

AESTHETIC CONSTRUCTING:
AN INQUIRY INTO KELLY'S PERSONAL CONSTRUCT THEORY

by

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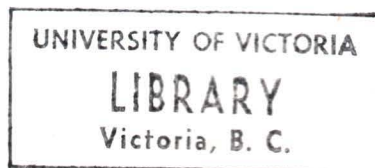
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Abstract

A theory of the nature of aesthetic construing was developed from within the framework of George Kelly's (1955) Psychology of Personal Constructs. Subjects employed a modified version of Kelly's role construct repertory test in a multidimensional scaling of polished and unpolished rocks. It was found that artist subjects generated more complex patterns of scaling of the rocks than did the non-artist subjects. It was also found that artist subjects demonstrated a greater degree of permeability of constructs than did non-artist subjects in that the artist subjects were able to include more of a second sample of rocks within the descriptions which they had produced for the first set of rocks than were the non-artist subjects. In addition, 12 different indices reported in the literature on personal construct psychology as measures of cognitive complexity were examined. It was found that each measure of horizontal complexity in the repertory grid correlated highly with the corresponding measure of vertical or column complexity in the grid. Estimates of test-retest reliability of the 12 complexity indices were also obtained. Further development of grid complexity indices and their rationale was shown to be necessary for future inquiry, particularly in light of the finding that different indices produced different conclusions with respect to the generality of cognitive complexity across different domains of content.

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1. Introduction

Aesthetic construing and personality--the major purpose of this inquiry is to make clear both the distinctions and the relationships between these two amorphous concepts. "Aesthetic construing" is defined in the present inquiry as the perpetual attempt to relate what was hitherto seen as diverse and thereby envisage a more integral universe of aesthetic events. It is assumed in this definition that the events and elements with which the artist works do not imply their own meanings or classifications, but instead appear meaningful and related as a function of the individual's erection of meanings and classifications to subsume them. An individual's aesthetic construing and the product of that construing which takes form in his production of or attempted production of a work of art, are both representations of the lawfulness and organization of his personality. The personality of the person who spawns a work of art has a lawfulness--a lawfulness which may or may not be different from the lawfulness of every other personality but which is none the less real and not beyond scientific investigation and description.

This, then, was the focus of this inquiry; the lawfulness of aesthetic construing and of the personality engaged in it. Specific attention was directed toward the individual who paints. The reasons for this attention were partly arbitrary and partly based upon some considerations for ease of method of inquiry. The theoretical discussion and the inquiry which follows it, however, can be applied as

well to those personalities which create music or poetry.

Why Study the Artist?

Certain notions about what the creative artist is "really" like have been held relatively constant throughout history: Artists are thought to be independent fellows. According to the legend, the artist experiences the world in a special way and, because he experiences in a special way, he also experiences more of the world than non-artists. He has an integral and unique awareness of the events in the world around him which provides him with the truths which form the substance of his art.

Personal Construct Theory

Any theory about any phenomenon tends to generate special kinds of questions about that phenomenon, special kinds of language to describe it and special kinds of tools to probe and examine it. The present theory and inquiry into the phenomenon of aesthetic construing is no exception.

While George Kelly's (1955) Psychology of Personal Constructs did not deal with the specific phenomenon of the artist's personality or with aesthetic construing, the theory of aesthetic construing and of the personality responsible for that construing is very much "Kellyian". This is true not only of the theoretical framework, but also of the language and tools of inquiry employed.

Kelly's (1955) Psychology of Personal Constructs provided a clear and definite statement of what he believed both the universe and man

to be. Kelly's philosophy of constructive alternativism assumes that the universe is real, lawful and integral, and in a constant state of process and, at the same time, a universe which is a relatively stable reality. Each individual man is also real, lawful, integral and in a state of process. Man does not just respond to the universe in the passive mechanistic sense. Rather, each man is actively involved in reconstructing and interpreting the universe in his own non-mechanical, personal way. Because man is constantly changing and growing, his personality is not a fixed and inalterable structure but is, instead, in a state of progressive change.

Kelly argues that the only way to account for the obvious fact of individual man's constantly changing personality is to view each man as a scientist in his own right. Within this notion of man-the-scientist lies a crucially important statement about what the philosophy of constructive alternativism holds the nature of man to be. The term "man-the-scientist" refers to all men, not just those who happen to be scientists. As Kelly argued, since the goal of every scientist is to predict and control, why not extend to each individual the possibility that he might just have the same aspirations--to predict and control the events in his own life? Each man-the-scientist, then, is seen as attempting to predict and control, in his own personal way, those events with which he finds himself involved. Thus, each individual postulates theories about the way events in his life will take place. He formulates hypotheses about what will happen, tests his hypotheses and, if they are substantiated, he tends to

employ them to predict the course of other events in his life. What this really means is that each man's behavior is his way of posing a question--a question about his universe and how he ought to behave in order to survive in it./

Kelly (1966) described in some detail the thinking which led him to the development of his psychology of personal constructs. It is an interesting description, the essence of which bears repeating. In reading through a number of introductory text books of psychology, Kelly was particularly impressed with the great pains to which text-book authors went to emphasize the scientific nature of psychology. He found that the authors, in order to clarify what they meant by "scientific" and the methodology that went with it, most often gave the reader the "inside dope" on just how a scientist behaves. His behavior goes something like this: he becomes intimate with the problem which confronts him; he forms hypotheses deductively and/or intuitively; he makes trial runs to test these hypotheses; he then relates the data to his predictions, after having controlled his experiments so that he knows what leads to what, he then generalizes cautiously and revises or updates his thinking in the light of new experience or information. The fact which Kelly found so interesting was that, after having described a fairly cohesive theory of the nature of the personality of the individual who makes his living by being a scientist, these text-book authors laid this theory aside and commenced to describe the personality and behavior of "ordinary" mortals in an entirely different way. Man becomes an organism who responds to

stimuli, is propelled by motives, is the product of his culture--is whatever pushes or pulls him.

The shift from one account of personality to another did not make much sense to Kelly. In his view there were only two alternatives open to the personality theorist: either apply to the psychologist himself the theory which he has devised to explain the personality and behavior of others or apply to others the theory which the psychologist has devised to explain himself. If, as it seems to be in most instances, the particular theory which the theorist has devised cannot explain the processes which led him to the building of his theory, then one is faced with the other alternative of looking toward the theorist's theory of the structure and workings of his own personality. Kelly accepts this second alternative and proposes the generalization of the psychology of the scientist's behavior to all of human behavior. It is a view of man which implies that he is creative, changing, rational, questioning and capable of intuitive responding. It is a view of man which implies that he is not less than this inquirer knows himself to be.

Construction Systems. Kelly (1955) claimed that each man looks at his world through a set of patterns or templates which he, the individual, constructs. With these templates (which Kelly calls constructs), man tries to determine and account for bits of the reality of his universe. Without these patterns, it would be impossible for a man to divide up and make sense of the constant stream of events which flows before him. Any construct or set of constructs is better

than none at all since, without them, this stream of events would be an undifferentiated flow. These constructs are, however, expendable and conditional approximations to reality. They can be replaced and/or modified by new experience and interpretation.

Kelly argued that most men were trying constantly to improve the fit of their constructs to the reality of events in their world by: (i) increasing the number of constructs, (ii) by altering existing ones to provide a better fit, and/or (iii) by making them a part of a larger system. These constructs may be explicitly formulated or implicitly acted out—rationally deduced or instinctively sensed. Each construct is a representation of the world which is tested by the man who derives it against the reality of the world that he experiences. This testing is done in terms of the predictive efficiency which the construct affords. Constructs and the construction systems of which they are a part can be communicated to other men. In addition, no two persons' construction systems are exactly alike. Also, some of the alternative ways of construing the events in the universe are more adaptive than others. According to Kelly, an individual has many construction systems, either superordinate or subordinate, each with its own range of convenience, since there are probably no constructs or construction systems which are relevant to everything.

The Phenomenon of the Creative Artist

Perhaps the best point at which to begin a discussion of the creative artist is with the labour or experiencing which is preparatory to the

act of creation. As Ghiselin (1952) in The Creative Process points out:

A great deal of the work necessary to equip and activate the mind for the spontaneous part of invention must be done consciously and with an effort of will. Mastering accumulated knowledge, gathering new facts, observing, exploring, experimenting, developing technique and skill, sensibility, and discrimination are all more or less conscious and voluntary activities. The sheer labor of preparing technically for creative work, consciously acquiring the requisite knowledge of a medium and skill in its use, is extensive and arduous enough to repel many from achievement. (p. 28)

The single most important condition of creativity, it would appear, is experience. Without experience in his medium, the artist cannot attain the understanding of or the flexibility in handling of that medium in the creation of a new work. This necessity for an active experiencing prior to the creation of a work of art is not, of course, confined solely to the artist's medium. It includes the active experiencing of the events and objects in the world around him. As Koestler (1970) points out:

Discovery often means simply the uncovering of something which has always been there but was hidden from the eye by the blinkers of habit.

This equally applies to the discoveries of the artist who makes us see familiar objects and events in a strange, new, revealing light--as if piercing the cataract which dims our vision. Newton's apple and Cezanne's apple are discoveries more closely related than they seem. (p. 108)

Without a certain kind and quantity of experience and without a certain minimum range of experience, all else that separates artist from non-artist cannot emerge.

Before creating one must experience. The artist who wishes to

expand his awareness of the nature of things and to bring a representation of that awareness to others must begin by breaking up the flow of things in the world which passes by before him. He must begin to make distinctions between these things--many distinctions. This is necessarily so if we accept the assumption that the world is very complex and that it is made up of many essences and relationships which are not readily apparent to the individual. As Jacques Maritain (1955) argues:

A philosopher (or an artist) who is in search of the nature of things is obliged to begin with sharp distinctions. These distinctions may seem brutal. They simply deal with certain essences taken in themselves: and how could we bring out otherwise, the intelligibility of things from the confused flux of existence? To isolate an essence does not imply any disregard for the complexity and continuity of the real. It is indispensable in order to analyze this complexity and continuity in a correct manner... and finally become aware of their very richness and meaning. (p. 31)

Now, the artist who creates is in search of the very things that Maritain's philosopher is. The work of art is the representation of a set of rules and relationships discovered in nature by the artist. The discovery of these rules and relationships depends upon his intellect, his judgement and his creative intuition. His intellect, judgement and creative intuition, however, are of little value without his active experiencing of the world in which these rules and relationships are to be found.

There is a very specific meaning for the word "experience" as it is employed here. This meaning is contained in Kelly's (1955) "experience corollary" wherein he states that "A person's construction

system varies as he successively construes events (p. 71)." What this means is that as a person receives more exposure to a set of events he then has the opportunity to make new distinctions between those events whenever something different about them occurs. As the person continues to experience events, the constructions which he has erected about those events are subjected to a validation process.

Kelly (1955) described this process:

The constructions one places on events are working hypotheses which are about to be put to the test of experience. As one's anticipations or hypotheses are successively revised in the light of the unfolding sequence of events, the construction system undergoes a progressive evolution. The person reconstrues. This is an experience. (p. 72)

Experience, then, is not a passive process. A person experiences to the extent to which he reconstrues the events in his life. It is entirely possible and entirely common for a person to remain a passive witness to the great stream of events which pass before him—passive in the sense that he makes no attempt to make any sense out of them. However, Kelly makes a critical distinction between passive witnessing and active experiencing when he argues that:

It is not what happens around him that makes a man experienced; it is the successive construing and reconstruing of what happens, as it happens that enriches the experience of his life. (1955, p. 73) e

Aesthetic construing involves the active experiencing of the events or objects from which the artist extracts the relationships which form the essence of his work.

It was mentioned above that one of the recurrent descriptions of the artist was that he somehow experienced the world in a "special"

way. At the core of the present theory of the nature of the artist's personality is the notion that the artist does indeed experience the world in a special way. At this stage of discussion, it is possible to state the present theory's position on the nature of this special kind of experience. It is a statement of the nature of the kind of experience achieved by an individual who, as an artist, is actively involved in aesthetic construing.

Cognitive Complexity. One area of research in personal construct psychology has centred around the dimensions of individuals' construction systems or, more specifically, the relative complexities of different individual's construction systems. Central to the present research is the proposition that individuals will vary in the number of dimensions they use in their construction systems according to their experience within the domain of phenomena to which the construction system applies. Thus, the first purpose of this inquiry was to determine whether or not the artist who paints is more actively involved in successively construing and reconstruing objects that are multidimensional in the domain of touch and sight than is the non-artist. If he is so involved, then the artist will be able to make more inferences from a sample of objects from such domains than will the non-artist.

One of the fundamental assumptions involved in the present inquiry is that the absolutely essential first component of the creative personality is an active and continuing experience with a wide variety of phenomena within the domain of events with which he deals in his art. In the present inquiry, the domain of stimuli

which was employed was that of polished and unpolished rocks. This particular domain was chosen because these rocks could be scaled along a very large number of dimensions, both subjective and objective. Thus, the employment of polished and unpolished rocks as stimuli provided subjects with the opportunity to respond to a set of stimuli which were multi-dimensional and varied in complexity of pattern and novel to all subjects. The first concern of the present inquiry became, therefore, a question of determining whether or not the cognitive systems of artists with respect to the domain of polished and unpolished rocks will be significantly more complex than the cognitive systems of non-artists.

Permeability of Constructs. The second major concern of the present inquiry has its source in Kelly's (1955) modulation corollary: "The variation in a person's construction system is limited by the permeability of the constructs within whose range the convenience of the variants lie." (p. 77). As Kelly pointed out, the individual is capable of perceiving and learning only that which the framework of his construction system permits him to see in the events and things which flow before him. This concept is directly related to the present theory of aesthetic construing--the ability to admit and to consider new forms and new relationships between things already familiar to the artist. This second condition refers to the artist's presumed ability to experience and combine things in new and unique ways--even to the point of apparent distortion of the "natural" order of things.

The construction system of the artist may be compared to a theory (as contrasted with a hypothesis). As Kelly explains:

A hypothesis is deliberately constructed so as to be relatively impermeable and brittle, so that there can be no question about what it embraces and no doubt about its being wholly shattered or left intact at the end of an experiment. A theory is not so inflexibly constructed. It is stated in relatively permeable terms so that it may ~~be~~, in the future, embrace many things which we have not yet thought of. It is stated in an open-ended form. A theory, then, both provokes and accepts a wide variety of experimental ventures, some of which may even be antithetical to one another. (1955, p. 81)

The second proposition that this inquiry investigated was that the construction systems of artists will be characterized by a significantly greater degree of permeability of construct systems than will the construction systems of non-artists. In short, it was proposed that the second condition for aesthetic construing of the artist was that it have the permeability of a theory.

As Kelly defined it: "A construct is permeable if it will admit into its range of convenience new elements which are not yet construed within its framework. An utterly concrete construct, if there were such a thing, would not be permeable at all, for it would be made up of certain specified elements--those and no others. Such a construct would have to be impermeable." (1955, p. 79). If a person's superordinate construction relationships are characterized by a high degree of permeability, he will be free to invoke what Kelly called "new arrangements among the systems which are subordinate to them." Such a quality is absolutely essential to the artist who is in the business of making new combinations of things and events.

The two hypotheses proposed above form the basis for a Kellyian theory of the nature of aesthetic construing. No statement is made about the nature of the final product of the artistic process, the work of art. Nor, was there any attempt to account for individual differences among artists in the technical skills in their medium. There is, obviously, a very wide range of skills and abilities among artists. This inquiry was concerned with the two fundamental conditions of aesthetic construing--complexity and permeability.

Theory and Methods of Measurement

The principal method developed by Kelly for the eliciting and measuring of personal construct systems was the grid form of his Role Construct Repertory Test (Rep Test). As Bannister and Mair (1966) point out, most of the features of constructs and construction systems (including those of complexity--simplicity and permeability) are reflected in this measurement technique.

Kelly (1955) provided the full details of administration of the Rep Test. However, since the present inquiry extended the application of the grid technique from the domain of people to another domain of inquiry, it is necessary to describe the modifications of the Rep Test employed here and where they deviate from Kelly's (1955) techniques.

In Kelly's original form, each subject was given a list of role-titles to represent a sample of the important people within his life. There was no requirement for uniformity of role titles across subjects

(special role titles could be chosen for individual subjects). The subject was then required to supply a different person to each role title. In the original form Kelly elicited 24 names from each subject. These names served as elements in the test. In the present inquiry, each subject was presented with a sample of 22 polished and unpolished rocks instead of the 24 role titles as elements in the test.

The second step in the administration in both the original and the present form of the Rep Test involved the selection of three of the elements (people in the original form and rocks in the present form) and presenting them to the subject. The subject was then asked to suggest some important way in which two of the elements are alike and different from the third. The subject's response was recorded and his attention was then drawn to the third element and asked to suggest how this element is different from the other two. He was then asked to point out to which other of the 19 elements the "alike" description could also apply. Thus, if the subject said that two of the original three rocks were polished and that the third one was unpolished, he would then be asked to indicate which of the remaining 19 elements were also polished. The subject was then led through a series of similar sorts (originally between 10 and 25). In the present inquiry, the subject was required to complete 22 sorts.

For each subject, a 22 X 22 matrix was generated in which each row contained a series of "checks" and voids. Each check indicated that the similarity pole of the construct applied to the rock in whose

column the check appeared. Throughout the test, each subject was encouraged to produce constructs different from those already produced earlier in the test. Thus, the matrix represents for each subject, a scaling of the rocks along 22 self-elicited dimensions.

Each grid represents 484 two point (one - zero) ratings. From this matrix, a large amount of information can be extracted (see Bannister and Mair, 1968; Bonarius, 1965; Crockett, 1965; and Kelly, 1955, for descriptions of grid measures). Since the primary concern of this inquiry was the pattern generated (i.e., the relative complexity-simplicity of the grid and the measure of permeability which was also extracted from the matrix pattern), the focus of this discussion will be on the theoretical and practical issues surrounding the measures extracted from these patterns. This concern with the matrix pattern avoided the problem encountered by Bieri and Blacker (1955) in that it removed the necessity of assuming that the examiner will interpret correctly the meanings of the subject's verbal labels.

Factor Analysis of Repertory Grids. Kelly (1955), in his explaining of his non-parametric factor analytic technique, offered the following comment:

The method of factor analysis of Rep Test protocol which we have devised does not involve the computation of tetrachoric r 's. Since the sum of the intersects in any two rows is always the same, we may simply count matchings of incidents and voids between any two rows gives us a measure of the relationship (not a correlation coefficient) between the two variables represented by the rows. Moreover, the significance of the matching can be computed by a p -value (level of statistical significance) determined even more appropriately than in the case of a correlation coefficient. (p. 281)

It is, therefore, a method of analysis specifically designed for Rep Test matrix data. As a method of analysis it may not warrant the title of factor-analysis. It does, however, provide a technique for yielding a simpler picture of the matrix data. The method is consistent with the theory of personal construct psychology.

The computer program employed for the factor analysis of the grid data is similar to that employed by J. V. Kelly (see Bonarius, 1965, pp. 7-9) and modified for use on the IBM 360 and later on the XDS Sigma 3.

An Examination of Two Grid Formats. One difficulty which had to be considered in the present study was that there was a very real possibility that the artist might not be able to verbalize effectively those dimensions along which he might scale the elements presented to him. It became necessary, therefore, to devise and examine an alternate method of response elicitation for the grid. This involved the same procedures described above for the elicitation of verbal dimensions with the simple exception that this second method did not require subjects to verbalize the dimension along which they were evaluating the elements. This second, non-verbal form of the Rep Test (NVRT) involved the assumption that a reliable, consistent and more sensitive measure of structure could be extracted without the necessity of verbal descriptions on the part of the subjects. Thus, before proceeding to the examination of the hypotheses of the present theory of aesthetic construing, the relative usefulness of the two forms of the Rep Test, the Verbal dimension Rep Test (VRT) and the

Non-verbal dimension Rep Test (NVRT), had to be examined.

Cognitive Complexity-Simplicity. The term cognitive complexity has been defined in numerous ways, not only within the framework of Personal Construct psychology, but also within other theoretical frameworks (e.g., Zajonc, 1960). Bonarius (1965) lists ten different measures of complexity extracted from Rep Test data, up until that time, all with varying degrees of reliability and none with reported relationships to other complexity measures.

The number of measures available of complexity and the limited number of examinations of these measures and the assumptions underlying them posed a serious problem for the testing of the first hypothesis of the present inquiry. Quite obviously, a choice had to be made among the various indices of complexity. The index or indices chosen had to be, in the first place, reliable. In addition, pilot-work by the author and preliminary investigation by Guthrie (1971) indicated that some of the complexity measures reported did not correlate very highly with one another, thereby suggesting that, if they were measuring anything validly, they were measuring different things or, whatever they were measuring, they were measuring it unreliably. Findings reported by Adams-Webber (1970) indicate that the segregation of construct from figure comparisons in the structural analysis of repertory grids was unwarranted or, more specifically, that measures of "cognitive complexity", "identification", and "constellatoriness" were functionally similar. As Campbell and Fiske (1959) point out, a test (or score) lacks discriminant validity if, in measuring one

variable, it correlates too highly with a test (or score) designed to measure a different, theoretically independent variable. Thus, the selection of a measure of cognitive complexity for the present inquiry had to involve an analysis of the discriminant validity of the various indices.

The present inquiry extended the work of Adams-Webber on discriminant validity by expanding the number of grid indices from five to twelve and by deriving measurements of reliability of these indices in both the VRT and NVRT test forms. As Bannister and Mair (1968) point out, information on specific reliabilities for different types of grids in different contexts with different measures of grid complexity is notably scarce. It was necessary, therefore, to determine the reliability of each of the two grid forms employed in the context of this inquiry and of some of the many measures of complexity afforded by the grid format. It is important to note that the term "construct" refers to data obtained from the rows in the grid and that the term "figure" refers to data obtained from columns in the grid. The following complexity measures were examined in both grid forms:

1. The percentage of variance accounted for by the first construct factor (PVFCF). This was suggested by Kelly (1955) as a measure of the grid's horizontal complexity.
2. The percentage of variance accounted for by the first figure factor (PVFFF). This was suggested by Kelly as a measure of constellatoriness and was obtained from the factor analysis of the data obtained in the columns of the grid.

3. The explanatory power of the first construct factor (EPFCF), defined by Jaspars (1963) as the sum of all matches between the hypothetical row which describes the first factor and all rows which are significantly loaded on this factor, where 16 out of 22 matches was considered to be significant ($p < 0.05$) loading. The test-retest reliability was reported by Pederson (1958) as 0.48 ($p < .01$).
4. The explanatory power of the first figure factor (EPFFF) devised as a measure of vertical unidimensionality by Flynn (1959) but found to correlate very highly with EPFCF by Adams-Webber (1970). EPFFF is obtained in the same manner as EPFCF but from the first figure factor obtained.
5. The number of construct factors (NCF) elicited (Jones, 1954 and Pedersen, 1958). Pedersen reported a test-retest reliability of 0.19 (not significant).
6. The number of figure factors (NFF) obtained from the factor analysis of the columns of the grid.
7. The number of perfect or near-perfect matches between rows (NPMR). Each identical pattern is given a score of 2; an identical pattern except for one non-match has a score of 1. The NPMR score is the sum of the scores and has been employed by Bieri, 1955; Pedersen, 1958, (test-retest reliability 0.36, $p < .05$); and by Renner and Maher, 1962 (test-retest reliability 0.51).
8. The number of perfect or near-perfect matches between columns (NPMC).

9. The average match between rows (AMR) developed by Adams-Webber (1969) (corrected for reflections).
10. The average match between columns (AMC) developed by Adams-Webber (1969) (corrected for reflections). Both the AMR and the AMC are estimates of construct/figure unidimensionality (cognitive simplicity).
11. The test for random information (TRIR) reported by Adams-Webber (1970). Each row is compared with every other and TRIR = the number of significant ($p = 0.05$) relationships between rows. The TRIR score for a random grid = $m(p(m-1)+1)$ where m = the number of rows and p = the level of significance.
12. The test for random information in columns (TRIC) in which each column is compared with every other and TRIC = the number of significant matches between columns.

Conceptually, the AMR, AMC, NPMR, NPMC, TRIR and the TRIC indices provide estimates of grid complexity without the complicated (and disputed) rationale of Kelly's non-parametric factor analysis.

Measurement of Permeability. The measure of permeability employed in the present inquiry was similar to that which was reported by Bannister and Mair (1968). Their measure involved requiring subjects to mark a zero on the Rep Test when neither the alike nor the contrast pole of the construct could be applied to the element. The total number of zeroes in the grid was taken as the measure of permeability of the constructs involved (i.e., the fewer the zeroes, the greater the degree of permeability). However, Fjeld and Landfield (1961) and

Landfield (1967) argued that this sum could be described better as a measure of range of convenience rather than of permeability of the constructs. To overcome the confusion involved, it was decided by the present author not to elicit the measure of permeability (or of range of convenience) from the set of elements in the original Rep Test. Rather, it was decided to ask subjects to apply the constructs from the original Rep Test to a second set of elements. Subjects were then asked to indicate to which of the new elements the constructs from their original Rep Test could not be applied. This measure is in accord with Bannister and Mair's (1968) definition of permeability:

A construct is permeable if it admits newly perceived elements to its context. It is impermeable if it rejects elements on the basis of their newness. (p. 220)

Generality of Complexity Across Domains. The present inquiry afforded an opportunity to assess the generality of cognitive complexity across two different domains of content (i.e., of polished and unpolished rocks and of people). As Crockett (1965) points out, the question is whether or not cognitive complexity can be conceived as a general trait of personality. The implications of the present theory of the nature of aesthetic construing suggest that cognitive complexity is domain-specific. An individual becomes cognitively complex as he successively construes and reconstrues the events within a given domain of events. This successive construing and reconstruing defines experience within a domain. Quite obviously, different individuals have different levels of experience within different domains of events. It is, therefore, quite possible to be

cognitively complex in the domain of interpersonal events and cognitively simple within the domain of interpersonal events and cognitively complex within the domain of rocks.

Bieri and Blacker (1956) reported a significant correlation between the complexity of subjects' responses on the Rep Test and their responses to the Rorschach. However, Sechrest and Jackson (1961) failed to replicate the results reported by Bieri and Blacker. In addition, in his summary of research on cognitive complexity, Crockett (1965) points out that the relationship of interpersonal cognitive complexity to complexity with respect to other domains of objects and phenomena has not differed significantly from zero. Thus, Bieri and Blacker's (1956) findings have received less than overwhelming confirmation. The present inquiry hypothesized that there would not be a significantly high correlation between interpersonal complexity and complexity with respect to the domain of rocks.

Summary of Areas of Inquiry

From the two hypotheses presented by the present theory of aesthetic construing and from certain issues in Personal Construct psychology methods, the present inquiry grew into the following series of investigations:

- a. the comparison, based upon their relative levels of consistency of patterns, of the two forms of the Rep Test devised for this inquiry: i.e. the verbal Rep Test (VRT) and the non-verbal Rep Test (NVRT);

- b. an examination of the reliability of 12 different measures of complexity extracted from the grid form of the Rep Test;
- c. an examination of the discriminant validity of the 12 different measures of complexity;
- d. the testing of the hypothesis that artists will demonstrate a significantly greater degree of cognitive complexity with respect to the test elements than will non-artists;
- e. the testing of the hypothesis that artists will demonstrate a significantly greater degree of permeability of constructs with respect to new elements than will non-artists;
- f. the examination of the degree of generality of cognitive complexity across the two domains of events: interpersonal and of rocks.
- g. no attempt was made to assess the reliability of the permeability measure since it does not lend itself to measures of internal consistency and test-retest data could not be readily obtained.

2. Experiment 1

Experiment 1 was concerned with the examination of the two forms of the Rep Test devised for this inquiry. In addition, it was also concerned with obtaining estimates of the reliability and discriminant validity of each of 12 different measures of complexity extracted from the grid.

Method

Subjects. Forty male and female undergraduate students in two introductory psychology classes served as volunteer subjects. Subjects were assigned randomly to one of the two groups (either the verbal (VRT) or the non-verbal (NVRT) test group).

Stimulus Materials. The stimuli for both the test and the retest phases consisted of five different sets of 22 polished and unpolished rocks in varying shapes and sizes. Each set of rocks contained 11 polished and 11 unpolished rocks. Stimulus rocks were randomly placed in consecutively numbered squares across the top row (element row) of the test grid. The position of each rock in each set was recorded in order to maintain the same element sequence in both the test and the retest phases. There were five different sets of rocks.

Procedure. Subjects were tested in groups of five, one subject per set of rocks. Each subject was presented with the same set of rocks in both the test and the retest phases. Subjects were asked to complete 22 different sorts. In both the VRT and the NVRT groups, subjects were asked

to bring the three rocks designated by the first sort into the second or "alike" row of the test grid. They were then asked to think of some important way (i.e., in terms of physical dimension, their emotional response, etc.) in which two of the rocks were alike and different from the third. The VRT group was then asked to specify how the two rocks were alike and also to specify the characteristic which they believed to be the opposite of the characteristic which the two rocks shared in common. These two responses were then recorded. The NVRT group did not verbalize the shared and opposite characteristics and simply proceeded to the next step.

Both groups were then asked to place the third, non-alike rock, in the third (contrast) row of the test grid and, of the remaining 19 rocks, to place those which shared the alike description into the alike row and those that did not into the contrast row. This allocation of the elements was then recorded by a "1" for an alike sort and a "0" for a contrast sort. All rocks were then returned to the element row and the subject was instructed to continue with the remaining 21 sorts following the same procedure as the first sort. Subjects were encouraged to find different characteristics or constructs for each sort. Each completed test yielded a 22 x 22 matrix filled with a pattern of zeroes and ones. In addition, the VRT group provided 22 verbal labels for each row in the grid whereas each row in NVRT subjects' grids was unlabeled.

One week after their first test, both groups were then subjected to the retest phase. In this phase, the VRT group was provided with

their original set of rocks and the verbal labels or constructs which they had suggested for each sort. They were then asked to re-allocate the 22 rocks to either the alike or the contrast pole of each of the 22 constructs in the same manner as in the test phase. This yielded a second 22 x 22 matrix of zeroes and ones for each subject. The NVRT group was presented only with their original set of rocks and asked to complete 22 sorts in the same manner as in the first testing, thereby also yielding a second 22 x 22 matrix of zeroes and ones for each NVRT subject.

Twelve scores cited as measures of complexity of the grid were obtained from both the test and retest grids in both the VRT and the NVRT forms.

Results. Raw data for experiment 1 may be found in tables 4 and 5 in Appendix 1. Pearson product-moment correlations were calculated for the 12 complexity measures on both the VRT and the NVRT in order to obtain indices of test-retest reliability for both test forms. The results are depicted in Table 1. It was found that with the exception of the EPFFF in the NVRT and the NCF and the NFF in the VRT all complexity measures produced significant ($p < .05$, $df = 18$) reliability coefficients. There were significant differences only between the NPMR ($Z = 5.36$, $p < .001$), the NPMC ($Z = 4.29$, $p < .001$), and the TRIR ($Z = 2.87$, $p < .01$) reliability coefficients obtained from the two test forms.

All subjects taking the NVRT complained that the test was uninteresting and dull in both the first and second test sessions and

Table I

Experiment 1 - Pearson Product-Moment Reliability Coefficients
for (Verbal Rep Test and Non-Verbal Rep Test) Test-Retest (df = 18)

Test Form	Complexity Indices											
	PVFCF	PVFFF	EPFCF	EPFFF	NCF	NFF	NPMC	NPMR	AMR	AMC	TRIR	TRIC
Non-verbal (NVRT)	.86	.51	.87	.42	.79	.56	.71	.73	.76	.78	.95	.73
Verbal (VRT)	.72	.68	.46	.68	.08	.22	.99	.98	.77	.85	.69	.55

df = 18 $\bar{r} = .44, p < .05$

$\bar{r} = .52, p < .02$

$\bar{r} = .56, p < .01$

PVFCF = Per cent of variance first construct factor

PVFFF = Per cent of variance first figure factor

EPFCF = Explanatory power first construct factor

EPFFF = Explanatory power of first figure factor

NCF = Number of construct factors extracted

NFF = Number of figure factors extracted

NPMR = Number of perfect matches between rows

NPMC = Number of perfect matches between columns

AMR = Average match between rows

AMC = Average match between columns

TRIR = Test for random information across rows

TRIC = Test for random information across columns

added that they had difficulty in remembering whether or not they had used certain constructs earlier in the test. Subjects taking the VRT registered no complaints and, in fact, appeared to enjoy taking the test. Subjects' preference for the VRT and the significantly higher test-retest correlations in two of the six measures of pattern complexity not involving the use of Kelly's factor analytic technique (as opposed to only one significantly higher test-retest correlation for the NVRT) led to the selection of the VRT as the test form to be employed.

Table 2 presents the Pearson product-moment correlation coefficients among the 12 measures of complexity (i.e., 6 horizontal and 6 vertical measures) derived from the first administration of the VRT. The only correlations smaller than 0.44 ($p < .05$, $df = 18$) involved correlations between the NCF and the NPMR, and the NPMC, between the NFF and the NPMR, NPMC, EPFCF and PVFCF, between the TRIR and NMR the NPMC and between the TRIC and the NPMR and the NPMC. In all instances, vertical and horizontal representations of the same index correlated with one another significantly ($p < .01$), indicating, therefore, the functional equivalence of vertical and horizontal complexity indices.

Average inter-correlations were calculated for the three measures of horizontal complexity not involving Kelly's factor analytic technique. The highest average correlation was obtained for the AMR (.77) as opposed to the NPMR (.51) or the TRIR (.49). This led to the selection of the AMR as the index of complexity to be employed in the present study.

Table II

Experiment 1 - Pearson Product-Moment Correlation Coefficients Between
Several Measures of Grid Complexity Within the Verbal Rep Test

	PVFCF	PVFFF	EPFCF	EPFFF	NCF	NFF	NPMR	NPMC	AMR	AMC	TRIR	TRIC
PVFCF	-	.70	.95	.76	-.45	-.32	.66	.69	.81	.83	.52	.59
PVFFF		-	.67	.94	-.48	-.62	.71	.77	.85	.90	.46	.72
EPFCF			-	.72	-.46	-.39	.52	.54	.76	.75	.54	.60
EPFFF				-	-.57	-.60	.65	.69	.89	.91	.54	.79
NCF					-	.47	-.13	-.15	-.67	-.59	-.75	-.77
NFF						-	-.32	-.27	-.62	-.61	-.49	-.77
NPMR							-	.99	.65	.77	-.01	.24
NPMC								-	.70	.81	.08	.32
AMR									-	.96	.68	.86
AMC										-	.54	.80
TRIR											-	.81
TRIC												-

$df = 18, r = .44 p < .05$

$r = .52 p < .02$

$r = .56 p < .01$

PVFCF = Per cent of variance first construct factor

PVFFF = Per cent of variance first figure factor

EPFCF = Explanatory power first construct factor

EPFFF = Explanatory power of first figure factor

NCF = Number of construct factors extracted

NFF = Number of figure factors extracted

NPMR = Number of perfect matches between rows

NPMC = Number of perfect matches between columns

AMR = Average match between rows

AMC = Average match between columns

TRIR = Test for random information across rows

TRIC = Test for random information across columns

3. Experiment 2

Experiment 2 was performed to determine whether or not cognitive complexity was general across the domains of people and of polished and unpolished rocks.

Method

Subjects. Ten male and ten female undergraduate psychology students served as volunteer subjects.

Stimulus Materials. Each subject completed the Verbal Rep Test (VRT) with the standard sample of polished and unpolished rocks. Each subject also completed a 22 x 22 Rep Grid involving 22 persons fulfilling 22 different roles in their lives. Subjects completed the VRT one month after completing the Rep Test. Neither test had a time limit imposed upon it. Test scheduling difficulties did not permit the balancing of the order of administration of the two tests.

Results

Raw data for experiment 2 may be found in table 6 in Appendix 1. Pearson product moment correlation coefficients between the complexity indices on the VRT and on the Rep Test are depicted in Table 3. It was found that on the basis of the AMR score ~~that~~ there was a significant correlation ($p < .05$) between complexity in the domains of rocks and of people indicating a generality of complexity across these two domains. However, it is important to note that only two other of the 12 complexity indices (NPMR and NPMC) achieves a significant coefficient. It is also important to recall that the NPMR and NPMC are by far the most reliable indices.

Table III

Experiment 2 - Pearson Product Moment Correlation Coefficients
Between Indices of Complexity Across Two Domains
of Content (People and Rocks)

Complexity Indices

	PVFCF	PVFFF	EPFCF	EPFFF	NCF	NFF	NPMR	NPMC	AMR	AMC	TRIR	TRIC
r	.37	.24	.22	.05	-.13	-.24	.84	.83	.48	.07	.39	.21

df = 18 r = .44 p < .05

r = .52 p < .02

r = .56 p < .01

r = .68 p < .001

PVFCF = Per cent of variance first construct factor
 PVFFF = Per cent of variance first figure factor
 EPFCF = Explanatory power first construct factor
 EPFFF = Explanatory power of first figure factor
 NCF = Number of construct factors extracted
 NFF = Number of figure factors extracted
 NPMR = Number of perfect matches between rows
 NPMC = Number of perfect matches between columns
 AMR = Average match between rows
 AMC = Average match between columns
 TRIR = Test for random information across rows
 TRIC = Test for random information across columns

4. Experiment 3

Experiment 3 was performed to determine whether or not artists would produce significantly more complex Verbal Rep Tests (VRT) employing rocks as elements than would non-artists.

Method

Subjects. Twenty artists and twenty non-artists served as volunteer subjects for this experiment. Artists were selected on the basis of the following criteria: (i) he or she stated that his or her principle occupation was that of an artist who paints and; (ii) he or she was actively painting at the time, and (iii) a willingness to participate in the experiment. Artist subjects were selected from four different cities in Canada (Victoria, Vancouver, Ottawa and Toronto) in order to avoid possible regional bias. Non-artist subjects were matched with artist subjects on the basis of: (i) age, (ii) sex, (iii) city of residence, (iv) educational background and (v) source (i.e., earned or supported) and amount of annual income. Non-artist subjects were rejected if they had been engaged in painting or drawing during the past year. No subject in either group had engaged in any of the following hobbies: rock collecting, rock polishing, geology, ceramics or pottery.

Procedure. The procedure was the same as that of Experiment 1. for the VRT. Each subject completed the VRT on the same sample of polished and unpolished rocks.

Results

Raw data for artists and non-artists may be found in table 7 in Appendix 1. A matched t-test was employed to compare the two sets of data. Artist subjects were found to produce significantly more complex grids, using the AMR score, than did the non-artist subjects.

($t = 3.69$, $df = 38$, $p < .005$; $\bar{X}_A = 13.68$, $S_A = 0.34$, $\bar{X}_{NA} = 14.41$, $S_{NA} = 0.83$). In addition, matched t-tests were obtained for the remaining 11 complexity indices. These are depicted in table 4.

Table IV

Experiment 3 - Matched t-test Values Obtained from 12
Complexity Indices of Artists and Non-
Artists

Complexity Indices

	PVFCF	PVFFF	EPFCF	EPFFF	NCF	NFF	NPMR	NPMC	AMR	AMC	TRIR	TRIC
t =	2.20	3.12	3.45	3.17	8.38	NS	1.16	1.13	3.69	3.80	2.92	3.78

df = 19; t = 2.54; p < .01

t = 2.09; p < .025

t = 1.73; p < .05

t = 1.33; p < .10

t = 1.07; p < .15

PVFCF = Per cent of variance first construct factor
 PVFFF = Per cent of variance first figure factor
 EPFCF = Explanatory power first construct factor
 EPFFF = Explanatory power of first figure factor
 NCF = Number of construct factors extracted
 NFF = Number of figure factors extracted
 NPMR = Number of perfect matches between rows
 NPMC = Number of perfect matches between columns
 AMR = Average match between rows
 AMC = Average match between columns
 TRIR = Test for random information across rows
 TRIC = Test for random information across columns

5. Experiment 4

Experiment 4 was performed to determine whether or not artist subjects would present constructs which were characterized by a significantly greater degree of permeability than would non-artist subjects.

Method

Subjects. Twelve of the artist subjects from Experiment 3 participated as artist subjects for this experiment (eight subjects were lost for this final stage of testing due to subjects' inability to remain for the entire testing session). The twelve matched non-artist subjects served as subjects in the non-artist group.

Procedure. All subjects were presented with a second sample of rocks and with the list of bipolar constructs which had been elicited by the first rock samples on the VRT. They were asked to check which rocks of the second sample could be described by either pole of each construct. The measure of permeability was taken to be the sum of the checks (maximum permeability score = 484).

Results

Raw data for experiment 4 may be found in table 8 in Appendix 1. Artist subjects were found to have significantly higher permeability scores than non-artist subjects. ($t = 1.85$, $df = 22$, $p .05$; $\bar{X}_A 388.17$, $S_A = 54.15$, $\bar{X}_{NA} 314.08$, $S_{NA} = 116.70$). Pearson product-moment correlations were calculated between all subjects' permeability scores and the 12 complexity indices. The results are depicted in table 5. Only

Table V

Experiment 4 - Pearson Product Moment Correlation Coefficients
 Between Indices of Complexity and Permeability
 Score

	Complexity Indices											
	PVFCF	PVFFF	EPFCF	EPFFF	NCF	NFF	NPMR	NPMC	AMR	AMC	TRIR	TRIC
Permeability	-.53	-.37	-.54	-.40	.48	.56	.39	-.27	-.54	-.52	-.62	-.56

$df = 19$ $r = .43$ $p < .05$

$r = .50$ $p < .02$

$r = .55$ $p < .01$

PVFCF = Per cent of variance first construct factor

PVFFF = Per cent of variance first figure factor

EPFCF = Explanatory power first construct factor

EPFFF = Explanatory power of first figure factor

NCF = Number of construct factors extracted

NFF = Number of figure factors extracted

NPMR = Number of perfect matches between rows

NPMC = Number of perfect matches between columns

AMR = Average match between rows

AMC = Average match between columns

TRIR = Test for random information across rows

TRIC = Test for random information across columns

the PVFFF, EFFFF, NPMR and the NPMC failed to achieve a significantly high correlation ($p < 0.05$; $df = 19$). With the exception of the NCF, NFF, and NPMR, all correlations were negative.

6. Discussion

Test form

The finding of significant reliability coefficients for 11 of 12 measures of complexity in the NVRT and for 10 of 12 measures of complexity in the VRT indicates that both forms of the test are highly reliable with respect to the stimuli employed. The choice of the VRT as the form to be employed in the experimental inquiry was based primarily upon subjects' marked preference for the VRT. Subjects argued that the VRT was easier to complete and that it "made more sense", suggesting that it might have better face validity. As it was hoped to employ a complexity index that did not involve the complicated rationale of Kelly's (1955) nonparametric factor analysis, the higher average correlation (.85) of the six non factor analytic indices (the number of perfect matches between rows (NPMR), the number of perfect matches between columns (NPMC), the average match between rows (AMR), the average match between columns (AMC) and the test for random information in the columns (TRIC)) for the VRT added an additional reason for employing the VRT over the NVRT (average correlation = .78).

Complexity Indices in VRT

The failure to achieve significant reliability coefficients for the number of construct factors (NCF) and the number of figure factors (NFF) indices is in accord with the findings of Pedersen (1958). The number of factors elicited would appear to be of value only in graph-

ically representing the major construct and element dimensions.

The high reliability coefficients found for the remaining ten indices reaffirm the consistency of the grid form of the Rep Test in another domain of phenomena. Kelly's (1955) experience corollary ("a person's construction system varies as he successively construes the replication of events") is, in fact, necessarily a good thing. As Bannister (1968) points out, Kelly once defined reliability as "...that characteristic of a test which makes it insensitive to change" (p. 156). It is in accord with Personal Construct theory to suggest that the high stability of the VRT is an indication of a minimal change in subjects' construction systems with respect to the domain of polished and unpolished rocks and/or the reliability of the test. Since, the subjects in Experiment 1 were not selected on any basis of experience in this domain, these coefficients of reliability are probably accurate indices of a minimal amount of active construing with respect to polished and unpolished rocks and/or with respect to the dimensions along which these rocks might be scaled. Artist subjects, however, if they are more actively involved in construing and reconstruing the replication of events within the domain of polished and unpolished rocks, ought to produce lower test-retest reliability coefficients than non-artists as a function of the change in construction systems due to active experiencing. This is an area of potentially fruitful investigation not only in the realm of aesthetic construing but also when it is necessary to map changes in the construction systems as a function of experience and/or time.

The high intercorrelations between vertical complexity coefficients and their horizontal counterparts substantiates Adams-Webber's (1970) conclusion that the explanatory power of the first construct factor (EPFCF) and the explanatory power of the first figure factor (EPFFF), AMR and AMC are virtually functionally equivalent and extends that conclusion to the relationship between the per cent of variance accounted for by the first construct factor (PVFCF) and the per cent of variance accounted for by the first figure factor (PVFFF), the number of construct factors (NCF) and the number of figure factors (NFF), the NPMR and the NPMC, and to the TRIR and TRIC. The arbitrary segregation of construct and figure relationships in a structural analysis of the grid is, indeed, unwarranted.

The high intercorrelations between most of the 12 indices of complexity indicate that most of these indices are assessing the same variable. The only exceptions to this general conclusion are the NPMR and the NPMC which show little or no relationship to the NCF, NFF, TRIC and to the TRIR and the NFF which shows little or no relationship to the PVFCF or to the EPFCF. With the highest average intercorrelation of the 12 indices and a respectable degree of stability, the AMR would appear to be the best choice as an index of complexity.

Generality of Cognitive Complexity

The present investigation produced a significant positive correlation between the AMR on the Rep Test (people as elements) and the AMR on the VRT (rocks as elements). While this finding would tend to support Bieri and Blacker's (1956) contention that cognitive complexity is

general across different domains of content, it is made less conclusive by the fact that 10 of the other 11 complexity indices do not support this finding of generality. This lack of agreement among indices of complexity probably explains the lack of conclusive support of either generality or lack of generality of complexity across domains in the many investigations which have been made. As Crockett (1965) points out, different investigations have employed different complexity indices, resulting in markedly different results. The findings of the present study underline the necessity of determining the reliabilities of various grid measures, of developing a rationale for those measures and the factors affecting them and, finally, of assuring that generalizations from investigation to investigation are, at least made on the basis of the same measures of complexity. The use of a grid in a different context requires the assessment of its reliability in that new context. In the same way, different context of investigation will require the development of the rationale for the employment of a particular measure of complexity. In most cases employing the Rep Test, the AMR would appear to be the most useful, most reliable and most easily interpretable.

Experimental Hypotheses

In experiment 3 it was demonstrated that the construction systems of artists with respect to a domain of a set of multi-dimensional stimuli are more complex than those of non-artists. Artists, then, were capable of employing more dimensions along which the stimuli might be scaled than were non-artists. With this greater complexity, artists

were able to produce a higher degree of differentiation among the elements in the domain of polished and unpolished rocks. While the AMR was selected as the best index of grid complexity, it is important to note that the finding that artists presented more complex grids than non-artists is supported in 11 of the 12 indices of complexity.

It was found in Experiment 4 that the construction systems of artists were characterized by a significantly greater degree of permeability of constructs than were the construction systems of non-artists. The operational definition of permeability employed in the present study differed from that of Bannister and Mair (1968) in that each subject was presented with an array of elements different from those used to elicit the constructs. The addition of this second array of elements brings Bannister and Mair's technique of scoring (which, if used on the original array of elements, approximates more closely a measure of "range of convenience") in line with Kelly's definition of permeability. However, the significantly high negative correlations found between the permeability scores and eight of the 12 complexity indices suggests that the permeability score is not independent of these complexity scores. These results suggest that the artist is more permeable because he is more complex. It is likely that the artist scores lower (i.e. possesses more permeable constructs) than the non-artist because he has had fewer matches between rows.

Further Inquiry

The present inquiry has demonstrated that, with respect to a certain domain of events, the artist, as an aesthetic construer, employs a

more complex cognitive system and a cognitive system whose constructs are characterized by a greater degree of permeability than does the non-artist. With these two characteristics forming the basis of a theory of aesthetic construing, it is then possible to formulate further hypotheses worthy of experimental inquiry--questions involving, instead of the quantity of the aesthetic experience, the quality of that experience. The present extension of Kellyian theory promises much towards the understanding of the nature of the aesthetic experience--experience which has, at its roots, discovery. The requirement for an active experiencing of the events in the domain of one's inquiry, be he artist, poet or scientist, is the same for all who would transcend the boredom of the endless repetition of an unchanging perception of events and experience the joy of discovery. At this level, the boundaries between domains of creativity can only be artificial.

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Appendix 1

Table VI

Experiment 1 - Raw Data from Non-Verbal Rep Tests

<u>S</u>	<u>Test</u>	<u>PVFCF</u>	<u>PVFFF</u>	<u>EPFCF</u>	<u>EPFFF</u>	<u>NCF</u>	<u>NFF</u>	<u>NPFR</u>	<u>NPMC</u>	<u>AMR</u>	<u>AMC</u>	<u>TRIR</u>	<u>TRIC</u>
1	1	25.83	17.15	313	115	2	2	3	0	15.86	15.39	103	118
	2	24.38	30.58	243	331	2	2	3	3	15.14	14.99	84	99
2	1	15.08	21.28	69	204	4	3	2	0	13.96	13.99	23	49
	2	8.47	26.24	16	315	5	2	31	2	15.66	16.45	36	142
3	1	13.84	22.11	121	250	4	3	3	1	14.01	14.23	25	59
	2	15.50	21.28	118	193	4	3	3	0	13.81	13.96	21	54
4	1	32.85	14.26	328	48	2	1	112	38	16.87	17.43	67	110
	2	42.15	40.50	381	434	2	2	214	91	18.86	19.45	81	110
5	1	21.07	9.92	208	34	5	1	56	1	14.32	15.07	22	54
	2	23.76	9.71	185	32	4	3	20	0	13.99	14.60	18	40
6	1	14.67	12.19	101	65	6	5	0	0	13.01	12.93	9	11
	2	20.04	22.11	157	191	4	3	5	0	14.11	14.27	52	65
7	1	32.23	36.36	398	419	1	1	2	1	16.79	16.58	231	164
	2	35.12	33.47	412	389	1	1	0	5	16.90	16.59	225	170
8	1	18.39	19.63	143	184	3	2	8	5	14.15	14.06	52	60
	2	18.80	19.63	133	175	3	3	6	3	14.76	14.42	61	63
9	1	18.39	20.46	141	169	3	2	1	0	13.83	13.93	38	42
	2	16.12	15.70	94	132	4	4	1	0	13.69	13.77	34	47
10	1	13.84	15.91	101	116	5	5	0	0	13.19	13.24	16	15
	2	16.94	15.70	86	97	4	4	1	0	14.11	14.09	51	57

Table VI (cont'd.)

<u>S</u>	<u>Test</u>	<u>PVFCF</u>	<u>PVFFF</u>	<u>EPFCF</u>	<u>EPFFF</u>	<u>NCF</u>	<u>NFF</u>	<u>NPMR</u>	<u>NPMC</u>	<u>AMR</u>	<u>AMC</u>	<u>TRIR</u>	<u>TRIC</u>
11	1	34.09	32.03	308	407	3	1	183	22	16.37	17.90	49	99
	2	29.75	25.62	265	234	4	2	72	6	15.38	16.26	42	83
12	1	17.77	17.36	135	156	3	4	8	0	13.57	13.94	24	44
	2	20.04	17.56	195	169	4	4	9	1	13.70	14.02	24	48
13	1	23.55	17.36	244	171	2	3	46	26	14.90	15.26	56	70
	2	21.90	19.01	218	169	2	3	0	0	14.51	14.49	70	65
14	1	21.07	23.14	233	210	4	2	0	1	14.39	14.41	66	63
	2	20.87	21.28	158	202	3	3	0	1	14.52	14.52	77	64
15	1	29.96	11.72	282	32	3	2	84	18	15.83	16.51	53	75
	2	27.69	18.60	263	196	3	2	76	14	15.47	16.13	43	94
16	1	17.98	16.32	136	132	5	5	0	0	13.69	13.75	30	36
	2	18.18	16.12	149	149	4	3	0	0	13.97	13.96	47	49
17	1	15.08	23.35	118	245	4	3	1	0	14.22	14.19	40	52
	2	17.56	19.63	157	168	3	4	1	1	14.09	14.00	44	51
18	1	26.86	36.36	297	414	1	1	2	3	16.76	16.58	231	193
	2	34.50	36.57	411	419	1	1	2	4	16.88	16.64	231	167
19	1	14.46	20.66	70	219	4	3	9	2	13.95	14.17	43	58
	2	14.05	15.70	53	131	4	5	7	1	13.89	13.97	25	48
20	1	26.03	17.36	324	115	2	2	3	0	15.63	15.46	104	121
	2	20.46	13.02	204	70	3	4	9	5	14.74	14.92	58	52

Table VII

Experiment 1 - Raw Data from Verbal Rep Tests

<u>S</u>	<u>Test</u>	<u>PVFCF</u>	<u>PVFFF</u>	<u>EPFCF</u>	<u>EPFFF</u>	<u>NCF</u>	<u>NFF</u>	<u>NPMR</u>	<u>NPMC</u>	<u>AMR</u>	<u>AMC</u>	<u>TRIR</u>	<u>TRIC</u>
1	1	20.46	20.46	198	186	3	2	6	2	14.84	14.80	51	81
	2	20.46	19.22	210	150	4	3	13	4	14.34	14.54	37	74
2	1	16.74	19.22	150	169	4	3	7	1	14.00	14.07	33	56
	2	15.91	20.04	122	187	3	4	6	0	13.39	13.39	30	58
3	1	23.55	16.53	188	180	3	4	13	2	14.52	14.75	47	66
	2	22.11	24.59	207	238	3	3	9	2	14.59	15.04	50	66
4	1	11.78	19.22	54	163	3	2	39	3	14.58	14.58	47	68
	2	15.91	19.22	168	196	3	3	16	4	14.72	14.76	49	58
5	1	16.32	15.50	141	84	5	6	0	0	13.29	13.22	16	16
	2	19.22	16.32	193	152	4	4	0	0	13.43	13.99	24	38
6	1	17.56	19.63	120	172	3	5	6	1	13.92	13.99	37	51
	2	17.56	19.22	132	153	4	3	6	0	13.97	14.01	36	55
7	1	26.45	21.90	282	243	2	2	1	1	15.24	15.16	107	94
	2	17.98	22.52	133	253	4	3	1	0	14.46	14.52	75	68
8	1	19.01	19.84	163	155	5	2	2	1	14.03	14.11	35	54
	2	16.53	18.60	108	169	4	5	2	1	13.69	13.73	30	47
9	1	13.64	20.25	84	178	3	3	2	0	14.23	14.07	44	58
	2	17.77	19.84	117	151	4	4	2	0	13.99	13.87	33	55
10	1	23.35	25.42	258	248	2	2	0	1	15.14	15.16	75	94
	2	17.15	20.87	117	188	4	3	0	0	13.76	13.93	35	42
11	1	14.46	15.70	64	99	4	4	0	0	13.57	13.69	37	40
	2	15.08	23.35	118	245	4	3	1	0	14.22	14.16	40	51

Table VII (cont'd.)

<u>S</u>	<u>Test</u>	<u>PVFCF</u>	<u>PVFFF</u>	<u>EPFCF</u>	<u>EPFFF</u>	<u>NCF</u>	<u>NFF</u>	<u>NPMR</u>	<u>NPMC</u>	<u>AMR</u>	<u>AMC</u>	<u>TRIR</u>	<u>TRIC</u>
12	1	14.05	19.42	68	189	4	4	0	0	13.68	13.67	31	42
	2	17.98	20.87	109	219	4	3	0	1	14.11	14.12	55	53
13	1	24.38	19.83	248	197	3	4	0	2	14.81	14.61	79	71
	2	18.18	19.42	122	141	3	3	0	1	14.21	14.12	51	60
14	1	20.66	23.14	200	254	3	2	13	3	14.52	15.06	39	85
	2	16.53	17.36	121	160	5	2	19	6	14.89	15.06	41	67
15	1	19.01	16.94	157	172	4	5	14	1	14.32	14.08	28	45
	2	17.98	16.32	137	122	4	3	4	0	13.73	13.92	24	42
16	1	21.90	22.73	233	211	3	3	47	10	14.52	14.81	37	49
	2	20.46	20.46	198	179	5	4	48	2	14.20	14.64	25	38
17	1	34.30	35.30	331	394	3	2	139	45	16.54	17.43	58	91
	2	35.95	35.95	350	411	3	1	174	57	17.12	17.83	67	86
18	1	17.15	20.87	168	199	4	3	6	1	14.20	14.32	33	60
	2	16.53	17.77	155	172	4	4	4	0	14.12	14.26	32	48
19	1	10.12	15.91	34	123	7	6	2	0	13.38	13.55	11	24
	2	13.84	14.26	51	101	7	4	4	0	13.30	13.42	17	26
20	1	17.77	23.55	132	241	3	3	0	1	14.99	15.00	83	94
	2	22.31	19.42	232	184	3	3	1	1	14.63	14.54	74	63

Table VIII

Experiment 2 - Raw Data - Generality Across Two Domains

<u>S</u>		<u>PVFCF</u>	<u>PVFFF</u>	<u>EPFCF</u>	<u>EPFFF</u>	<u>NCF</u>	<u>NFF</u>	<u>NPMR</u>	<u>NPMC</u>	<u>AMR</u>	<u>AMC</u>	<u>TRIR</u>	<u>TRIC</u>
1	rocks	20.46	20.46	198	186	3	2	6	2	14.84	14.80	51	81
	people	19.63	22.52	204	168	3	3	5	2	14.27	14.21	39	53
2	rocks	33.26	32.44	286	278	3	2	212	168	17.09	17.44	52	52
	people	27.27	27.27	276	298	2	2	51	21	15.81	15.97	57	115
3	rocks	16.74	19.22	150	169	4	3	7	1	14.00	14.07	33	56
	people	20.04	20.87	191	158	3	3	6	2	14.26	14.09	43	49
4	rocks	23.55	16.53	188	180	3	4	13	2	14.52	14.75	47	66
	people	18.80	23.35	154	241	3	3	27	7	14.46	14.61	25	58
5	rocks	16.32	15.50	141	84	5	6	0	0	13.29	13.22	16	16
	people	10.54	23.76	83	233	6	3	5	0	14.20	14.15	36	57
6	rocks	17.56	19.63	120	172	3	5	6	1	13.92	13.99	37	51
	people	16.94	21.07	151	225	4	3	1	2	14.13	14.04	32	46
7	rocks	26.45	21.90	282	243	2	2	1	1	15.24	15.16	107	94
	people	23.35	15.08	221	104	4	4	5	2	14.39	14.38	63	65
8	rocks	19.01	19.84	163	155	5	2	2	1	14.03	14.11	35	54
	people	20.46	13.84	227	51	4	6	1	0	13.92	13.94	34	40
9	rocks	13.64	20.25	84	178	3	3	2	0	14.23	14.07	44	58
	people	9.92	26.03	55	292	3	3	8	5	15.00	14.87	59	84
10	rocks	23.35	25.41	258	248	2	2	0	1	15.14	15.16	75	94
	people	11.78	19.22	50	154	6	4	2	0	13.66	13.71	19	47
11	rocks	14.46	15.70	64	99	4	4	0	0	13.57	13.69	37	40
	people	17.36	17.36	97	156	4	4	3	0	13.69	18.03	19	40

Table VIII (cont'd.)

<u>S</u>		<u>PVFCF</u>	<u>PVFFF</u>	<u>EPFCF</u>	<u>EPFFF</u>	<u>NCF</u>	<u>NFF</u>	<u>NPMR</u>	<u>NPMC</u>	<u>AMR</u>	<u>AMC</u>	<u>TRIR</u>	<u>TRIC</u>
12	rocks	14.05	20.25	84	192	4	3	0	0	13.81	13.88	30	45
	people	21.49	23.14	213	233	3	4	0	9	14.81	14.41	47	64
13	rocks	13.22	14.46	87	103	4	5	0	0	13.19	13.14	10	25
	people	18.60	21.07	183	250	4	3	1	1	13.88	13.93	32	41
14	rocks	15.08	22.93	116	228	3	6	2	2	14.02	14.06	18	57
	people	17.77	21.07	187	192	5	4	3	1	14.14	14.22	38	52
15	rocks	17.77	23.55	132	237	3	3	0	1	14.99	15.00	84	94
	people	25.00	29.60	306	347	2	1	0	3	15.74	15.81	110	129
16	rocks	17.15	20.87	168	199	4	3	6	1	14.20	14.32	33	60
	people	23.35	25.83	293	289	3	2	5	2	15.03	15.09	66	70
17	rocks	10.12	15.91	334	123	7	6	2	0	13.38	13.55	11	24
	people	20.66	21.07	189	272	3	2	22	8	14.49	14.59	32	68
18	rocks	22.52	25.41	233	301	3	2	1	2	14.91	14.93	72	84
	people	14.88	19.42	100	186	5	3	0	0	13.69	13.77	24	43
19	rocks	13.64	21.07	49	185	4	3	0	0	14.03	14.14	34	61
	people	14.88	17.77	95	150	4	4	8	0	13.54	13.74	25	39
20	rocks	11.16	25.21	33	272	6	4	2	0	14.52	14.50	41	67
	people	15.70	22.31	133	227	3	2	1	0	14.19	14.19	43	68

Table IX

Experiment 3 - Raw Data AMR scores for Artists and Non-Artists

<u>Artists</u>	<u>Non-Artists</u>
S1 - 13.68	S1 - 16.54
S2 - 13.37	S2 - 13.29
S3 - 14.06	S3 - 13.92
S4 - 13.49	S4 - 15.24
S5 - 13.41	S5 - 14.03
S6 - 13.22	S6 - 14.23
S7 - 14.26	S7 - 15.14
S8 - 14.12	S8 - 13.57
S9 - 13.84	S9 - 13.81
S10 - 13.56	S10 - 15.61
S11 - 13.69	S11 - 13.60
S12 - 14.03	S12 - 14.53
S13 - 13.27	S13 - 14.36
S14 - 13.33	S14 - 14.02
S15 - 14.12	S15 - 13.87
S16 - 13.61	S16 - 14.99
S17 - 13.92	S17 - 14.20
S18 - 13.34	S18 - 13.38
S19 - 14.00	S19 - 14.91
S20 - 13.33	S20 - 14.99

Table X

Experiment 4 - Raw Data - Permeability Scores of Artists
and Non-Artists

<u>Artists</u>	<u>Non-Artists</u>
S1 - 360	S1 - 335
S2 - 371	S2 - 259
S3 - 474	S3 - 178
S4 - 337	S4 - 183
S5 - 382	S5 - 182
S6 - 429	S6 - 418
S7 - 352	S7 - 474
S8 - 439	S8 - 147
S9 - 357	S9 - 394
S10 - 484	S10 - 414
S11 - 330	S11 - 403
S12 - 343	S12 - 382

VITA

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Place of Birth: St. Catharines Date of Birth: Aug 20 1944

Educational Institutions Attended, with Dates of Entering and Leaving:

Institution	Entered	Left
<u>Carleton University, Ottawa</u>	<u>1962</u>	<u>1966</u>

Degrees, Diplomas, Etc., Awarded, with Dates and Names of Institutions:

Degree	Date	Institution
<u>BA</u>	<u>1966</u>	<u>Carleton University</u>

Honors and Awards:

- Carleton University Residence Fellowship 1965/66
- Canadian Armed Forces Post Graduate Scholarship 1970/71

Publications:

- Ozerkevich, M.J. Television distortion and attitude change: A backlash effect. Proceedings: Psychology in the Air Force 3rd Annual Symposium, April 1972. (in press)