. TERRY KANNER:  
I don't fight with my mother as much now. When I didn't meditate, it was fighting every five minutes; now it's not. (70)
- 70 Terry K., Mom and sister hugging HY KANNER:  
I find that they're more into other people. They understand other people's feelings a lot better than they used to. Now

VIDEOAUDIOSlide number & image

Terry seems to sense that she may be hurting somebody else; so she'll watch what she says; but before, she wouldn't care what she said. (71)

71 Joe M., CU

JOE MASON:

Before I started to meditate, I didn't have very many friends, you know. I did make some really good friends, but nowadays I have friends bulging out of my pockets, you know. (72) I

72 Joe M. with friend

mean ... and it's funny, because I don't feel all pulled apart by people. When one kid will say "Can you come and help me with my homework?" and the other kid will say, "Do you want to come and play baseball?" .. (73) and I find that I can get around those things, I mean, I find I can fit both things in. Like helping student A with his homework and going with student B to a baseball game. I get things done more easily. (74)

73 Joe M. - casual

74 Simon K.

SIMON KIDDELL:

Since I started meditating, my social life, my group of friends has grown substantially. I used to have... Now I have a lot more friends in general who I can phone up and talk to or whatever. (75)

75 Terry H. in group

TERRY HILL:

I don't think I noticed much change in my inner feelings. But it is noticeable how you get along with people. You're more relaxed so you're happy. (76)

76 Terry H. - side CU

Like I mean, if you're tired or uptight or something.. nothing seems to go right and everything drops in school and your friends drop, you know. But with the T.M., it relaxes you, you get along with

VIDEOAUDIOSlide number & image

people better, everything seems to go fine. (77)

77 Graphic:  
"Source of Thought"

NARRATOR:  
By doing less, we accomplish more. The attention goes inward to the source of thought, where energy, intelligence, and happiness exist in potential. (78)

78 Simon K.

SIMON KIDDELL:  
Usually, like when I'm doing, let's say, a group meditation. I go to a meeting and like, you know, there are 200 people in a room and they're all meditating. (79)

79 Group meditation

That is a really good feeling, because you just sit there and it's total silence and you just feel so good, so positive. It's .... excellent.

80 Rose bud

NARRATOR:  
Bring the mind to the silence of the inner self and enjoy. (80)  
When the silence becomes integrated with lively activity, (81) we experience a smooth, effortless flow of energy and intelligence, which makes everything we do easier, more enjoyable, more useful for our own development and for our environment. (82)

81 Hands on piano

82 Terry K.

TERRY KANNER:  
I'm very aware. It took a long time, though. I think I'm beginning to develop C.C. I think. Just a little bit. Just a touch, just a little touch. My friend would say something and I would be thinking of it before she'd say it and things like that. (83)

83 Joe M.

JOE MASON:  
The T.M. teachers call it an experience of cosmic consciousness. I don't know if that's true or not,

VIDEOSlide number & imageAUDIO

maybe they're just pulling my leg. But I was telling some information to the class. And when I got up to tell the information, I felt as if I was sitting down in the class and somebody else was up there for me and I was listening to myself. But I knew I was doing it. And my mind wasn't in control. I mean, actually I really didn't know what I was saying. But I said it, and I said it - uh - well. And - uh - I did a pretty good job on it! Oh, I felt great, you know. I hardly even knew the class was there. I felt as if I was telling something to my Mom or Dad, and that's usually very - very casual, but I wasn't telling it very casually. I was telling it like I would usually tell something in school, but it felt as if I was telling it casually. (84)

84 Mason family

PAT MASON:

Our family life has changed in three years. I started about three weeks before Joe and Joseph. Joe, who's a complete sceptic, (85) watched me for three weeks, and decided there was something in it, and now he's an avowed meditator. I think I've noticed the biggest difference after these enlightenment courses, especially in Joseph. (86) It seems to have shown up a lot in him. He comes home from school with little stories which he doesn't realize what is happening, but his compassion, his heart is growing so quickly, (87) and, um, his math, and again, his interest in sports... He never had any interest in sports and now he's very interested in doing any that he can. (88) And, um, I think - uh - T.M. is

85 Pat Mason

86 Joe M. in class

87 Joe M. - MS

88 Pat M. - MS



VIDEOAUDIOSlide number & image

probably going to be the greatest influence on the family that we have ever seen. I think families who are having problems and - uh - will just find that there aren't any problems, only solutions. And that they can really live the way I think ideally we - we're supposed to. And it's not idealism. It really does happen. (89)

89- Sunrise series

MUSIC

91

Guitar and flute

92 Seagull

93 Maharishi

NOTE: THE PROGRAM COULD BE STOPPED HERE UNTIL THE DISCUSSION ON REGULARITY. THEN CONTINUE.

94 "An interview with one of these students two years later."

SILENCE

95 Joe M.

INTERVIEWER:

Joe, you were interviewed for this Transcendental Meditation program about two years ago. Since then, have you noticed any changes in particular, either in your meditation experience or outside of meditation?

JOE MASON:

Well, two years ago I said something to the effect that T.M. was boring. Well, it's not boring anymore. When I do my T.M. whenever I wake up everything seems bigger and brighter and beautiful. You see? And I'm always anxious to finish so I can wake up and get the full effect. But the thing is, that even when I'm meditating I get these terrific experiences. It's not boring - it's very beautiful - it's a very beautiful experience. Even after

VIDEOAUDIOSlide number & image

I wake up the experience stays  
with me for a long time.

INTERVIEWER:

Do you still find that you have  
a lot of friends? (96)

96 Joe M. (side view)

JOE MASON:

Well, I have even more friends.  
See, just about everybody seems  
to like me now. I don't want to  
sound vain or anything, but I  
have a lot of friends  
and I get along with a lot of  
people.

INTERVIEWER:

You spoke about one experience --  
um - that you called an experience  
of cosmic consciousness...

JOE MASON:

The experience of cosmic conscious-  
ness - or "if they're pulling my  
leg", I was talking about - was  
like for just a brief period of  
time, or sometimes even a long  
period of time. I - all of a  
sudden I feel differently about  
things.. it's not that I feel  
differently, it's that everything  
feels different. You see? Now  
it seems to feel like that most  
of the time. You know, I always  
look at things in a different way.

INTERVIEWER:

What do you mean by different?

JOE MASON:

More silence within and more  
silence and peace from other  
things. And other people.

97 Credits

98 Credits

99 Credits

"Cycles"VIDEOAUDIOSlide number & imageTitles:MUSIC:

- |  |  |
|--|--|
| 1 Science of Creative Intelligence                                   | String ensemble.                           |
| 2 Progressive and Evolutionary<br>Qualities of Creative Intelligence |  |
| 3 Lesson 4: Progress towards more<br>and more.                       |  |
| 4 "CYCLES"   | Guitar solo.                               |
| 5 "CYCLES" supered over winter<br>scene.                             |  |
| 6 Pan on jackpine to snow.   |  |
| 7 Waterfall.   | Flute solo.                                |
| 8 Water drop.  |  |
| 9 Lily opens (time-lapse).   | Theme taken up by<br>ensemble and guitar.  |
| 10 CU Single seedling.   |  |
| 11 Tree bud.   |  |
| 12 Slow zoom on tree buds.   |  |
| 13 Yellow crocus.  | Flute solo.                                |
| 14 Purple crocus.  |  |
| 15 Rose opens (time-lapse).  |  |
| 16 MS Narcissus.   |  |
| 17 CU Narcissus.   |  |
| 18 MS Apple blossoms.  | Same theme, flute,<br>guitar and ensemble. |
| 19 CU Apple blossom.   |  |
| 20 Pan on garden in full bloom.                                      |  |

VIDEOAUDIOSlide number & image

- |    |  |  |
|----|--|--|
| 21 | Rose opens (time-lapse)  | Flute solo.  |
| 22 | CU Full rose starting to fade.   |  |
| 23 | Sun sets (time-lapse) (fade out).  |  |
| 24 | Soft focus:<br>Slow pan up dried grasses to red leaves of bushes (fall).             | Guitar - slow and pensive - is joined by ensemble and flute. To end. |
| 25 | CU Milkweed seeds.   |  |
| 26 | CU Fall leaves.  |  |
| 27 | LS Farm garden in late fall. Slow zoom in, then pan and focus on dill plant in seed. |  |
| 28 | CU (soft focus) on twisted dry leaf.   |  |
| 29 | Camera focuses on girl lying down in field mime-fashion.                             |  |
| 30 | MS Fall leaves.  |  |
| 31 | CU Single torn leaf.   |  |
| 32 | Sun sets (time-lapse) (fade out).  |  |
| 33 | Still - winter scene.  | Guitar solo.   |
| 34 | Pan on jackpine.   |  |
| 35 | Rose opening.  | Flute solo (repeat of first piece).                                  |
| 36 | Seedlings growing (time-lapse).  |  |
| 37 | Zoom on tree bud.  |  |
| 38 | Yellow crocus.   | Guitar and ensemble join flute.                                      |

VIDEOAUDIOSlide number & image

39 Lily opens.

40 Sun sets (time-lapse).

41. Titles.

APPENDIX B

Pilot Summative Evaluation

Instructions for Teacher

"Introduction" for Test Groups (All)

Pilot Summative Evaluation

Instructions for Teacher

"Introduction" for Test Groups (All)

Group A (Treatment)

1. Welcome.

2. General Introduction:

We are going to show you a videotape and tape-slide show designed as a part of the Science of Creative Intelligence course for high school students, and then we will ask you to fill out a couple of questionnaires to give your opinion of some things. You would like to do that? Good.

First I will tell you a few things about the Science of Creative Intelligence and Transcendental Meditation.

3. Introduction to the Science of Creative Intelligence:

The Science of Creative Intelligence is a new course taught in high schools and is designed by Maharishi International University especially for meditating students.

The Science of Creative Intelligence has two aspects:

1) theoretical, to give knowledge about creative intelligence; and 2) practical, to give the experience of creative intelligence during the practice of Transcendental Meditation (T.M.).

The first year course involves the study of the qualities of creativity and intelligence in nature, in our own lives, and in the lives of great men.

4. Introduction to Transcendental Meditation:

T.M. (Transcendental Meditation) is a simple, natural, and effortless technique which allows the mind to settle down and become very quiet. When mind quiets, body also settles down due to the link between mind and body. Because of the deep rest both mind and body gain during T.M., one feels refreshed, more energetic and clearer after meditating.

5. Just before showing the audio-visuals, read:

The audiovisuals help to bring out some of the ideas contained in one of the lessons, and will give you an idea of the content of an S.C.I. lesson. They will help you to relate and compare the progressive and evolutionary qualities of creative intelligence found in natural cycles of growth to those same qualities evident in our own growth.

6. Show tape-slide show.

7. Administer tape-slide evaluation forms.

8. Show film (videotape).

9. Administer film evaluation form.

10. Just before giving out attitude questionnaire, say:



Please be very honest in your answers. You're allowed to disagree!

Group B (Control)

1. Welcome.

2. General Introduction:

Before we show you the videotape and the tape-slide show, we would like to have your opinion of certain things related to meditation. You would like to answer a questionnaire? Good. Please be very honest in your answers - you're allowed to disagree!

First, you should know a bit about the Science of Creative Intelligence course before filling out the forms.

3. Introduction to the Science of Creative Intelligence:

The Science of Creative Intelligence is a new course taught in high schools and is designed by Maharishi International University especially for meditating students.

The Science of Creative Intelligence has two aspects:

1) theoretical, to give knowledge about creative intelligence; and 2) practical, to give the experience of creative intelligence during the practice of Transcendental Meditation (T.M.).

The first year course involves the study of the qualities of creativity and intelligence in nature, in our own lives and in the lives of great men.

4. Introduction to Transcendental Meditation:

T.M. (Transcendental Meditation) is a simple, natural and effortless technique which allows the mind to settle down and become very quiet. When mind quiets, body also settles down due to the link between mind and body. Because of the deep rest both mind and body gain during T.M., one feels refreshed, more energetic and clearer after meditating.

5. Attitude questionnaires on T.M. and S.C.I. are filled out.

6. Just before showing audio-visuals, read:

The audio-visuals help to bring out some of the ideas contained in one of the lessons, and will give you an idea of the content of an S.C.I. lesson. They will help you to relate and compare the progressive and evolutionary qualities of creative intelligence found in natural cycles of growth to those same qualities evident in our own growth.

APPENDIX C

Questionnaires

## QUESTIONNAIRE

STUDENT

AGE

PLEASE CIRCLE THE LETTERS THAT BEST REPRESENT YOUR OPINION  
AT THIS MOMENT ON THE STATEMENTS BELOW. IF A STATEMENT  
DOES NOT APPLY TO YOU, PLEASE WRITE "NA" BESIDE IT.

CODE: Strongly Agree Agree Neutral Disagree Strongly Disagree  
SA A N D SD

THANK YOU FOR YOUR COOPERATION!

- |    |   |    |   |   |   |    |
|----|---|----|---|---|---|----|
| 1. | I feel meditation is good for most people.  | SA | A | N | D | SD |
| 2. | I feel meditation is (or would be) good for me.                                   | SA | A | N | D | SD |
| 3. | I think my life would be more fulfilling if I were to start the TM technique.     | SA | A | N | D | SD |
| 4. | People who meditate regularly probably don't get all the benefits they claim.     | SA | A | N | D | SD |
| 5. | I think my life would be happier if I were to practice TM regularly.              | SA | A | N | D | SD |
| 6. | I feel I don't need transcendental meditation.                                    | SA | A | N | D | SD |
| 7. | If my parents consent I would like to begin the TM technique.                     | SA | A | N | D | SD |
| 8. | People who meditate regularly seem weird.   | SA | A | N | D | SD |
| 9. | I would like to have the opportunity to talk more about TM with other meditators. | SA | A | N | D | SD |

- |     |  |    |   |   |   |    |
|-----|--|----|---|---|---|----|
| 10. | TM can have an important effect on my life.  | SA | A | N | D | SD |
| 11. | Most people who do TM regularly seem well balanced.  | SA | A | N | D | SD |
| 12. | Most TM meditators seem relaxed.   | SA | A | N | D | SD |
| 13. | I feel close to nature.  | SA | A | N | D | SD |
| 14. | I feel that natural rhythms and cycles of growth are also reflected in my own life.                | SA | A | N | D | SD |
| 15. | From what I know about persons who practice TM, they are quite likeable.                           | SA | A | N | D | SD |
| 16. | I think that if people want to gain good results with TM, they should not miss more than:          |    |   |   |   |    |
|     | a. 1-5 meditations per year.   | SA | A | N | D | SD |
|     | b. 6-11 meditations per year.  | SA | A | N | D | SD |
|     | c. 1 meditation per month.   | SA | A | N | D | SD |
|     | d. 2-3 meditations per month.  | SA | A | N | D | SD |
|     | e. 1-3 meditations per week.   | SA | A | N | D | SD |
|     | f. 4-6 meditations per week.   | SA | A | N | D | SD |
|     | g. 1 or more meditations per day.  | SA | A | N | D | SD |
| 17. | I think the Science of Creative Intelligence course is going to be boring.                         | SA | A | N | D | SD |
| 18. | If the Science of Creative Intelligence course were offered in my school, I would like to take it. | SA | A | N | D | SD |
| 19. | I think the SCI course would help me understand more about myself.                                 | SA | A | N | D | SD |
| 20. | I feel the SCI course would help me understand more about life in general.                         | SA | A | N | D | SD |

21. If the SCI course is not offered in my school, I would like to take it at the TM centre.

SA A N D SD

IF YOU HAVE NOT BEGUN THE TM TECHNIQUE, RESPOND TO THE FOLLOWING QUESTION BY IMAGINING HOW YOU WOULD ANSWER IF YOU WERE PRACTICING THE TM TECHNIQUE:

(CHOOSE ONE BY CIRCLING THE LETTER BESIDE YOUR CHOICE)

22. Personally, I would like to keep the following routine of meditation:

- a. Missing not more than 7-10 meditations per week;
- b. Missing not more than 4-6 per week;
- c. Missing not more than 1-3 per week;
- d. Missing not more than 2-3 per month;
- e. Missing not more than 1 per month;
- f. Missing not more than 6-11 per year;
- g. Missing not more than 5 per year;
- h. Not meditating.

23. I feel quite sure that I will be able to keep the above routine of meditation.

SA A N D SD

IF YOU HAVE NOT BEEN INSTRUCTED IN THE TM TECHNIQUE, PLEASE ANSWER AS THOUGH YOU WERE PLANNING TO PRACTICE IT.

24. Supposing that sometime in the future the following situations occur during your normal time for meditation. Please circle the letters that best indicate whether you will meditate in the situation described.

CODE: SA: I will definitely meditate; A: I will probably meditate; N: I don't know; D: I probably won't meditate; SD: I definitely won't meditate.

- a. You have exams to study for. SA A N D SD
- b. A friend telephones. SA A N D SD
- c. A friend arrives for an unexpected visit. SA A N D SD

- d. Friends are visiting and show no signs of leaving. SA A N D SD
- e. You come home from school exhausted and have a very busy evening ahead. SA A N D SD
- f. You are travelling in a car as a passenger and there won't be time to meditate anywhere else before supper. SA A N D SD
- g. The only place you have to meditate is the metro station. SA A N D SD
- h. You are in the middle of a good game with friends away from home. SA A N D SD
- i. An interesting show is on T.V. SA A N D SD
- j. You're reading a good book. SA A N D SD
- k. You feel very restless and don't feel like sitting down. SA A N D SD
- l. You're visiting friends who don't know you meditate. SA A N D SD
- m. You're visiting friends who know you meditate. SA A N D SD

STUDENT # \_\_\_\_\_

(Administered at the end of the session.)

PLEASE ANSWER THE FOLLOWING QUESTIONS AS ACCURATELY AS POSSIBLE.

25. If you are presently meditating, please indicate by circling the letter beside the statement closest to your present routine of meditation: You miss about:

- a. 0-5 meditations per year;
- b. 6-11 meditations per year;
- c. 1 meditation per month;
- d. 2-3 meditations per month;
- e. 1-3 meditations per week;
- f. 4-6 meditations per week;
- g. 7 or more meditations per week..

26. Has this presentation made you feel like meditating more regularly?

YES \_\_\_\_\_ NO \_\_\_\_\_

27. Did you know anything about the Science of Creative Intelligence before you were invited to attend this lesson?

YES \_\_\_\_\_ NO \_\_\_\_\_

28. Have you ever heard an introductory lecture on T.M. before?

YES \_\_\_\_\_ NO \_\_\_\_\_

29. Have you ever been instructed in the T.M. technique?

YES \_\_\_\_\_ NO \_\_\_\_\_

If your answer is NO, please proceed to question 33.  
If your answer is YES, please continue.

30. Are you presently practicing the T.M. technique?

YES \_\_\_\_\_ NO \_\_\_\_\_

31. What was the approximate date of your instruction?

\_\_\_\_\_



32. Did you receive the eyes-closed technique?

YES \_\_\_\_\_ NO \_\_\_\_\_

33. If you are no longer meditating, approximately when did you stop? \_\_\_\_\_

STUDENT: \_\_\_\_\_

TAPE-SLIDE EVALUATION FORM

PLEASE CIRCLE THE NUMBER CLOSEST TO YOUR OPINION OF THE TAPE-SLIDE PROGRAMME:

- A. PHOTOGRAPHY      beautiful   1 2 3 4 5 6 7 ugly  
                          clear        1 2 3 4 5 6 7 unclear  
                          colorless   1 2 3 4 5 6 7 colorful
- B. MUSIC              well suited   1 2 3 4 5 6 7 poorly suited  
                          unappealing   1 2 3 4 5 6 7 appealing
- C. SOUND QUALITY      clear        1 2 3 4 5 6 7 unclear
- D. IDEAS                I clearly        I did not  
                          understood   1 2 3 4 5 6 7 understand  
                          logical        1 2 3 4 5 6 7 illogical
- E. NARRATION          interesting   1 2 3 4 5 6 7 boring  
                          unclear        1 2 3 4 5 6 7 clear
- F. INTERVIEWS          boring        1 2 3 4 5 6 7 interesting  
    (Students)           liked        1 2 3 4 5 6 7 disliked  
                          believable   1 2 3 4 5 6 7 unbelievable
- G. GENERAL            interesting   1 2 3 4 5 6 7 boring  
    INTEREST            tiresome     1 2 3 4 5 6 7 enjoyable  
                          good         1 2 3 4 5 6 7 bad  
                          I could        I could not  
                          relate to it   1 2 3 4 5 6 7 relate to it  
                          I would like   I would not  
                          to see another 1 2 3 4 5 6 7 like to see  
                          another

H. Please mention some strong points (what you liked) about the tape-slide programme:

\_\_\_\_\_

---

---

I. Please mention some weak points (what you disliked) about the tape-slide programme:

---

---

---

FILM EVALUATION FORM

PLEASE CIRCLE THE NUMBER CLOSEST TO YOUR OPINION OF THE FILM:

- A. PHOTOGRAPHY      beautiful 1 2 3 4 5 6 7 ugly  
                                  clear 1 2 3 4 5 6 7 unclear  
                                  colorless 1 2 3 4 5 6 7 colorful
- B. MUSIC              well suited 1 2 3 4 5 6 7 poorly suited  
                                  appealing 1 2 3 4 5 6 7 unappealing
- C. IDEAS              I clearly understood 1 2 3 4 5 6 7 I did not understand
- D. GENERAL APPEAL      interesting 1 2 3 4 5 6 7 boring  
                                  tiresome 1 2 3 4 5 6 7 enjoyable  
                                  good 1 2 3 4 5 6 7 bad  
                                  I could relate to it 1 2 3 4 5 6 7 I could not relate to it  
                                  I would like to see another 1 2 3 4 5 6 7 I would not like to see another

E. Please mention some strong points (what you liked) about the film:

---



---



---

F. Please mention some weak points (what you disliked) about the film:

---



---



---

MODIFIED EFLA EVALUATION FORM

TYPE OF MEDIA: \_\_\_\_\_ TITLE: \_\_\_\_\_

TITLE OF EVALUATOR: \_\_\_\_\_

1. For what grade levels would you recommend this production?

Pri \_\_\_\_ Int \_\_\_\_ J.H. \_\_\_\_ S.H. \_\_\_\_ COL \_\_\_\_ ADULT \_\_\_\_

2. List possible audiences, and the purposes for which you think the production could be used. Please rate probable values.

	<u>Audience</u>	<u>Purpose</u>	<u>Low</u>					<u>High</u>
a.	_____	_____	1	2	3	4	5	
b.	_____	_____	1	2	3	4	5	
c.	_____	_____	1	2	3	4	5	

3. Content and organization

a.	Clarity and logical flow	1	2	3	4	5
b.	Accuracy of information	1	2	3	4	5

4. Pedagogical value

a.	Vocabulary appropriate for audience	1	2	3	4	5
b.	General approach appropriate	1	2	3	4	5
c.	Relevance of content to program	1	2	3	4	5
d.	Value for motivating students	1	2	3	4	5
e.	Convenience of format	1	2	3	4	5

5. Image Quality

a.	Aesthetic appeal	1	2	3	4	5
b.	Framing	1	2	3	4	5
c.	Color	1	2	3	4	5
d.	Editing	1	2	3	4	5

6. Sound Quality

a. Clarity (audibility) 1 2 3 4 5

b. Music 1 2 3 4 5

d. Harmony between sound and image 1 2 3 4 5

## 7. Your opinion of the production as a whole:

Poor \_\_\_ Fair \_\_\_ Aver \_\_\_ Good \_\_\_ Very Good \_\_\_ Exc \_\_\_

8. Value of the production for use in the S.C.I. course  
for High School:

Poor \_\_\_ Fair \_\_\_ Aver \_\_\_ Good \_\_\_ Very Good \_\_\_ Exc \_\_\_

## 9. Could another medium be more appropriate and/or economical for the particular objectives of this production?

(Please note that the production is not meant to be complete in itself, but to be used as a teaching aid.)  
\_\_\_\_\_  
\_\_\_\_\_10. Do you know of any other media which achieve the objectives outlined as well or better than this production?  
\_\_\_\_\_  
\_\_\_\_\_

## 11. GENERAL COMMENTS AND RECOMMENDATIONS:

(Please mention weak and/or strong points of the production):  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Thank you for your valuable time and cooperation!

APPENDIX D

Comparison of Means  
between Treatment and Control Groups  
(Tables A, B, C)

Table A

Treatment Groups (T) Exhibiting Higher Scores  
than Control (C) Groups  
For Mann-Whitney U Test  $p < .10$

Dependent Variable	Moderator Variable	p Value
Whole test: Q's 1 to 24 averaged	francophone	$< .10$
Attitude towards T.M.: Q's 1,2,4,6,10	non-meditators	$< .07$
Attitude towards meditators: Q's 8,11,12,15	non-meditators	$< .07$



Table B  
Treatment Groups (T) Exhibiting Higher Scores  
than Control Groups (C)  
For Mann-Whitney U Test  $p > .10$

Dependent Variable	Moderator Variable	Means	T - C
Whole test Q's 1 to 24 averaged	All subjects	T 4.1 C 3.8	.2
Attitude towards starting T.M. Q's 3, 7	Non-meditators	T 4.0 C 3.6	.4
Attitude towards T.M. Q's 1, 2, 4, 6, 10	All subjects	T 4.4 C 3.9	.5
Attitude towards regularity Q's 5, 22, 23, 24	Practicing meditators	T 3.7 C 3.6	.1
Attitude towards meditators Q's 8, 11, 12, 15	Practicing meditators	T 4.3 C 4.2	.1
Attitude towards S.C.I. Q's 9, 13, 14, 17 to 21	Non-meditators	T 4.1 C 3.7	.4

Table C

Control Groups (C) Exhibiting Higher Scores  
than Treatment Groups (T)

For Mann-Whitney U Test  $p = \text{or} > .10$

Dependent Variable	Moderator Variable	Means	C - T
Attitude towards meditators	Non-practicing meditators	T 4.1 C 4.8	.7
Attitude towards S.C.I.	Practicing meditators	T 3.6 C 4.0	.4

APPENDIX E

Summaries of Comments  
and

Tables of Student and Teacher Responses

on Evaluation Questionnaires

(Tables D to K)

Table D

Film-based Videotape  
Summary of Teachers' Comments  
on an Open-Ended Question  
(n=6)

<u>Category of Comment</u>	<u>Number of Teachers Volunteering Similar Comments</u>
----------------------------	---

Strong Points

- |  |   |
|--|---|
| 1. Music beautiful and/or well-matched with image. | 5 |
| 2. Feeling of growth and progress is strong.       | 1 |
| 3. Liked the mime.                                 | 1 |

Weak Points

- |   |   |
|---|---|
| 1. Meaning unclear/should have more explanations. | 4 |
| 2. Some hazy or unclear images.                   | 3 |
| 3. Didn't like mime.                              | 1 |
| 4. Didn't like zoom in on dried garden in fall.   | 1 |

Table E  
Tape-Slide  
 Summary of Teachers' Comments  
 on an Open-Ended Question  
 (n=6)

<u>Category of Comment</u>	<u>Number of Teachers Volunteering Similar Comments</u>
----------------------------	---

Strong Points

- |   |   |
|---|---|
| 1. Good continuity of ideas.                | 1 |
| 2. Inspirational interviews (or effective). | 2 |
| 3. Uplifting (general) (or inspiring).      | 2 |
| 4. Very good.                               | 1 |

Weak Points

- |                                       |   |
|---------------------------------------|---|
| 1. Flow of ideas could be stronger.   | 1 |
| 2. Tired of seeing flowers.           | 1 |
| 3. Slides too fast first two minutes. | 1 |
| 4. Sound quality unclear.             | 2 |
| 5. A bit long.                        | 1 |
| 6. Couple of slides inappropriate.    | 1 |
-

Table F

Film-based Videotape  
Summary of Students' Comments  
on an Open-Ended Question  
(n=20)

<u>Category of Comment</u>	<u>Number of Students Volunteering this Comment</u>
----------------------------	---

Strong Points

- |   |   |
|---|---|
| 1. Enjoyed seeing the growth of flowers, sunsets, and the progression (i.e., these students enjoyed dynamic features best). | 6 |
| 2. "No weak points." (Liked everything).  | 4 |
| 3. "Great ideas - nice things in action".   | 1 |
| 4. Music beautiful or well matched.   | 7 |
| 5. Loved nature scenes.   | 2 |
| 6. "Made me feel good."   | 1 |
| 7. "Relaxing."  | 1 |
| 8. "Easy to understand."  | 1 |
| 9. "Liked images."  | 3 |

Weak Points

- |  |   |
|--|---|
| 1. Meaning unclear.                              | 6 |
| 2. Didn't like repetition of images.             | 3 |
| 3. Would prefer to see people or have narration. | 2 |

Table G  
 Tapé-Slide  
 Summary of Students' Comments  
 on an Open-Ended Question  
 (n=20)

<u>Category of Comment</u>	<u>Number of Students Volunteering this Comment</u>
<u>Strong Points</u>	
1. Liked interviews.	11
2. Found it realistic.	2
3. Liked photography.	4
4. Helped to understand T.M.	1
5. Liked everything.	3
6. Liked nature sequences.	6
<u>Weak Points</u>	
1. Too many interviews.	1
2. Repetitions.	3
3. Want more explanations (for non-meditators).	3
4. Didn't like photos of the students.	1
5. Would like to see more different people speak.	2
6. Sound unclear - interviews.	3
7. Disliked interviews (found it degrading, felt it wasn't necessary to prove anything).	1

Table H

Summary of S.C.I. Teachers' Responses  
to the Film-based Videotape  
(for those 6 who filled out forms in a formal evaluation session)

Media Characteristic	Number Responding (on a scale of 1 to 5)				
	1	2	3	4	5
1. Content and organization					
a. Clarity and logical flow	0	1	3	1	1
b. Accuracy	0	0	4	1	1
2. Pedagogical value					
a. Vocabulary appropriate for audience		N/A			
b. General approach appropriate for audience	0	1	2	3	0
c. Relevance of content to program	0	1	2	1	2
d. Value for motivating students	0	1	3	1	1
e. Convenience of format	0	0	2	2	2
3. Image quality					
a. Aesthetic appeal	0	1	1	0	4
b. Framing	0	1	1	2	2
c. Color	0	0	1	3	1
d. Editing	0	1	2	3	0
4. Sound Quality					
a. Clarity	0	0	0	2	4
b. Music	0	0	0	1	5
c. Harmony between sound and image	0	0	0	2	4
7. Opinion of production as a whole	1	0	3	2	0
8. Value of the production for use in S.C.I. course for high school	1	0	3	1	1



Table I

Summary of S.C.I. Teachers' Responses  
to the Tape-Slide Program  
(for those 6 who filled out forms in a formal evaluation session)

Media Characteristic	Number Responding (on a scale of 1 to 5)				
	1	2	3	4	5
1. Content and organization					
a. Clarity and logical flow	0	1	0	2	3
b. Accuracy	0	0	1	2	3
2. Pedagogical value					
a. Vocabulary appropriate for audience	0	0	1	0	4
b. General approach appropriate for audience	0	0	1	2	3
c. Relevance of content to program	0	0	1	1	4
d. Value for motivating students	0	0	0	1	4
e. Convenience of format	0	0	0	4	2
3. Image Quality					
a. Aesthetic appeal	0	0	1	2	3
b. Framing	0	0	1	4	1
c. Color	0	0	1	2	3
d. Editing	0	1	0	5	0
4. Sound Quality					
a. Clarity	0	1	2	3	0
b. Music	0	0	1	1	3
c. Harmony between sound and image	0	0	1	2	3
7. Opinion of production as a whole	0	0	1	5	0
8. Value of the production for use in S.C.I. course for high school	0	0	2	3	1

Table J

Summary of Students' Responses  
to Film-based Videotape  
(n=20)

Media Characteristic	Number Responding (scale of 1 to 7)						
	1	2	3	4	5	6	7
<u>Photography</u>							
a. Beauty	1	0	0	0	1	4	14
b. Clarity	0	0	2	1	4	5	8
c. Color	2	3	0	0	1	5	9
<u>Music</u>							
a. Appropriateness	1	0	0	0	4	5	11
b. Appeal	1	0	0	0	3	10	5
<u>Sound</u>							
a. Clarity	0	0	0	0	2	0	11
<u>Ideas</u>							
a. Clarity	0	0	0	3	6	4	9
<u>General Appeal</u>							
a. Interest	0	0	0	1	5	6	8
b. Enjoyableness	1	1	0	0	6	6	6
c. "Good"-ness	0	1	0	0	6	6	8
d. Could relate to	0	0	0	8	1	2	8
e. Would like to see another (n=8)	0	0	0	1	1	0	6

Table K

Summary of Students' Responses  
to Tape-Slide Program  
(n=20)

<u>Media Characteristic</u>	<u>Number Responding (scale of 1 to 7)</u>						
	(low)	1	2	3	4	5	6 7 (high)
<u>Photography</u>							
a. Beauty		0	0	0	1	0	5 14
b. Clarity		0	0	1	2	4	4 8
c. Color		0	1	0	0	0	5 11
<u>Music*</u>							
a. Appropriateness		0	0	1	4	4	8 3
b. Appeal		3	1	4	3	1	5 1
* (Note: Francophones could hardly hear because sound was turned low for translation.)							
<u>Sound</u>							
a. Clarity		2	2	0	5	1	3 4
<u>Ideas</u>							
a. Clarity		0	0	0	3	2	7 8
b. Logic		0	0	0	1	2	7 8
<u>Narration</u>							
a. Interest		0	0	1	2	1	7 6
b. Clarity		0	0	1	3	2	7 3
<u>Interviews</u>							
a. Interest		0	1	1	1	1	8 3
b. Clarity		0	1	0	0	2	6 6
c. Credibility		1	0	0	2	3	2 8
<u>General Appeal</u>							
a. Interest		0	0	0	2	0	9 7
b. Enjoyable		0	0	0	1	2	13 4
c. "Good"-ness		0	0	0	0	2	8 9
d. Could relate to		0	0	0	5	2	3 7
e. Would like to see another		0	0	1	1	0	5 8

APPENDIX FFormative Evaluation of an "In-Context"  
Supplementary Teaching Procedure

## Formative Evaluation

### Supplementary Teaching Procedure

The film-based videotape and tape-slide programs were shown both in and out of context of the S.C.I. lesson 4 to the anglophone evaluation groups (May 17, 18, 1980).

The purpose of the supplementary teaching procedure was to gain feedback regarding effectiveness of the audio-visuals when incorporated in a classic lesson design along the lines recommended in the literature review (pp. 7-17 in the main text).

The procedure took place for both Treatment and Control groups (anglophone only) after all testing for the main research questions had been completed. Students were given questionnaires after the lesson to probe their attitudes towards the lesson and the course as a whole.

Group C: Media shown before discussion and development. (This was also used as the Treatment group for the main research questions.)

1. Show tape-slide and then film; administer all evaluation questionnaires and questions 1-24 of the attitude questionnaire.
2. Group meditation and introduction or discussion on T.M. for non-meditators.
3. Development  
Define main idea #1 and develop with

Group D: Integration of media in lesson content. (This was also used as the Control group for the main research questions.)

1. Administer questionnaires, questions 1 to 24.
2. Group meditation and discussion of T.M. for non-meditators.
3. Outline the two main ideas of the lesson.
4. Introduce and show tape-slide show.
5. Administer questionnaire on opinion of the program.

examples and non-examples.

4. Conclusions

Talk about how this course is to be the core course for a new school for meditators.

5. Administer questionnaires, Questions 25 to 39 (see next page).

6. Use the tape-slide program to develop main idea #1.

7. Introduce and show film

8. Administer questionnaire on opinion of film.

9. Use the film to develop main idea #2.

Let students bring out examples and non-examples, and/or bring out related aspects of the film.

10. Conclusions

See step #4 for Group A.

11. Administer questionnaire, Questions 25 to 31 (Appendix C) and Questions 32 to 39 (see next page).

Student # \_\_\_\_\_

Group B

Questionnaire Distributed May 17 and 18  
at the End of Each Session.

32. If the center offers more lectures on S.C.I., I  
would like to attend: (Circle one):  
15-20 lessons; 10-14 lessons; 5-9 lessons;  
1-4 lessons; none at all.
33. Most students my age would find  
this lesson enjoyable. SA A N D SD
34. Personally I liked this lesson. SA A N D SD
35. This lesson was boring SA A N D SD
36. I found this lesson gave me  
some good ideas to think about. SA A N D SD
37. This lesson would be most  
interesting for students younger  
than myself. SA A N D SD
38. This lesson would be most  
interesting for students older  
than myself. SA A N D SD
39. It would be interesting to  
attend a school where all  
students practice T.M. and  
take the S.C.I. course. SA A N D SD

APPENDIX G

Transcendental Meditation and  
the Science of Creative Intelligence  
Literature Review



## Transcendental Meditation and the Science of Creative Intelligence

### Introduction

An educational technologist (as any educator) can be said to be morally bound to ensure that the technology that he employs serves a useful and morally sound purpose for society. For the most part educators take for granted the value of the traditionally taught subjects, but when a new subject arises, it is important to analyze its goals, content and effects, not only to avoid waste of time and money, but also to ensure that the end result will assist the individual in becoming a fulfilled, active and responsible member of society.

For this reason, a brief description and analysis of the Science of Creative Intelligence course is in order.

### Definition and Literature Review

The Science of Creative Intelligence course is an academic course for secondary education developed by Maharishi International University\* and which includes the practice of the Transcendental Meditation (T.M.) technique. The course at any level has seven broad goals:

1. To develop the full potential of the individual.
2. To realize the highest ideal of education.

\* An accredited university in Fairfield, Iowa, U.S.A., which offers S.C.I. and T.M. as nonoptional core courses.

3. To improve governmental achievements.
4. To solve the age-old problems of crime and all behavior that brings unhappiness to the family of man.
5. To bring fulfillment to the economic aspirations of individuals and society.
6. To maximize the intelligent use of the environment.
7. To achieve the spiritual goals of mankind in this generation.

The academic material of the first year high school course includes a study of qualities associated with creativity and intelligence (e.g., spontaneity, precision, stability, progression) and their expression in the lives of the students, in the natural environment, and in the lives of great people. The practical aspect of the course involves the practice of the Transcendental Meditation technique twice a day. The technique derives from an ancient Vedic tradition and was introduced to the West by Maharishi Mahesh Yogi in 1959. In Levin (1975), T.M. is described as "an effortless mental technique for experiencing thought at successively earlier (primitive) stages of development" (p. 2).

Since 1970, the effects of the technique on the physiology and psychology have been studied scientifically; 200 of the studies have been published in various medical, psychological and pedagogical journals as well as Dissertation Abstracts International and so are available for

scrutiny. In answer to a demand for better and more wide-spread research on the technique, several teams of scientists toured the world in 1978 giving conferences and encouraging research on T.M. at medical, psychiatric and educational institutions, with the result that approximately 700 research projects on the T.M. and T.M.-Sidhis techniques are currently underway. Although not every study has found significant improvements, the majority of research results indicate that the technique, when practiced regularly, has a significantly positive and cumulative effect on the psychology and physiology of the individual, with implications for improving societal trends. Some studies were designed to separate treatment effect from a predisposition to improve by dividing subjects who were not particularly interested in the T.M. technique among the treatment and control groups. Otis (1974), using such a design, found the T.M. group significantly higher in enjoyment of life, restfulness of sleep, happiness, energy level, sexual adjustment and level of creativity.

A UCLA study (Levin, 1975) comparing a) students who took T.M. and the Science of Creative Intelligence for one year; b) those who took a psychology self-development course for the first semester and switched to the T.M.-S.C.I. class for the second semester; and c) a control group receiving no treatment, reported the following results:

Significant differences between groups were found on neuroticism, self-concept and perceived change. The T.M.-S.C.I. class was found to be lower on neuroticism and higher on self-concept and per-

ceived change measures than the other groups .... Regularity of meditation was found to be positively correlated with gains in the Psychology/T.M. class on self-concept and perceived effectiveness. (p. 2)

The author concluded that:

The usefulness of a widely applicable psycho-physiological technique which relieves stress and improves the functional efficiency of the nervous system can be considered potentially valuable for improving the efficiency of the educational process. The decrease in neuroticism and improvements in self-concept and perceived positive changes in student experiences at school, at home, and in interpersonal relationships found in the study, suggest that the student practicing the T.M. technique becomes more comfortable with himself and others, more alert and more receptive to the educational environment. (Levin, 1975, p. 23)

The study supports in part findings by Shacter (1975) in a study comparing high school students practicing T.M. for 14 weeks to non-meditating controls. He found greater improvement in the T.M. group in measures of creativity, intellectual performance, anxiety and the personality variables of complexity, conformity, energy level, innovation, self-esteem and tolerance.

In two studies, Tjoa (1975, 1976) found that nonverbal, logical reasoning increased significantly in meditating participants over 12- and 16-month periods as compared to control groups.

Other studies touching on the possible educational applications of T.M. using non-meditating controls found the following: significant improvements in long- and short-term recall (Abrams, 1976), learning of a simple motor task (Miskiman, 1976), creativity (MacCallum, 1976), academic

performance (Collier, 1976); Heaton & Orme-Johnson, 1976; Kory & Hufnagel, 1976).

The psychological effects of incorporating the T.M. and S.C.I. into a university curriculum were assessed by Brown (1976) in a study of 312 students at Maharishi International University (accredited Spring 1980), where staff and students practice T.M. and routinely use the Science of Creative Intelligence as a basis for interdisciplinary studies. The OPI (Omnibus Personality Inventory) profiles for M.I.U. students were very different from the profiles of the students in the two reference groups (n=635 and 366), one from the University of California at Berkeley and one from a private liberal arts college with an innovative curriculum similar in structure to the M.I.U. curriculum. In general, the M.I.U. students "were more intellectually oriented, more tolerant of authority and of traditional religion, more socially outgoing and altruistic, and more psychologically stable" (p. 2).

In the same study, M.I.U. students were found to be much more committed to higher education, more serious about their studies and an unusually large proportion of them expected to complete the doctoral degree. Statistical analysis supported the conclusion that the atypical profiles of M.I.U. students were not the result of background factors but the result of exposure to aspects of the M.I.U. curriculum, both prior to entrance and during six months on campus.

An extensive body of related research supports claims

that T.M. reduces stress and anxiety (Bloomfield et al., 1975; Ferguson & Gowan, 1976; Hjelle, 1974; Nidich et al., 1973; Penner et al., 1974); reduces hypertension (Wallace & Benson, 1972); produces greater coherence and synchrony in brain functioning (Banquet, 1973); improves job performance, job satisfaction and relations with co-workers (Frew, 1974; Friend, 1976); increases self-actualization (Nidich et al., 1973; Seeman et al., 1972); contributes to a marked reduction in tobacco and alcohol consumption (Benson & Wallace, 1972; Shafii, Lavelly, & Jaffe, 1974); decreases use of non-prescribed drugs (Benson & Wallace, 1972; Brautigam, 1976; Schenkluhn & Geisler, 1976; Shafii, Lavelly, & Jaffe, 1974); has beneficial effects on health (Honsberger & Wilson, 1973; Zamarra et al., 1976); and is beneficial in treating major psychiatric disorders (Bloomfield et al., 1975; Glueck & Stroebel, 1975).

Wallace (cited in Maharishi International University, 1980) tested 84 subjects using the "Adult Growth Examination" by Morgan, a normative test of biological aging. He found that while non-meditating controls had an average biological age of 2.6 younger than their chronological age, that of short-term T.M. participants was 5.0 years younger than their chronological age and that of the long-term meditators was 12.0 years younger than their chronological age ( $p=.001$ ). Short-term participants were described as meditating under five years. A significant correlation was found between younger biological age and

length of time practicing the T.M. technique.

Such findings may be due to a more stable and efficient internal physiology together with increased resistance and adaptability to stress, both of which seem to be produced by regular practice of the T.M. technique (Maharishi International University, 1980).