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THE EFFECT OF INSTRUCTIONS ON SCENIC BEAUTY RATINGS OF RIVERSCAPES AND THE PREDICTION OF THOSE RATINGS BY ENVIRONMENTAL QUESTIONNAIRES

by

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(ABSTRACT)

The purpose of this study was to assess the impact of instructions on scenic beauty ratings of riverscapes. 128 college student observers viewed and rated 200 slides of riverscapes for overall scenic beauty with a magnitude estimation scaling procedure. There were two groups of observers differing in the instructions each received. One group received biased instructions which emphasized the presence of industry while the other group received neutral instructions. The hypothesis that overall scenic beauty ratings would be lower for the biased instructional group was supported. Also, it was found that the Easy Living scale from the Leisure Activities Blank (McKechnie, 1975) interacting with the effects if the manipulation predicted these ratings.

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Introduction

Definition

Defining "scenic beauty" is a difficult and ambitious task. Webster's New World Dictionary (1979) does not contain a definition for scenic beauty, but defines scenic as "of natural scenery" (p. 532) and beauty as "the quality of being very pleasing, as in form, color, etc." (p. 55). One can combine the two and define scenic beauty as natural scenery which is very pleasing. However, this definition would satisfy neither poets nor scientists. Whereas the poet will describe scenic beauty in probably a much more eloquent, albeit elusive, manner, the scientist prefers to be operational, thus numerical, in his/her definition.

Science has many ways of assessing scenic beauty and, therefore has many different definitions. Some of these assessments are much more quantifiable than others. Thus, even in science, there seems to be a continuum of definitions of scenic beauty differing in the quantifiability each provides. The scaling procedure used in the present research was neither poetic nor the most statistically complex, but is an intermediary procedure which minimizes the laborious task asked of the observers who participated in the present research, while yielding data which have been found to be indistinguishable from the more statistically complex scaling methods.

Scaling Procedures

Historically, there have been many methodologies used to measure scenic beauty preferences. These include different environmental checklists (Leopold & Marchand, 1968; Lucas, 1964), semantic differentials (Evans & Wood, 1980), prediction equations (Arthur, 1977; Buhyoff, Gauthier, & Wellman, 1984; Buhyoff, Hull, Lien, & Cordell, 1986; Buhyoff, Wellman, & Daniel, 1982; Carls, 1974; Jackson, Hudman, & England, 1978; Nasar, 1984; Schroeder, Buhyoff, & Cannon, 1986; Shafer & Brush, 1977; Vining, Daniel, & Schroeder, 1984), factor analyses (Jackson, et al., 1978; Knopp, Ballman, & Merriam, 1979), and the more precise scaling procedures such as the Law of Comparative Judgement (LCJ) procedures adapted from Thurstone (Buhyoff, Arndt, & Propst, 1981; Buhyoff, et al., 1984; Buhyoff & Riesenman, 1979; Hull & Buhyoff, 1981, 1984; Hull, Buhyoff, & Daniel, 1984; Jackson, et al., 1978; Schroeder, 1984), the Scenic Beauty Estimation (SBE) method (Arthur, 1977; Brown & Daniel, 1987; Buhyoff, et al., 1986; Buhyoff, et al., 1982; Hull, et al., 1984; Schroeder, 1984; Schroeder, et al., 1986; Vining, et al., 1984), and various magnitude estimation procedures (Brown & Daniel, 1987; Buhyoff, et al., 1981; Schroeder, 1984). The above-cited references are only a small sample of the variety of research which has been applied to the scaling of scenic beauty.

In the category of the environmental checklists, I have included such methods as actual checklists on which the observers simply mark off adjectives which describe the particular scene in response to open-ended questions asked of the observers. The obvious pitfall here is the lack of quantification. These data are usually quantified in terms of frequencies of responses. The same limitation (that these procedures are descriptive in nature) applies to the use of semantic differentials in which the observer indicates where the scene would fall on a 7 point bipolar anchored by extreme adjectives.

Prediction equations and factor analyses are somewhat better approaches. Usually, the numbers from either the LCJ, SBE, or magnitude estimation procedures are used in a multiple regression analysis to determine if there are certain components of the scene which will systematically predict scenic beauty evaluations. These analyses are appropriate when the data used are taken from one of these more statistically complex scaling techniques.

There have been two main types of the statistically complex scaling methods: the SBE method and the LCJ method. The LCJ method is taken from Thurstone (1927) and is accomplished through pair comparison (PC) or rank ordering

(RO) of photographs or slides. These comparisons are then used to evaluate the perceived similarities or differences between the landscape scenes by assessing the overlap of the distributions of scenic beauty for each scene. This overlap is represented by the number of times one landscape is chosen over the other in terms of scenic beauty. In theory, if the two landscapes are very similar to one another, then there should be much confusion in choosing one of the scenes over the other (Hull, et al., 1984). The SBE method is similar in that it also assesses the degree of overlap between two scenic beauty distributions, but it does this in terms of a set of categories which define the continuum of scenic beauty. Hull, et al. (1984) assessed the relationship of the two methods by having observers rate the scenic beauty on a ten point categorical scale. Each of the categories on this scale is assumed to have a distribution of its own, and the overlap between distributions is actually between the distribution of ratings for the landscape scene and the distributions for the categories. The Pearson product moment correlations between the scaling procedures have been found to be the following: between LCJ-PC and SBE, r=.89; and between LCJ-RO and SBE, r=.87 (Hull, et al., 1984). The individual observer reliability for the rank ordering procedure of the Law of Comparative Judgement has been found to be .80 on average, while the reliability of group consensus values has been found to average around .95 with the same procedure (Hull & Buyhoff, 1984).

Another procedure which may be incorporated in the measurement of scenic beauty is magnitude estimation in which the observer assigns numbers to the landscapes which represent the perceived magnitude or intensity of scenic beauty. This method is advantageous in that it is easily understood by observers and the data derived from it may be subjected to statistical manipulations without transformations. Magnitude estimation can be used with a standard (modulus), against which the observer rates the other scenes, or without one. Stevens (1971) strongly advised using the free-modulus procedures over those that do incorporate a standard. He advised using this free-modulus procedure because it allows the subject to use his or her own anchor. The magnitude estimation procedure has been found to predict scenic beauty in a similar fashion to the LCJ procedures (Arndt, 1980; Buhyoff, et al., 1981).

The magnitude estimation procedure, which yields, at the least, interval-scale data and probably even ratio-scale data (Stevens, 1975), is very simple to use and analyze statistically. The type of estimation procedure used in this study (scale from 1 to 10, whose values can be averaged, etc.) has been shown to yield scale values which are nearly indistinguishable from more statistically sophisticated scaling methods (Schroeder, 1984). Specifically, it has been found to correlate with LCJ procedures, r=.9976; true-score methods, r=.993; and SBE procedures, r=.999. Furthermore, the intergroup reliabilities of the values obtained from the simpler magnitude estimation method were not different from the others (LCJ, true-score, and SBE). The reliability coefficients for the magnitude estimation procedure have been shown to range from .640 to .988. The mean reliability coefficient for Shroeder's (1984) study was calculated to be .871.

The present study incorporated a free-modulus magnitude estimation procedure because of the ease with which it is understood and used by naive observers and it can be analyzed statistically without transformations. Previous studies by this author have included this scaling procedure to obtain scenic beauty ratings to assess the impact of industry on a riverscape and the effect of that industry's contributed color to its host river (Laws & Prestrude, 1989; Prestrude & Laws, 1989).

Presentational Medium

This study used the presentation of color slides of riverscape scenes. Previous research has validated the use of color photographs or slides as a medium of presentation (Dunn, 1976; Shuttleworth, 1980). Dunn (1976) had observers rank order six on-site observations and the corresponding six photographic observations of the same scenes, with an average difference between the ranks being only .57 on the six point scale. Using a chi-square analysis for independent samples on data derived from a semantic differential, Shuttleworth (1980) found no significant difference between viewing scenes on-site and viewing photographs. Seung-Bin Im, (1984) has found a correlation of .92 between on-site evaluations and slide evaluations. In recent studies (Laws & Prestrude, 1989; Prestrude & Laws, 1989), a correlation coefficient of .60 was obtained between on-site ratings and ratings of color slides of riverscape scenes. This relatively low, but significant, correlation was probably due to the fact that the slides which duplicated on-site observations were interspersed in a much larger slide set. The previous studies had observers look only at slides which duplicated actual scenes they had viewed and rated.

Research In Forestry

The practical and applied impact of scenic beauty assessments has been demonstrated in a variety of areas by environmental, architecture, landscape planning, and forestry researchers. For instance, researchers have used scenic beauty assessments to measure the attractiveness and appearance of different types of southern pine stands

(Buhyoff, et al., 1986) and hardwood stands under different types of management regimes (Vodak, Roberts, Wellman, & Buhyoff, 1985). Scenic beauty assessments have also been used to help forest planning efforts by measuring the scenic beauty of forest stands which have been aged by simulation procedures (Hull & Buhyoff, 1986). A great deal of the research in environmental and forestry journals assessed the impact of insect damage to forests by scenic beauty estimates (Buhyoff & Leuschner, 1978; Buhyoff, Leuschner, & Arndt, 1980; Buhyoff & Riesenman, 1979; Buhyoff, et al., 1982).

Arthur (1977) found that natural-looking forest areas were preferred over more strictly managed areas (in which there are trees which have been cut down). This same study also demonstrated that landscape architects' ratings are lower than other groups consisting of students and a variety of other persons from the general public. Also, high scenic beauty estimates have been shown to be predicted from the presence of water, the amount of distance in the view, clumped tree distributions (especially deciduous), and the privacy of homesites. Low scenic beauty estimates were shown to be predicted from the presence of pines and slash piles (piles of trees which have been forested), the amount of sky, the presence of development, the perception of crowdedness, and feature incongruity (Vining, et al., 1984).

Other research using scenic beauty estimates identified the variables which affect these estimates. One study has shown that, with respect to distance and scene composition, center middleground and center background vegetation were important contributors (Patsfall, Feimer, Buhyoff, & Wellman, 1984). Also, observers were sensitive to foreground vegetation and its placement on the image (right or left), and that there were no visual field advantage effects. In other words, observers are sensitive to the content of the scene and not to one side of the visual field. Researchers have also found that as tree diameter increases, so do the scenic beauty estimations (Buhyoff et al., 1986; Lien & Buhyoff, 1986), and as the density and the age of the stand increases, the scenic beauty estimations again increase (Vodak et al., 1985; Hull & Buhyoff, 1986). It has also been noted that natural stands are estimated to be higher in scenic beauty than planted stands (Hull & Buhyoff, 1986). Finally, distance has been found to be a major predictor of scenic beauty estimates in that, as distance from the front peak of a mountain increased, perceived scenic beauty decreased and as distance to the back peak of a mountain increased, perceived scenic beauty increased (Hull, 1981; Hull & Buhyoff, 1983). Brown and Daniel (1987) demonstrated that a set of common slides (mixture of high and low scenic beauty slides) was rated lower after the subjects had viewed a set of slides high in scenic beauty and were rated higher after a slide set which was low in scenic beauty.

Research in Urban Areas

The methods of scenic beauty assessment have not been limited to rural forests. In reality, there has been much research done to assess the scenic beauty of "urban forests", which consist of vegetation growing in the city, along streets, and such (Buhyoff, et al., 1984; Lien & Buhyoff, 1986). There have even been studies assessing the aesthetic quality of residential streets (Schroeder, et al., 1986).

Other studies have also been done in regard to urban scenes. For instance, in a cross-cultural study, Nasar (1984) found that Japanese and U.S. subjects preferred foreign urban scenes rather than urban scenes from their own country. The same study found that environmental preferences were related to the order (order, naturalness, and upkeep) and diversity (high contrast, diversity, and few vehicles) of the scenes. Another study (Seung-Bin Im, 1984) found that the preference for an enclosed urban space is predicted from ground slope, height ratio, and vegetation coverage. The effect of the amount of vegetation on ratings of scenic beauty for urban/suburban places has been shown to be one of raising the ratings (Gauthier, 1981).

Studies have also demonstrated that as human intrusion and development increased, ratings of scenic beauty of highway corridors decreased (Evans & Wood, 1980). Still other investigators have found that scenes containing commercial and entertainment dimensions were preferred less than those containing contemporary or cultural dimensions (Herzog, Kaplan, & Kaplan, 1976).

In a study with the purpose of assessing the impact of power transmission lines, Jackson, et al. (1978) found that greenery in trees and vegetation was preferred over snow, leaflessness or dryness. Mountainous views were preferred to open fields and preferences were higher as the evidence of the presence of humans decreased, unless the presence of humans was rustic or unique. Transmission lines were found to reduce preference when they were highly visible in a scene which would have little evidence of the presence of humans otherwise. Preferences were not largely affected by such variables as location of respondent, ethnicity, age, income, residency, or length of residency. The only exceptions were that a farm group preferred rural scenes and an inner city group preferred rural and low income areas.

Research on Riverscapes

The only studies found which attempted to assess preferences for waterscapes either defined the waterscape as wetlands or did not use rating scales or any other quantitative measures. The measures used were descriptive: either describing the waterscape as a wilderness (Lucas, 1964) or in terms of "...visual-cultural values..." (Smardon, 1975). Leopold and Marchand (1968) had observers rate a riverscape on a 5-point categorical scale with regard to dimensions such as physical and chemical character, biological character, and human use and interest. From this the researchers calculated "uniqueness ratios" and compared the sites. Again, the research was descriptive. Another study, the purpose of which was to generate a new method for analyzing river users' preferences, used the method of cluster analysis. This study was yet again mainly descriptive in nature and did not supply the field with much new information (Knopp, et al., 1979).

One other study (Laws & Prestrude, 1989; Prestrude & Laws, 1989) used the same rating procedure as in the present proposal to study the effects of industry and contributed color on scenic beauty ratings of riverscapes. Industrial plants were found to decrease scenic beauty ratings only if they were in plain view. In a controlled environment (water samples) an increase in water color led to a decrease in preference ratings of the water samples. However, riverwater color in its natural environment seemed to increase scenic beauty ratings up to a point.

Moderating Variables and Demographics

Still other investigations have demonstrated that the size of an observer's hometown can affect the ratings of scenic beauty as measured by a semantic differential scale known as the Environmental Rating Scale (Pederson, 1979). However, other studies have found that regional familiarity effects do not exist and that there could be a generic methodology for scenic beauty estimation which need not take into account familiarity differences in the sample (Wellman & Buhyoff, 1980). Feimer (1984) attempted to account for the effects of medium of presentation, evaluative context, and sample found that with regard to evaluative context, an enroute rating procedure (as opposed to a post hoc type of rating procedure) seemed to increase the perceived activity level (perception of an active, busy place - one of the dependent measures) of the scene and environmental professionals varied more in their responses to the different mediums of presentation than a countywide sample.

As far as strict demographics are concerned, Lyons (1983) found no differences between landscape preferences of men and women across all ages and residences (urban vs. rural) as measured by a 1-6 Likert scale ranging from extremely desirable to live or visit to extremely undesirable to live or visit. With respect to age, it was found that young children show significantly higher preferences and the elderly show significantly lower preferences on the same scale. Urban and rural residents were shown to have similar preferences, as well. No significant interactions among gender, age, and residence were found.

Theoretical Considerations

There seem to be two theoretical approaches to landscape preference research: the person-environment interaction model and the adaptation level model.

The adaptation level model, advocated by Wohlwill (1966; Arthur, Daniel, & Boster, 1977), states that scenic beauty ratings follow an inverted-U shaped form in which great deviations away from an observer's adaptation level in either direction will lead to a decrease in ratings of scenic beauty. For example, one who lives in the suburbs might enjoy vacationing in the city or country, just as long as the city is not too boisterous or the country too quiet, for this would be too great a deviation from their adaptation level. This type of reasoning may be used to describe such findings as the effects of the size of an observer's hometown or familiarity effects.

The person-environment interaction model (Levy, 1979; Zube, Sell, & Taylor, 1982) purports that it is the previous interaction which an observer has had with the environment with good or bad consequences which determines the ratings of scenic beauty. Thus, if a person has used a particular landscape for recreation, or whatever, with pleasing consequences in the past, then they are apt to rate it and similar landscapes highly and vice-versa for landscapes which lead to displeasing consequences. This seemed to be epitomized by an observer in a previous study (Laws & Prestrude, 1989; Prestrude & Laws, 1989) who rated an attractive vista with rapidly flowing water very low. When asked why he rated that particular scene so low, he responded that he could not canoe on that water, therefore, it was not pleasing to him.

The present research will rely on these perspectives to explain the results of certain scales on the Leisure Activities Blank (McKechnie, 1975), a questionnaire which taps both past recreational behaviors and future intentions about recreational behaviors, and the Environmental Response Inventory (McKechnie, 1974) which taps environmental dispositions and attitudes. These questionnaires will be given to observers in an effort to systematically predict their average scenic beauty ratings. McKechnie (1975) reported certain scales from the LAB to be related to aesthetic interests and other research (Laws & Prestrude, 1989; Prestrude & Laws, 1989) has shown that the Pastoralism scale may be a predictor of scenic beauty ratings. The ERI has been shown to reliably assess environmental attitudes

(Buss& Craik, 1983; Kegel-Flom, 1976; McKechnie, 1977). It is hypothesized these scales on the questionnaires will predict average scenic beauty ratings.

Instructional Manipulations

The effect of instructions on a variety of dependent measures has been extensively investigated. For example, in eyewitness testimony, instructions have led to high rates of choosing a suspect in suspect-absent lineups, more "don't know responses, and variances at extreme ends of seriousness ratings for crimes (Kohnken & Maass, 1988; Malpass & Devine, 1981; Travis, Cullen, Link, & Wozniak, 1986) Other examples include: the information dumping effect, in which an increase in memory for certain items in a list occurs at the expense of memory for the remaining items (Kobayashi, 1979, 1985), inducing different strategies for classifying computer displayed faces into categories (Medin & Smith, 1981). Instructional manipulations have also been shown to differentiate responses to the state scales of the State-Trait Anxiety Inventory (STAI) (Johnson, Tracy, & Hohn, 1983), change response preferences to an unstructured questionnaire (one that contains no questions, only response alternatives) (van Heerden & Hoogstraten, 1980), increase risk-taking behavior (Coet & McDermott, 1979), induce faster simple reaction times to certain stimuli and not others (Bartels, Beck, & Clayson, 1979), control the reinforcing properties of nicotine in smokers wanting to stop smoking thus changing self-administration rates (Hughes, Pickens, Spring, & Keenan, 1985), increase the use of touching in dyadic interchanges (Hoddinott & Follingstad, 1983), change the type of reporting of errors in a daily diary (Fisher & Doogan, 1984), change the rates of detecting the extent of the relationship between two variables (McLaughlin, 1986), induce different creative problem-solving strategies (Buyer, 1988), and even increase such physiological measures as salivation (Siegel & Hagen, 1982).

Thus, instructional bias has been demonstrated in several areas of investigation. However, biased instructions have not been applied to scenic beauty ratings or in Environmental psychology in general. This is a major concern for industries which have preference rating studies performed. Their concern, and the concern of the present investigator, is that subjects may become easily biased by certain factors (where they make the ratings, membership with environmental groups, instructions) thus changing the way in which they rate scenes. It seems almost obvious, given the breadth of research using biased instructions, that instructions would have an effect on scenic beauty ratings. The purpose of the proposed research, with regard to instructional bias, is to demonstrate that scenic beauty ratings can be affected by the type of instructions given to the subjects. Specifically, subjects will receive either neutral instructions or instructions which emphasize the presence of industry which release effluent into the river (see Appendix A). The present investigator hypothesized that scenic beauty ratings would be lower for the latter type of instructions than the former.

Summary and Hypotheses

In summary, the present research will investigate whether pre-existing biases against industry will reduce scenic beauty ratings. A pre-existing bias will be instilled through the use of instructions which emphasize the existence of industry on the rivers in the slide set. This study will also investigate whether scales from the ERI and the LAB can reliably predict average scenic beauty rating. Therefore the hypotheses are: 1) scenic beauty ratings will be lower for the neutral instruction group than for the biased instruction group, and 2) certain scales from the LAB (Mechanics-Past and Future, Crafts-Past and Future, Sports-Past, Easy Living-Future, and Clean Living) and the ERI (Pastoralism) will predict average overall scenic beauty ratings.

Method

Observers

The observers were 155 students enrolled in psychology courses at Virginia Polytechnic Institute and State University. Observers' average age was 19.5 years old with a range from 17 to 33 years old. 27 observers' data were unusable because they had made a double response on the answer sheet or had incomplete data sheets. This occured despite the many precautions taken to ensure that the observers could see the data sheets suffiently (see below). This left 128 observers (63 men, 65 women) whose data were usable. However, 8 of these were dropped from analysis because they did not meet criteria on a follow-up visual screening (see below). Therefore, there were 120 (62 men, 58 women) observers in this study. They were given credit toward their psychology course grades for their participation.

Apparatus

Slide set - The slide set created for the present research was chosen from photographic film taken at several locations upriver, downriver, and at industrial and municipal water sites on the Hiwassee river in the vicinity of Calhoun, Tennessee. Some locations were also included from the Tennessee river, into which the Hiwassee flows, the treatment lagoons of the paper mill, and the Pigeon river, a known polluted river which flows from Canton, NC to Gatlinburg, TN. The photographs were taken by a professional photographer with a Minolta Maxxum 7000i camera on Kodak Ektachrome ASA 200 film. The final slide set was created according to the following procedures: students at Virginia Polytechnic Institute and State University viewed and rated the slides on a 10 point scale in which 1 represented an extremely unattractive appearance and 10 represented an extremely attractive appearance. Slides were then chosen to make up the final set by a procedure which consisted of picking out the low, medium, and high rated slides with the least variance to represent all locations and seasons. Given that the range of ratings was between 1.9 and 8.1, low rated slides were defined by the investigator as having a rating of three or below; medium rated slides were defined as having a rating between four and six; and high rated slides were defined as having a rating of above six. Low variance was defined as a standard deviation which was less than 2.0. From this procedure, 200 slides, representative of all seasons and all locations discussed above, were chosen for the final slide set. A log was created indicating the season and location for each slide in the set (see Appendix B).

A Kodak model 850H carousel projector equipped with an automatic timer was used to show the slides. Two trays with a 140 slide capacity were used to hold the slides.

A Bausch & Lomb Orthorater was used to screen the observers for adequate near and far visual acuity and color vision.

10-choice, 160-item Scantron opscan answer sheets on which observers made their ratings.

Questionnaires

The Leisure Activities Blank (LAB; McKechnie, 1975) - The LAB is a 120-item questionnaire which is designed to tap past recreational behaviors and future recreational behaviors. Thus, it measures the behaviors a person has actually engaged in while also measuring that persons intentions in engaging in these behaviors in the future. The LAB includes several scales which assess past recreational behaviors. These include: Mechanics (ME), Crafts (CR), Intellectual (IN), Slow Living (SL), Sports (SP), Glamour Sports (GS, and the Frequent Past (FP) scale, which assesses the validity of the test through detecting random responding. The scales which measure the future intentions to engage in certain recreational behaviors include: Adventure (AD), Mechanics (ME), Crafts (CR), Easy Living (EL), Intellectual (IN), Ego-Recognition (ER), Slow Living (SL), Clean Living (CL), and the Frequent Future (FF) scale which measures validity in the same fashion as the

Frequent Past (FP) scale discussed above. The study used the Mechanics-Past and Future, Crafts-Past and Future, Sports-Past, Easy Living-Future, and Clean Living scales since these have been shown to be related to aesthetic interests (McKechnie, 1975).

The split-half reliabilities for the LAB-past scales range from .81 to .93 with a mean of .87. The split-half reliabilities for the LAB-future scales range from .76 to .94 with a mean of .87 (McKechnie, 1975). The test-retest reliabilities for the LAB-past scales have been found to range from .71 to .92 with a mean of .83 whle the range of test-retest reliabilities for the LAB-future scales have been found to range from .63 to .93 with a mean of .85 (McKechnie, 1975).

The Environmental Response Inventory (ERI; McKechnie, 1974). The ERI contains eight different scales which purport to measure different qualities of environmental attitudes such as Pastoralism (PA), Urbanism (UR), Environmental Adaptation (EA), Stimulus Seeking (SS), Environmental Trust (ET), Antiquarianism (AN), Need for Privacy (NP), Mechanical Orientation (MO), and Communality (CO), a validity scale which assesses the communality of responses. The study used only the Pastoralism scale since previous research by the present investigator (Laws & Prestrude, 1989; Prestrude & Laws, 1989) has shown that this scale may be a predictor of scenic beauty ratings. Split-half reliabilities for these scales have been found to range from .74 to .87 with a mean of .80. The test-retest reliabilities range from .81 to .90 with a mean of .86 (McKechnie, 1974).

Procedure

Observers signed up for the experiment in two different folders. One folder was for men and the other was used for women. There were written instructions in each folder explaining that the observers must sign up in only one of the time slots and not both, the different time slots were the different instructional groups. This generated two groups of 60 (31 men, 29 women) and 60 (31 men, 29 women) observers each for the neutral instruction and the biased instruction groups, respectively.

The observers first read and signed the informed consent form (see Appendix C) which explained that the study had been approved by the Human Subjects Committe of the Psychology Department and the University's Institutional Review Board. After this, the observers completed the questionnaires. It took approximately one hour for each group to complete and hand in both questionnaires.

They then viewed a "preview" of 25 slides representative of the entire slide set under general instructions which simply described the scale to be used and how to make the ratings on the answer sheet. After this, one group received the neutral instructions while the second received the biased instructions. Observers viewed the entire set of 200 slides of different locations on the Hiwassee river from all four seasons. The observers were run in groups over three nights for a total of six groups. The order of treatments (biased or neutral instructions) was counterbalanced.

The slides were seen at night, in a darkened room, for approximately 45 minutes. They were projected onto a screen at 8 sec. intervals. Seating of the observers was arranged to minimize differences in viewing angles and distances to the screen. The lights were turned out and the observers received the appropriate instructions according to the group. The experimenter asked the observers to fill in their names, social security number (along with the corresponding circles on the answer sheet), etc., in the dark to ensure that they had adapted to the darkened room enough to see the answer sheet to make responses. Observers rated the slides for overall scenic beauty on a magnitude estimation scale from 1 to 10, where 10 represented an extremely attractive appearance and 1 represented an extremely unattractive appearance. The experimenter called out the number of each slide as it appeared on the screen to prevent miscoding of the data sheets. These procedures were used by the present investigator in a previous study (Laws & Prestrude, 1989; Prestrude & Laws, 1989).

Observers were then given the opportunity to earn additional credit by returning and being individually tested for normal or corrected-to-normal visual acuity with the Bausch & Lomb Orthorater in a follow-up session.

Results

Assessment of Visual Acuity and Color Vision

Of the total 120 observers, 105 (88%) returned for the follow-up visual test. Transformations of the Orthorater numerical designations to Snellen acuity measures revealed an average near visual acuity of 20/18 and an average far visual acuity of 20/20 (see Table 1). For color vision, a score of 2 or below on the Orthorater designates a possible color weakness. Of the 105 observers who returned, 16 scored a 2 or below. Since the color vision test is a distance test on the Orthorater, those observers who scored a 2 or below on the color vision test and who had below normal distance acuity cannot be considered to be color weak (Bausch & Lomb, Instruction Manual). This procedure is congruent with the Orthorater instruction manual. This left only 8 observers who scored a 2 or below on the color vision test and who had normal distance acuity. These data were subsequently dropped from further analyses. Observers who wore corrective lenses during the rating procedures wore the same corrective lenses during the follow-up visual test.

Evaluation of Pre-Existing Differences

The ratings of the preview of 25 slides were used to analyze any pre-existing differences between groups. A 2(instructional group - neutral or biased) X 2(gender) X 6(location - upriver Hiwassee, downriver Hiwassee, plant

Table 1

Number of Observers for the Different

Scores for Visual Acuity and Color Vision

on the Orthorater

Visual Acuity

	# Observers	
Snellen Acuity	Near	Far
20/33	-	2
20/29	3	4
20/25	1	13
20/22	6	23
20/20	25	15
20/18	21	31
20/17	49	17

Color Vision

Score on Orthorater	# Observers
0	-
1	-
2	16
3	24
4	27
5	26
6	12

site, treatment lagoons, Tennessee river, Pigeon River) General Linear Model (GLM) Analysis of Variance (ANOVA) was performed on the data (see Table 2). This revealed a main effect for gender, $F(1,696) = 6.309$, $p<.02$, in which women rated the 25 slides significantly higher ($M = 5.139$, SD = 1.702) than men ($M = 4.952$, SD = 1.661). A main effect for location was demonstrated, $F(5,696) = 188.14$, $p<.0001$, as well (see Figure 1). Duncan's Multiple Range Tests revealed that ratings for upriver and downriver Hiwassee were not significantly different, while the ratings for all other locations were significantly different from one another.

Since some of the slides at the different locations mentioned above contained scenes with industry while others contained scenes without industry, the experimenter separated the slides according to this criterion of presence or absence of industry. A 2(instructional group) X 2(gender) X 2(presence/absence of industry) GLM ANOVA revealed a main effect for the presence/absence of industry, $F(1,232) = 681.75$, $p<.0001$ (see Table 3). Scenes with no industry were rated higher ($M = 6.341$, SD = .959) than scenes containing industry ($M = 3.263$, SD = .860).

Evaluation of Experimental Manipulation

The analyses reported herein were performed on ratings of the 200-slide set. A 2(instructional group) X 2(gender) X 6(location) GLM ANOVA revealed a main effect for group,

Table 2

Source Table for Group X

Gender X Location GLM ANOVA

For Preview

Source	DF	Type I SS		F Value	PR>F
Group	1	.230		.19	.666
Gender	1	6.309		5.12	.024
GroupXGender	1	.723		.59	.444
Location	5	1159.211		188.14	.000
GroupXLoc.	5	2.345		.38	.862
GenderXLoc.	5	5.528		.90	.482
Grp.XGen.XLc.	5	1.964		.32	.902
		SS	Mean Square		
Error	696	857.688	1.232		

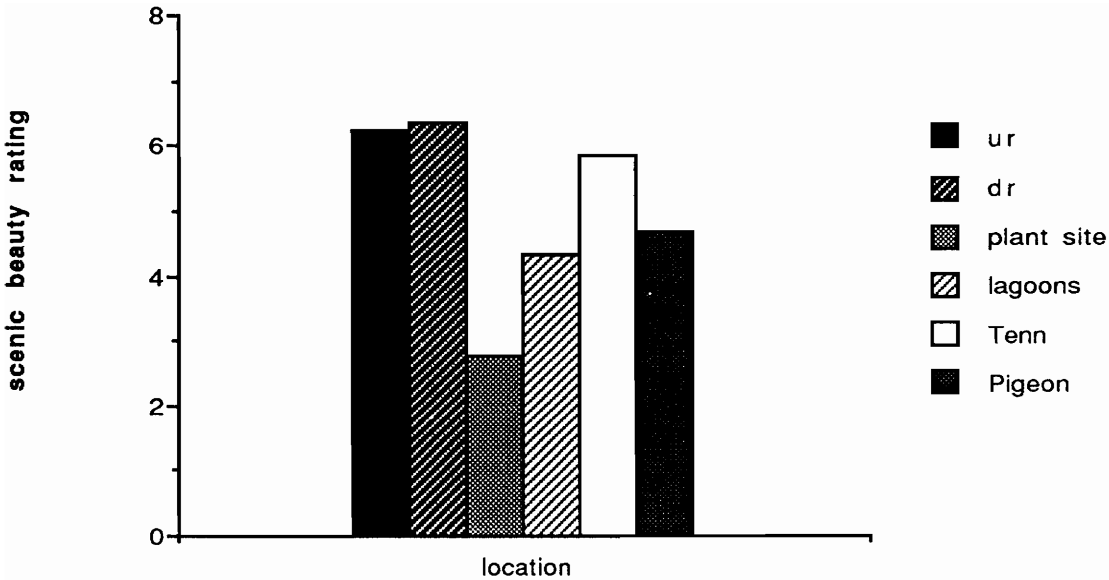

Figure 1

Average Scenic Beauty Ratings by Location for Preview

Table 3

Source Table for Group X

Gender X Presence/Absence

of Industry GLM ANOVA for Preview

Source	DF	Type I SS	F Value	PR>F
Group	1	.172	.21	.650
Gender	1	2.028	2.43	.120
GroupXGender	1	.143	.17	.679
Industry	1	568.314	681.75	.000
GroupXInd.	1	.025	.03	.864
GenderXInd.	1	1.707	2.05	.154
Grp.XGen.XInd.	1	.010	.01	.913

		SS	Mean Square
Error	232	193.397	.834

F(1,696) = 25.28, *p*<.0001, and location, *F*(1,696) = 98.03, *p*<.0001 (see Table 4). The neutral group rated the slides significantly higher (*M* = 5.331, SD = 1.335) than the biased instruction group (*M* = 4.952, SD = 1.282). Duncan's Multiple Range Testsindicated that the upriver and downriver Hiwassee and the Tennessee river's ratings were not significantly different (see Figure 2).

A 2(instructional group) X 2(gender) X 2(presence/absence of industry) GLM ANOVA performed on the data derived from the full 200-slide set revealed main effects for group, *F*(1,232) = 6.26, *p*<.01, and presence/absence of industry, *F*(1,232) = 349.42, *p*<.0001 (see Table 5). Again, the neutral instructional group rated the slides significantly higher (*M* = 4.706, SD = 1.508) than the biased instructional group (*M* = 4.397, SD = 1.493). Slides which did not contain the presence of industry were rated significantly higher (*M* = 5.708, SD = .879) than those which did (*M* = 3.395, SD = 1.040).

Evaluation of Pre/Post Differences

Since the preview of 25 slides was taken from the full 200-slide set, analyses of pre/post differences on those 25 slides was performed. A 2(instructional group) X 2(gender) X 2(pre/post) X 6(location) GLM ANOVA revealed a significant group X pre/post interaction, *F*(1,1392) = 9.948, *p*<.008, and a significant location X pre/post interaction, *F*(5,1392) =

Table 4

Source Table for Group X

Gender X Location GLM ANOVA

for 200-Slide Set

Source	DF	Type I SS	F Value	PR>F
Group	1	25.948	25.28	.000
Gender	1	.576	.56	.454
GroupXGender	1	2.745	2.67	.103
Location	5	503.182	98.03	.000
GroupXLoc.	5	5.804	1.13	.343
GenderXLoc.	5	2.010	.39	.855
Grp.XGen.XLoc.	5	.344	.07	.997
		SS	Mean Square	
Error	696	714.501	1.027	

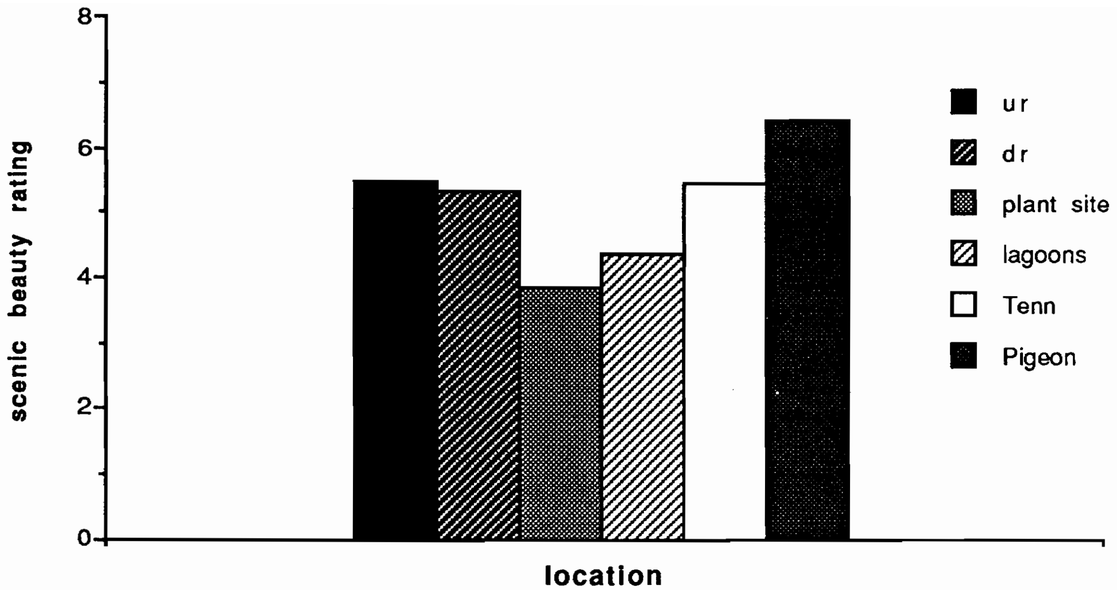

Figure 2

Average Scenic Beauty Rating by Location for Full 200-Slide Set

Table 5

Source Table for Group X

Gender X Presence/Absence of

Industry GLM ANOVA for 200-Slide Set

Source	DF	Type I SS	F Value	PR>F
Group	1	5.749	6.26	.013
Gender	1	.025	.03	.870
GroupXGender	1	.815	.89	.347
Industry	1	321.076	349.42	.000
GroupXInd.	1	.108	.12	.732
GenderXInd.	1	.649	.71	.402
Grp.XGen.XInd.	1	.010	.01	.916
		SS	Mean Square	
Error	232	213.181	.919	

78.152, p<.0001 (see Table 6; Figures 3 & 4). The neutral instructional group's ratings increased at post, while the biased instructional group's ratings decreased minimally. There does not seem to be any systematic pattern to the location X pre/post interaction. Ratings increased at post for some locations yet decreased for others.

A 2(instructional group) X 2(gender) X 2 (pre/post) X 2(presence/absence of industry) GLM ANOVA revealed a significant group X pre/post interaction, $F(1,464) = 3.892$, $p<.04$ (see Table 7; Figure 5). The ratings for the neutral instruction group increased slightly at post, while the ratings for the biased instructional group decreased at post.

Evaluation of Questionnaires

T-tests revealed no significant differences between standard scores on the seven scales of the LAB and the Pastoralism scale on the ERI by group. Some significant differences by gender were found between the following scales: Pastoralism, $t(110.6) = -2.031$, $p<.05$; Mechanics-Past, $t(113.5) = -5.222$, $p<.0001$; Crafts-Past, $t(116.9) = 5.129$, $p<.0001$; Mechanics-Future, $t(112.6) = -1.959$ $p<.05$; and Crafts-Future, $t(117.9) = 3.394$, $p<.0009$. Women scored higher on the Pastoralism and the Mechanics-Past and Future scales while men scored higher on the Crafts-Past and -Future scales. The means and standard deviations are

Table 6

Source Table for Group X

Gender X Pre/Post X Location

GLM ANOVA

Source	DF	Type I SS	F Value	PR>F
Group	1	6.129	4.42	.036
Gender	1	5.470	3.94	.048
GroupXGender	1	3.483	2.51	.113
Location	5	2337.834	337.02	.000
GroupXLoc.	5	4.684	.68	.642
GenderXLoc.	5	12.890	1.86	.099
Grp.XGen.XLoc.	5	7.399	1.07	.377
Pre/Post	1	.909	.66	.418
GroupXPre/Post	1	9.948	7.17	.008
GenderXPre/Post	1	1.472	1.06	.303
Grp.XGen.XPre/Post	1	.440	.32	.573
LocationXPre/Post	5	78.152	11.27	.000
Grp.XLoc.XPre/Post	5	2.758	.40	.851
Gen.XLoc.XPre/Post	5	1.126	.16	.976
Grp.XGen.XLoc.XP/P	5	1.911	.28	.927

		SS	Mean Square
Error	1392	1931.176	1.387

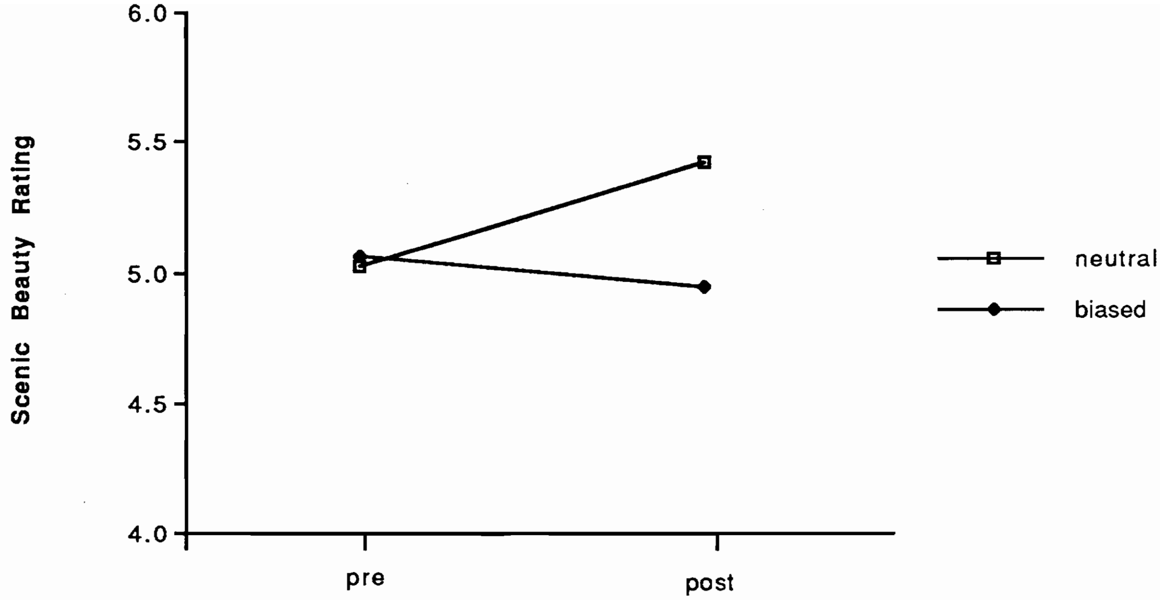

Figure 3
Instructional Group by Pre/Post Interaction for Group X Gender X Pre/Post X Location GLM ANOVA

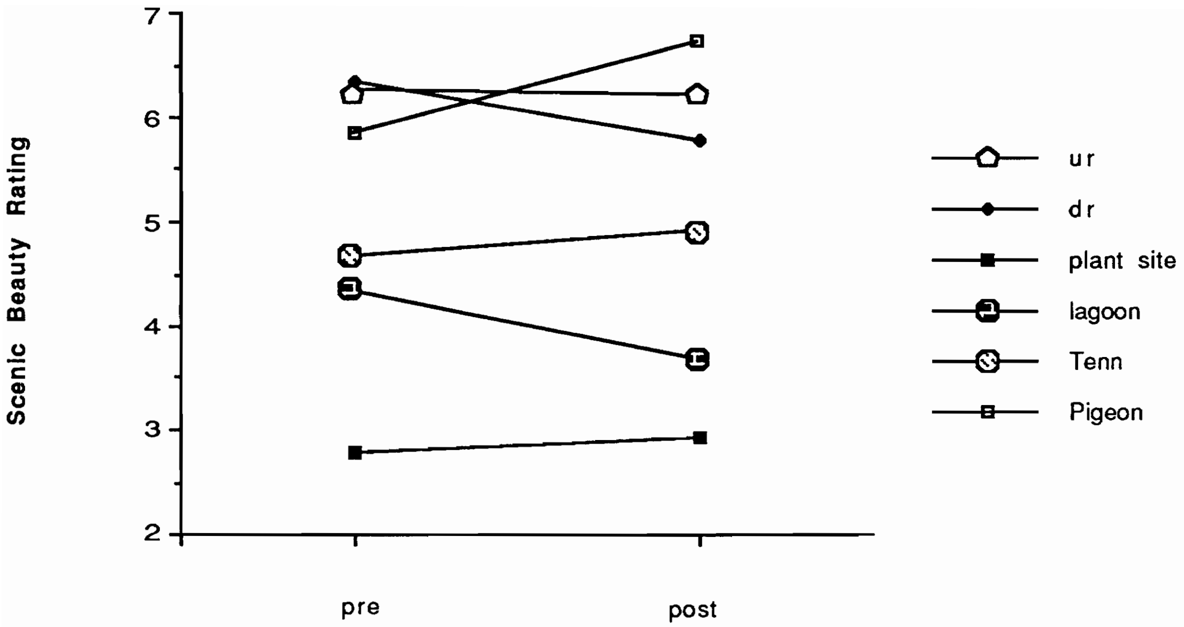

Figure 4

Location by Pre/Post Interaction for Group X Gender X Pre/Post X Location GLM ANOVA

Table 7

Source Table for Group X

Gender X Pre/Post X Presence/Absence

of Industry GLM ANOVA

Source	DF	Type I SS	F Value	PR>F
Group	1	1.921	2.12	.146
Gender	1	1.509	1.67	.198
GroupXGender	1	.345	.38	.538
Industry	1	1142.547	1261.08	.000
GroupXIndustry	1	.008	.01	.927
GenderXIndustry	1	4.815	5.31	.022
GroupXGen.XInd.	1	.938	1.04	.310
Pre/Post	1	1.921	2.12	.146
GroupXPre/Post	1	3.892	4.30	.039
GenderXPre/Post	1	.617	.68	.410
Grp.XGen.XPre/Post	1	.003	.00	.957
IndustryXPre/Post	1	.008	.01	.928
Grp.XInd.XPre/Post	1	.096	.11	.745
Gen.XInd.XPre/Post	1	.120	.13	.716
Grp.XGen.XInd.XP/P	1	1.233	1.36	.244

		SS	Mean Square
Error	464	420.389	.906

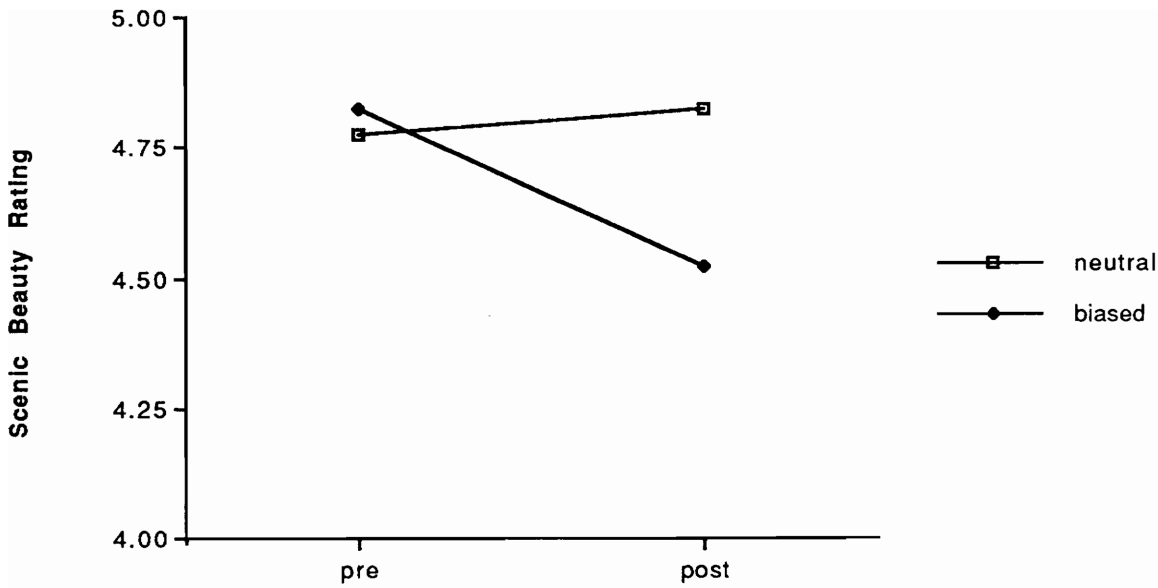

Figure 5

Instructional Group by Pre/Post Interaction for Group X Gender X Pre/Post X Presence/Absence of Industry GLM ANOVA

presented in Table 8.

A stepwise multiple regression using the scales on the questionnaires, gender, instructional group, and the scales interacting with gender and instructional group to predict average overall scenic beauty ratings was significant, $F(1,118) = 6.78$, $p<.01$. However, the only scale which was included was the Easy Living scale from the LAB interacting with the effect of instructional group (see Table 9) and this still accounted for only 5% of the variance in this sample of observers. The matrix of intercorrelations between the scales on the questionnaires are presented in Table 10.

Table 8

Means and Standard Deviations

for Questionnaire Standard Scores by Gender

Scale	Gender	Mean	Standard Deviation
Pastoralism	men	47.081	9.088
	women	50.845	11.045
Mechanics-Past	men	48.323	7.869
	women	56.397	8.985
Crafts-Past	men	50.387	8.076
	women	42.707	8.310
Mechanics-Future	men	51.484	8.494
	women	54.793	9.899
Crafts-Future	men	49.452	8.329
	women	44.396	7.987

Table 9

Predictor Variable for the

Prediction of Average Overall Scenic Beauty Ratings

Variable	B Value	Standard Error	F	p-value
EL X Group	-.006	.002	6.78	.01

Table 10

Intercorrelations Among the Different Scales on the Questionnaires

	PA	MEPAST	CRPAST	SP	MEFUT	CRFUT	EL	CL
PA	1.00	**.36	-.01	.13	**.34	.15	-.04	.09
MEPAST		1.00	.16	**.54	**.66	.12	*.17	**.28
CRPAST			1.00	*.22	**.25	**.68	*.21	**.29
SP				1.00	**.43	**.24	**.48	**.49
MEFUT					1.00	**.47	**.42	**.53
CRFUT						1.00	**.37	**.43
EL							1.00	**.54
CL								1.00

* $p < .05$
** $p < .01$

PA - PASTORALISM
MEPAST - MECHANICS-PAST
CRPAST - CRAFTS-PAST
SP - SPORTS
MEFUT - MECHANICS-FUTURE
CRFUT - CRAFTS-FUTURE
EL - EASY LIVING
CL - CLEAN LIVING

Discussion and Implications

Instructional Manipulation

The hypothesis that scenic beauty ratings will be lower for the biased instructional group was supported by the main effects obtained for instructional group. Observers in the biased instructional group did rate the slides significantly lower than observers in the neutral group. The significant group X pre/post interaction for the 2 X 2 X 2 X 2 GLM ANOVA also supports this hypothesis. The ratings for the biased group decreased at post while the ratings for the neutral group increased minimally. Thus, expectations about the presence of industry via instructions did have an effect on subsequent scenic beauty ratings.

The significant instructional group X pre/post interaction for the 2 X 2 X 2 X 6 GLM ANOVA lends some support to the hypothesis. Ratings at post for the biased instructional group decreased minimally while the ratings at post for the neutral instruction group increased. It should be noted that the pre/post analyses were performed on ratings of only 25 slides and, at post, these 25 slides were embedded within 175 other slides. This could have affected some of the ratings at post.

Pre-Existing Differences

There were no pre-existing differences by group. The 2 X 2 X 6 GLM ANOVA did reveal a main effect for gender, though, in that women rated the slides significantly higher than men. Previous research has shown that gender does not affect aesthetic ratings (Lyons, 1983). The gender difference did not exist when observers viewed the full 200-slide set, thus, the pre-existing gender difference may simply be due to the limited number of slides which were viewed. The present investigator has no other explanation as to why this may occur.

Significant differences by location also existed at pre, but were expected given the previous research by the present author (Laws & Prestrude, 1989; Prestrude & Laws, 1989). The main effect for location also existed in the analysis of the full 200-slide set. Ratings for the locations either increased or decreased in a non-systematic fashion between pre and post as indicated by the pre/post analysis of the 25 slides. This effect of location did not significantly interact with any other variables at pre or in the analysis of the full 200-slide set.

Significant differences due to the presence or absence of industry also existed in the preview of 25 slides. However, this difference was also revealed in the full 200-slide set and was in the same direction (slides with the presence of industry rated lower than slides without the presence of industry). The presence or absence of industry did not interact with pre/post either.

Questionnaires

The differences by gender for the Mechanics and Crafts scales, both Past and Future, were expected. However, these differences were opposite of those which have been previously reported by McKechnie (1975). On both the Mechanics-Past and -Future scales, women scored significantly higher than men; and on both the Crafts-Past and -Future scales, men scored higher than women (see Table 3). This is thought, by the present investigator, to be a function of two possibilities. The first is that the questionnaire is outdated. The LAB was constructed in the early seventies when there may have been slightly more traditional gender roles. Secondly, college students may have answered the questionnaire in ways that would make them appear to be "androgynous". They seem to have answered in opposition to traditional gender roles.

However, there were gender differences which were unexpected. The first is on the Pastoralism scale of the ERI. Women scored significantly higher on this scale than did men. McKechnie (1974) did not report significant gender differences on this scale, however, the magnitude of the difference between men and women on this scale is larger in his study than in the present study. He reports a difference of 4 standard points with women (standard score = 55) scoring higher than men (standard score = 51)

(McKechnie, 1974). In the present study the magnitude of the difference is 3.764, again, with women scoring higher than men.

One scale, Easy Living, interacting with the effects of group was found to predict average overall scenic beauty ratings. It should be noted that this scale only accounted for 5% of the variance in the sample, and, therefore, its usefulness is questionable. The correlation between this scale and average overall scenic beauty ratings was significant ($r = -.23$, $p<.05$). This seems to indicate that high scores on this scale are associated with low scenic beauty ratings and low scores are associated with high scenic beauty ratings. The Easy Living scale is concerned with people who work in the world of objects and actions rather than with abstract ideas (McKechnie, 1975). It is a future scale on the LAB meaning that it taps observers' future intentions in engaging in such leisure activities as casino gambling, social dancing, fraternities, going to horseraces and nightclubs, golf, motorboating, playing poker, shuffleboard, social drinking, and watching team sports and television shows (McKechnie, 1975). High scorers on the Easy Lining scale are described as sociable, outgoing, practical, optimistic, concerned with acheivement, and adopting economic and political value orientations while low scorers are described as introspective, introverted, aloof, withdrawn, concerned about philosophical problems in life, and adopting an aesthetic value orientation (McKechnie, 1975).

There were no significant differences on this scale due to group and the correlations between the Easy Living scale interacting with the effect of group and average overall scenic beauty rating by group were nonsignificant and in the same direction ($r = -.07$ for the neutral group; $r = -.14$ for the biased group). Therefore, the present investigator is unsure of how this scale is interacting with the effects of group.

The minimal prediction of average overall scenic beauty ratings by this scale is probably best explained through a synthesis of the person-environment interaction model and the adaptation level model discussed earlier. The observers may have had certain interactions with the environment which, in turn, became that observer's adaptational starting point from which great deviations are rated differentially. The interactions which observers scoring high on this scale have are not oriented toward the natural environment, thus, their adaptational starting point is not one which is greatly responsive to environmental aesthetic concerns. On the other hand, low scorers on this scale are oriented toward an aesthetic value system (McKechnie, 1975) making their adaptational starting point one which probably is responsive to environmental aesthetic concerns.

Statistical Significance and Practical Importance

A note should be given to the ideas about statistical significance and practical importance. Although many of the statistics performed reached significance, the practical importance of a .5 difference in scenic beauty ratings may be questionable. Statistically, observers were affected by the instructions in a way that reduced their scenic beauty ratings. However, the reduction may not have much practical significance. Therefore, from a practical standpoint, the concerns of the industries about biased expectations may not be significant, but to the researcher, the statistical significance of this study begs replication. From an applied standpoint, it is questionable whether governments, industries, and taxpayers will want to spend time and money for an increase in scenic beauty which is of the magnitude of a .5 difference.

Limitations and Future Research

One of the limitations of this study is that it is based on college student observers. These observers may not rate the slides in the same fashion as observers in a truly applied setting. Another limitation of this study is the fact that, for reasons of time and running observers efficiently, the preview only contained 25 slides which were embedded in the full 200-slide set. Thus changes between pre and post in the pre/post analyses may be due to the fact that the post slides were embedded within 175 other slides. Of course, another limitation of this study is that it does not contain actual on-site ratings which replicate the slides for comparison. Finally, this study did not contain a third instructional manipulation which creates a pro-industry expectation in observers.

Future research will want to investigate the effects of instructions which create both a pro- and an anti-industry expectation in observers. Research may also want to investigate the effects of a harsher instructional manipulation (the one in the present study is subtle), and the effects of these instructional manipulations on members of environmental groups as well as representatives of industrial plants.

Summary

In summary, the hypothesis that scenic beauty ratings will be lower for those receiving biased instructions rather than neutral instructions was supported by the significant differences found by experimental group. Thus, individuals can be affected in making scenic beauty judgements by the instructions alone. This has implications for any scenic beauty research in that investigators need to construct their instructions carefully and in a non-biased manner because the present study demonstrates that ratings can be affected by expectations and attitudes brought about through instructions.

If expectations of industry can affect scenic beauty ratings, then the concerns of the industries and researchers involved may be veridical. It has implications for the selection of subjects in that the researcher needs to ensure that the potential observers are not biased by certain expectations or attitudes that they may have.

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APPENDIX A

INSTRUCTIONS

INSTRUCTIONS FOR PREVIEW

You will be asked to view 25 slides of riverscapes, one at a time, each one for 8 seconds. Please rate the overall scenic neauty in each slide on a scale from 1 to 10 where 10 represents an extremely attractive appearance and 1 represents an extremely unattractive appearance. Some will be close ups of river surfaces, please rate these slides on the same scale. Mark your ratings on the answer sheet provided next to the number corresponding to the number of the slide. The experimenter will call out the number of each slide as it appears on the screen. Please do not compare ratings with one another and use only a #2 lead pencil.

NEUTRAL INSTRUCTIONS

You will be asked to view 200 slides of riverscapes, one at a time, each one for 8 seconds. Please rate the overall scenic beauty in each slide on a scale from 1 to 10 where 10 represents an extremely attractive appearance and 1 represents an extremely unattractive appearance. Some will be close ups of river surfaces, please rate these slides on the same scale. Mark your ratings on the answer sheet provided next to the number corresponding to the number of the slide. The experimenter will call out the number of each slide as it appears on the screen. Please do not compare ratings with one another and use only a #2 lead pencil.

BIASED INSTRUCTIONS

You will be asked to view 200 slides of riverscapes, one at a time, each one for 8 seconds. On these riverscapes are industries which dump chemicals into the river. Please rate the overall scenic beauty in each slide on a scale from 1 to 10 where 10 represents an extremely attractive appearance and 1 represents an extremely unattractive appearance. Mark your ratings on the answer sheet provided next to the number corresponding to the number of the slide. The experimenter will call out the number of each slide as it appears on the screen. Please do not compare ratings with one another and use only a #2 lead pencil.

APPENDIX B

LOG FOR SLIDE SET

1. SP - UPRIVER - COW SHOT
2. SU - LAGOON - WITH PLANT IN BACKGROUND
3. W - DOWNRIVER - WATERSHOT
4. SU - WATERFALL
5. W - UPRIVER - FACING DOWNRIVER WITH STEAM
6. SP - TENN. - WATERSHOT
7. SU - UPRIVER - BOWATER INTAKE
8. W - ISLAND - WATERSHOT
9. SP - HOUSE SHOT
10. F - DOWNRIVER - FISHERMEN
11. W - TENN. - WATERSHOT
12. W - LAGOON - PLANT IN BACKGROUND
13. SP - UPRIVER - BANK SHOT
14. W - PIGEON
15. SU - DRIFTWWOD AT WATERFALL
16. W - UPRIVER - BANKSHOT
17. SP - PLANT SITE - WATERSHOT
18. F - LAGOON 2
19. SP - DOWNRIVER - WAKE SHOT
20. F - INLET - BIRDS ON LOG
21. SU - DOCK - PEOPLE
22. SP - DOWNRIVER - FACING DOWNRIVER
23. SP - DOWNRIVER - BANK SHOT
24. F - HIWASSEE - DOWNRIVER - DUCKS
25. SU - UPRIVER - BANK SHOT
26. SP - TENN. - BANK SHOT
27. W - PIGEON RIVER
28. SU - RELEASE SITE
29. SP - UPRIVER - WAKE SHOT
30. SP - DOWNRIVER - WATER SHOT
31. SP - EFFLUENT CONTRAST SHOT
32. SP - DOWNRIVER - BANK SHOT
33. F - PLANT SITE
34. SU - DOWNRIVER - BANK WITH PINES
35. SP - UPRIVER - INTAKE
36. SP - EFFLUENT SITE - BANK
37. SP - UPRIVER - BANK SHOT
38. W - WATER SHOT - UPRIVER - INTAKE
39. SP - DOWNRIVER - WATER SHOT
40. W - UPRIVER - WATER SHOT
41. F - BELOW PLANT
42. F - UPRIVER - CLEVELAND UTILITIES
43. SU - TREE ROOTS - UPRIVER
44. SP - EFFLUENT SITE - BANK
45. F - DOWNRIVER
46. SP - DOWNRIVER - BANK SHOT
47. F - DOWNRIVER - HOUSES
48. W - UPRIVER - BANK
49. SP - BIRD SHOT - DOWNRIVER

50. SU - DOWNRIVER - WAKE SHOT
51. SU - RELEASE SITE - BANK
52. W - PIGEON
53. SU - OLIN
54. W - RELEASE SITE - BANK
55. SU - DIAMOND CRYSTAL
56. SU - UPRIVER - COW SHOT
57. SU - UPRIVER - FACING UPRIVER
58. F - INLET
59. SP - BIRD SHOT - DOWNRIVER
60. SP - UPRIVER - BANK SHOT
61. W - HOUSE SHOT
62. SU - DOWNRIVER - BANK SHOT
63. F - DOWNRIVER
64. F - DOWNRIVER
65. F - PLANT SITE
66. SU - UPRIVER - LOG
67. SP - DOWNRIVER - BIRD SHOT
68. F - UPRIVER - INTAKE
69. W - LAGOON - WATER SHOT
70. W - EFFLUENT CONTRAST SHOT
71. F - UPRIVER
72. SU - PLANT SITE
73. W - ISLAND
74. W - INTAKE
75. SU - DOWNRIVER - WATER SKIER
76. F - RELEASE SITE
77. F - LAGOON
78. W - EFFLUENT CONTRAST SHOT
79. F - LAGOON
80. SP - UPRIVER - BANK - OPPOSITE INTAKE
81. SU - WRECK
82. SU - DOWNRIVER - HOUSES
83. W - DOWNRIVER - WATER SHOT
84. W - PLANT SITE
85. SP - UPRIVER - BANK
86. F - LAGOON 2
87. W - LAGOON - MUDDY WATER
88. F - DOWNRIVER
89. F - RELEASE - BANK
90. F - WATERFALL
91. SP - MARINA - WATER SHOT
92. SP - UPRIVER - CLEVELAND UTILITIES
93. F - LAGOON
94. SU - RELASE SITE
95. SP - TENN. - WATER SHOT
96. SU - HOUSE SHOT
97. W - DOWNRIVER - WATER SHOT
98. SU - PLANT SITE - PIPE
99. SP - UPRIVER - BANK

100. W - PIGEON RIVER
101. F - DOWNRIVER - RIVER PLANT
102. W - UPRIVER - BANK WITH SNOW
103. F - UPRIVER
104. F - LAGOON 1
105. F - UPRIVER
106. W - DOWNRIVER - BANK SHOT
107. F - DOWNRIVER - MOUNTAIN
108. SU - EFFLUENT CONTRAST SHOT
109. SU - LAGOON
110. SP - BOATER - DOWNRIVER
111. SU - DOWNRIVER - WATER SHOT
112. SU - LAGOON 1
113. W - DOWNRIVER - WITH SNOW
114. SP - DOWNRIVER - BANK SHOT
115. W - DOWNRIVER - WATER SHOT
116. F - PLANT PIPE
117. F - DOWNRIVER - RED TREE
118. W - PIGEON
119. W - LAGOON - SLUDGE SHOT
120. SP - TENN. - BANK
121. W - UPRIVER - FACING DOWNRIVER
122. W - PIGEON
123. F - TENN. - MOUNTAIN
124. F - UPRIVER
125. SU - LAGOON 2 - WITH STICK
126. F - ISLAND
127. SU - MARINA
128. W - PLANT SHOT - TAKEN BY FARRIS
129. SU - PLANT - WITH BOX CARS
130. W - LAGOON 3 WITH TREES
131. F - DOWNRIVER
132. SP - DOWNRIVER - ROGER'S CREEK
133. SU - WATERFALL
134. F - LAGOON - PLANT IN BACKGROUND
135. W - LAGOON 4 WITH BANK
136. F - WRECK
137. SU - HIWASSEE - FROM I-75
138. SP - TENN. - BANK
139. SP - BIRD SHOT - DOWNRIVER
140. W - LAGOON <u>2ND SLIDE CAROUSEL</u>
141. SP - UPRIVER - BANK SHOT
142. SU - ISLAND
143. F - LAGOON 2
144. W - LAGOON
145. SU - LAGOON 3
146. SP - ISLAND
147. SU - TENN. - FROM I-75
148. F - UPRIVER - WAKE SHOT
149. W - DOWNRIVER - BANK SHOT

150. SU - UPRIVER - CLEVELAND UTILITIES
151. SP - DOWNRIVER - BANK
152. SU - TENN. MOUNTAIN
153. F - HOUSE SHOT
154. W - LAGOON 1 - WATERSHOT
155. SP - UPRIVER - FACING DOWNRIVER
156. F - LAGOON
157. SP - UPRIVER - FACING UPRIVER
158. SP - DOWNRIVER - WATERSHOT
159. SP - WRECK
160. SU - DOWNRIVER - BOATS
161. SU - UPRIVER - WATERSHOT
162. SP - DOWNRIVER - BARREN BANK
163. SP - DOWNRIVER - WATER SHOT
164. SU - UPRIVER - WATER SHOT
165. SU - LAGOON - WITH TAR GRASS
166. W - LAGOON - WATER SHOT
167. F - PLANT PIPE
168. F - DOWNRIVER - BOATER
169. SU - BELOW PLANT
170. SP - DOWNRIVER - FISHERMEN
171. W - UPRIVER - FACING DOWNRIVER
172. F - UPRIVER - INTAKE
173. SU - UPRIVER - WATER SHOT
174. SP - PLANT SITE
175. F - DOWNRIVER
176. W - PIGEON
177. F - OLIN
178. SP - INTAKE - UPRIVER
179. F - LAGOON - PLANT IN BACKGROUND
180. SP - WATERFALL
181. SU - PLANT SITE
182. SP - DOWNRIVER - FISHERMEN
183. W - PIGEON - WITH CHAMPION PLANT
184. SU - LAGOON 1
185. W - LAGOON - WITH DYKE
186. F - RELEASE SITE - BANK
187. SU - PLANT - POWER TOWER
188. W - WATERFALL
189. W - DOWNRIVER - BANK WITH SNOW
190. F - DIAMOND CRYSTAL
191. SP - DOWNRIVER - WATER SHOT
192. SU - DOWNRIVER - WAKE SHOT
193. F - DOCK (MISSING)
194. W - LAGOON 4 - WITH BANK
195. W - UPRIVER - FACING DOWNRIVER
196. F - LAGOON 4
197. W - UPRIVER - WATER SHOT
198. SU - UPRIVER - INTAKE
199. W - EFFLUENT RELEASE - BANK SHOT
200. SU - DOWNRIVER - MUDDY WATER

APPENDIX C

INFORMED CONSENT FORM

Informed Consent

Scenic Beauty Estimates of Riverscapes

You will be asked to view a series of color slides of river scenes and to record a numerical estimate of the scenic beauty of each slide. You will also be asked to respond to one or more questionnaires regarding your attitudes toward the environment.

Your participation will require no more than two hours of your time for which you will receive 2 experimental credit points toward your course grade.

You may terminate your participation at any time and will receive experimental credit proportionate to the extent of your participation. We will be happy to discuss your results and the overall results of the study at the completion of the study. Your responses will be kept confidential and will not be released to anyone unless we are directed by you to do so.

If you have any further questions please contact Dr. Helen Crawford, Head of the Human Subjects Committee of the Department of Psychology (231-6520 or 231-6581), Dr. Ernest Stout, Department Head, Research Administration (231-5281), Dr. Albert Prestrude (231-5673), or Eric Laws (5092-A Derring Hall).

I hereby agree to voluntarily participate in the research project "Scenic Beauty Estimates of Riverscapes" described above and under the conditions described above.

Your Signature____

Student Number____

Experimenter..____

Date..........____

VITA

Name: Eric L. Laws

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Blacksburg, VA, 24061

Educational Background

M.S. in Applied Experimental Psychology (Projected: May, 1990)	Virginia Polytechnic Institute & State University, Blacksburg, VA, 24061
B.S. in Psychology (May, 1987)	Christopher Newport College, Newport News, VA, 23606

Professional and Other Experiences

- Consultant with Bowater Southern Paper Company (Calhoun, TN) on the perception of scenic beauty and the impact of the mill on the surrounding riverscape (Winter, 1988 - Winter 1989).
- Performed two studies on the perception of apparent motion (Fall, 1987 - Winter 1988).
- Worked on t-scope program for the computer to complete apparent motion studies (Winter & Spring, 1988).
- Consultant with the Paper Industry Information Office in Maine (Summer, 1989 - Fall 1989).

Teaching Experience

- Fall, 1987 -	TA for Intro. Psychology
- Winter, 1988 -	TA for Nervous Systems and Behavior
- Spring, 1988 -	TA for History and Systems of Psychology
- Fall, 1988 -	Taught Lab in Sensation & Perception
- Spring, 1989 -	TA for History and Systems
- Fall, 1989 -	Taught Labs in Sensation and Perception
- Spring 1990 -	Adjunct Faculty at New River Community College - Introductory Psychology

Graduate Coursework

- Research Methods I
- Proseminar in Bio-Bases I
- Community Psychology

- Proseminar in Learning I & II
- Statistics for Psychologists I & II
- Proseminar in Developmental Psychology
- Proseminar in Personality and Social Psychology
- Information Processing
- Advanced Topics: Hypnosis
- Behavioral Management in Large Scale Systems
- Advanced Sensory Processes

Other Skills

- Use of computer for word processing and statistical analyses.

Publications, Presentations, and Reports

Prestrude, A. M. & Laws, E. L. (1988). Photosimulation study of the impact of treated papermill effluent on the appearance of a riverscape. Paper presented to the 11th European Conference on Visual Perception, Bristol, England: Sept. 2.

Prestrude, A. M. & Laws, E. L. (1989). Bowater Hiwassee River Project Technical Report. Bowater Southern Paper Co., Calhoun, TN.

Laws, E. L. & Prestrude, A. M. (1989). Magnitude estimation of the scenic beauty impact of industry on riverscapes. Poster presented at the Southeastern Psychological Association conference, Washington D.C., March 22-25.