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THE UNIVERSITY OF ALBERTA

THE EFFECTS OF MODIFICATION OF COGNITIVE STYLE ON CREATIVE BEHAVIOR

by

© VIVIAN RENNER

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES

IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE

OF DOCTOR OF PHILOSOPHY

DEPARTMENT OF PSYCHOLOGY

EDMONTON, ALBERTA

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FACULTY OF GRADUATE STUDIES

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies for acceptance, a thesis entitled "The Effects of Modification of Cognitive Style on Creative Behavior" submitted by Vivian Renner in partial fulfilment of the requirements for the degree of Doctor of Philosophy.

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Supervisor

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for R. Knapp

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for W. W. Rozeboom

Date ...August.22,.1968.....

ABSTRACT

In order to facilitate investigation of the creative process, a paradigm which suggested that molar aspects of this process may be understood most comprehensively when they are considered as a function of an individual's cognitive style was presented. The study was designed to test four major ideas: one, that preferences for a particular type of stimulus in a particular situation can be modified through learning procedures; two, that such modification will affect not only the particular stimulus in the specific situation but will also occasion a modification of the individual's cognitive style; three, that modification of one type of preference will thus generalize to other preference situations and be manifest as a change of attitude toward those situations; four, that modification of an individual's cognitive style will effect his creative behaviour.

Sixty subjects participated in the experiment, in three experimental conditions: one, an experimental training condition during which subjects were exposed to art stimuli and talks which described and clarified the novel and significant attribute of the complexities in these stimuli; two, an exposure-to-stimuli control groups which received the same art stimuli but not the talks; and three, a test-control group.

To test the hypotheses which predicted that individual preferences can be modified and that such modified preferences will generalize the criterion tests for initial preference and generalization (Revised Barron-Welsh Art Scale, Music Attitude Scale, and semantic differential scales) were submitted to analyses of covariance. The hypothesis which predicted modification of an individual's cognitive style was explored

through factor-analytic procedures. The hypothesis which predicted effects on an individual's creative behaviour was tested by analyses of variance on creativity scores derived from the Consequences Test and the Circles Test.

The major findings of the study demonstrated that through the training procedures described above, preference for a particular type of stimulus in an art situation can be modified in the direction of complexity; that such modifications will generalize and be manifest as a change of attitude toward music; that there is some suggestion that these latter effects are strong enough to be accompanied by concurrent modification of the subjects' cognitive styles; that such training, presumably through modification of his cognitive style, will facilitate an individual's verbal originality. There were also the suggestions that the Consequences originality score is positively related to an acceptance of novelty process, that the Consequences fluency score is related negatively to evaluation of complexity; that the Circles Test forms an independent factor in itself.

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CHAPTER I

INTRODUCTION

Several investigators have made the discovery that any one person will characteristically approach his world in a consistent way (Barron, 1953a; Goldstein and Scheerer, 1941; Klein and Schlesinger, 1949; Maddi, 1968; Rokeach, 1960; Witkin, Lewis, Hertzmann, Machover, Meissman, & Wapner, 1954). Klein (in Gardner, 1959) introduced the concept of "cognitive style" to account for the self-consistency in a person's behaviour. As such, the cognitive style of any one person is a general factor which encompasses his behaviour and which can be located somewhere on a continuum which ranges from simple and unarticulated to complex and well differentiated.

There is considerable evidence that cognitive style and certain personality characteristics can go hand in hand. For example, persons who have developed complex cognitive styles have been found to possess more self-sufficiency, initiative, achievement-orientation, introspection, perceptual and cognitive independence, tolerance for ambiguity and risk-taking habits than do those whose cognitive style places them at the simple end of the continuum (Table 1). Further, it would appear that the personality characteristics attributed to individuals with complex cognitive styles are much the same as those which have been used to identify the creative individuals (Table 1).

It has been suggested that the concept of cognitive style explains not only differences in cognition but also differences in other areas of personality organization (Gardner, 1959; Rokeach, 1960) and it is

Table 1

Comparison of Creative Individuals with Individuals of Complex Cognitive Styles and Individuals of Simple Cognitive Styles on Personality Traits

Personality Characteristics	Creative Individuals	Individuals with Complex Cognitive Styles	Individuals with Simple Cognitive Styles
self-sufficiency	high (Cattell and Drevdahl, 1955)	high (Witkin et al., 1954)	low (Witkin et al., 1954)
initiative	high (Barron, 1963a; Roe, 1953)	high (Witkin, et al., 1954)	low (Witkin et al., 1954)
achievement-orientation	high (Barron, 1959; Roe, 1953)	high (Witkin, et al., 1954)	-----
introspection	high (Cattell and Drevdahl, 1955)	high (Witkin et al., 1954)	low (Witkin et al., 1954)
perceptual and cognitive independence	high (Barron, 1963b; Rokeach, 1960)	high (Goldstein and Scheerer, 1941)	low (Barron, 1953b; Rokeach, 1960)
tolerance for ambiguity	high (Barron, 1952)	high (Rokeach, 1960)	low (Rokeach, 1960)
risk-taking	high (McClelland, in Taylor and Barron, 1963)	high (Barron, 1953b; Rokeach, 1960)	low (Rokeach, 1960)

suggested here that molar aspects of the creative process may be understood most comprehensively when the process is linked to the cognitive style of an individual as in the following diagram (Figure 1).

With respect to Figure 1, two assumptions are made. The first assumption is that cognitive styles are learned. Although some inherent organization may govern part of the development of any perceptual-conceptual structure (Wertheimer, 1945) the larger part of the structure depends on organization acquired through experience (Barron, 1963; Hebb, 1949; Werner, 1948). The second assumption is that cognitive styles underlie individual preferences for stimuli. Perceptual preferences are not merely a matter of capacity, they are a matter of orientation towards experience (Barron, 1952; Klein & Schlesinger, 1949).

For practical purposes a preliminary instrumental connotation of the stimulus situation in Figure 1, when it is complex, is that if an individual's experiences in the situation are manipulated so that he obtains specific kinds of feedback from it or if an individual is reinforced in association with it in some way, he will come to prefer it. Such preferences, which are really perceptual decisions in favour of complexity (Barron, 1952), will directly affect his cognitive style in the direction of increasing differentiation. Associated with such increasing differentiation will be the facilitation of all his cognitive processes including the development of values and motives which will enable him to elaborate upon his experience. The latter will be manifested behaviourally as tendencies to select, and to continue investigating, new forms within the stimulus situation. Optimally, such behaviour in the individual would make for understanding of problems and for originality

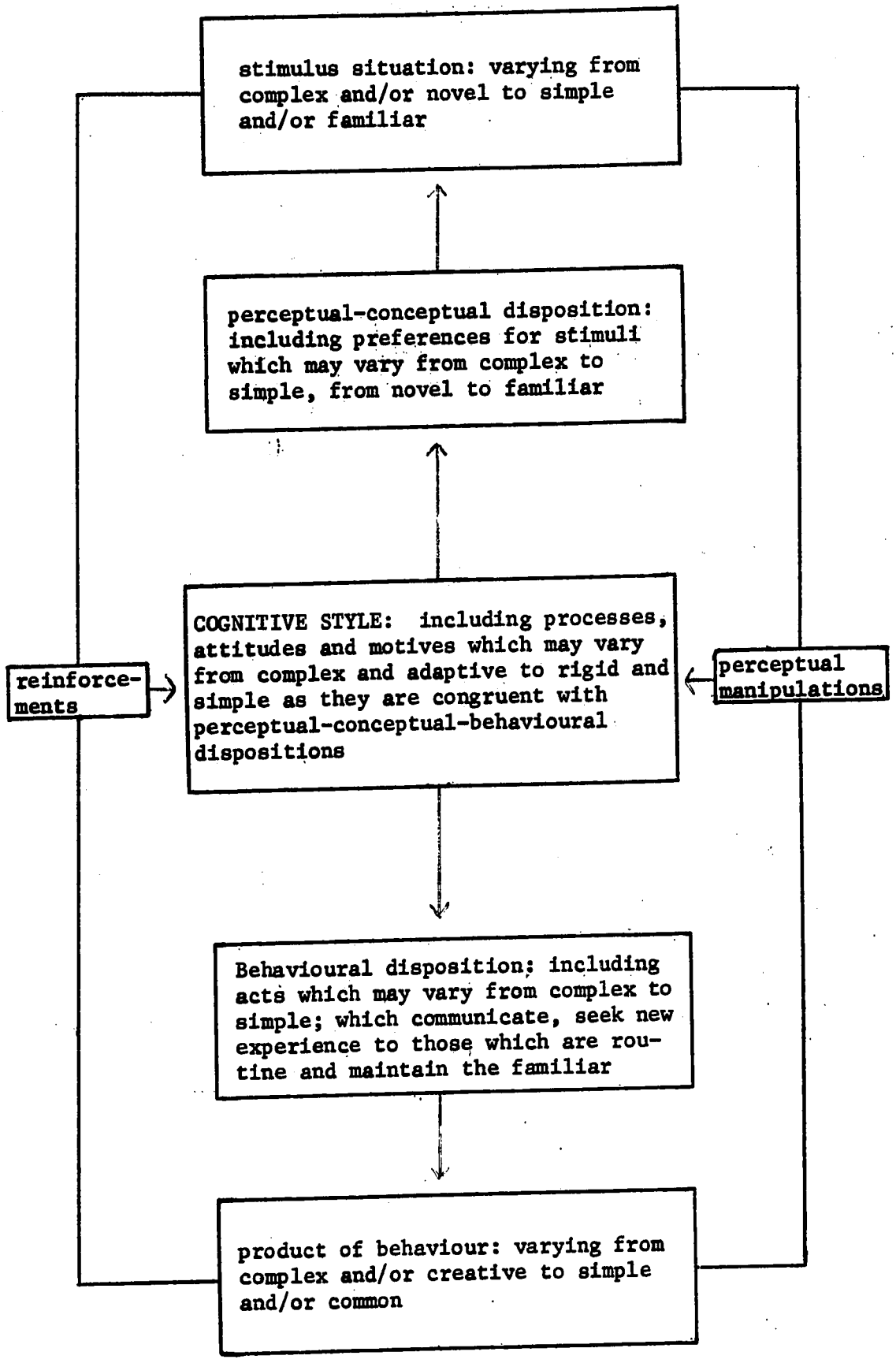

Fig. 1. Creative Behaviour as a Function of Cognitive Style.

in some creative endeavour. Conversely, another individual may learn to prefer simple stimulus situations and would, in consequence, maintain a more simple cognitive style. His behaviour would then consist primarily of a seeking out of the already familiar and maintaining the status quo.

The present study represents an attempt, then, to investigate the utility of the above paradigm. Essentially, the question asked is whether modification of a person's stimulus preferences will affect his cognitive style and his subsequent creative behaviour.

Statement of the Hypotheses

If an individual who does not ordinarily prefer complex stimuli is presented with a novel, complex stimulus for the first time, his responses to it will be minimal, for his cognitive and affective processes are not differentiated enough with respect to the stimulus to appreciate the subtleties of it. Because of his inability to discriminate its complexities, its very incomprehensibility and the potential threat that such incomprehensibility holds, he will, in all likelihood, not prefer that stimulus. If, however, his perceptions of the stimuli are manipulated in some way so that their incomprehensibility is reduced for him, or if he receives informational feedback or reinforcement in association with the stimuli, he will come to prefer them. Such changed preferences will affect his cognitive style. Cognitively and affectively his response to the stimuli will be more differentiated, thus implying that a more differentiated cognitive style has developed. As a result of the modification in his cognitive style and of the generalization of the new

preferences, his attitude to other complex stimuli should be more positive and his response to them should be also more differentiated. Finally, if such an individual's cognitive style does become more differentiated, the creative behaviour of the individual should be facilitated.

The four main areas on which this study focuses are:

1. Preferences for a particular type of stimulus in a particular situation can be modified through learning procedures.

2. Such modifications will affect not only the particular stimulus in the specific situation but will also occasion a modification of the individual's cognitive style.

3. Modification of one type of preference will thus generalize to other preference situations and be manifest as a change of attitude toward those situations.

4. Modification of an individual's cognitive style will affect his creative behaviour.

An approach to the investigation of these areas can be made by attempting to modify a subject's preference for particular stimuli, for example, modern art paintings, and then assessing the results of such modification on wholly different stimuli, such as modern music selections and on a variety of creativity tests. Modification of preferences, the extent of their generalization, and the effect of such modification on creative behaviour can be directly assessed, but whether modification of cognitive style occurs can be reached by inference only.

CHAPTER 2

METHOD

Apparatus

Visual Training Stimuli. The visual training stimuli consisted of 22 art slides of paintings. The paintings ranged from the first of the impressionists (e.g., Cezanne. Still Life: Jug of Milk and Fruit) to contemporary abstractionists (e.g., Jasper Johns. Device Circle.) (see Appendix A). Paintings which included identifiable objects were classified as structured art stimuli. Those which were totally abstract were called unstructured art stimuli. From these, six slides were chosen as test stimuli (see Appendix A).

Generalization Stimuli. The generalization stimuli consisted of a series of six musical pieces (tape-recorded) none of which were longer than two minutes in length. The music included pieces which--although unfamiliar--had some easily definable structure (e.g., Ronald LoPresti. Sketch for Percussion.) and pieces whose structure was built on very unfamiliar atonal patterns (e.g., Anton Webern's Bagatelles.) (see Appendix B). The former were classified as structured music stimuli and the latter as unstructured music stimuli.

Measurements

1. The Revised Art Scale (RAS) (Welsh, 1959), a revision of the Barron-Welsh Art Scale (Barron & Welsh, 1952) was the criterion test for general type of stimulus preference by the subject. On this scale subjects are simply required to state their preferences for black and white drawings, some of which are freehand, asymmetric, and complex, while others are ruled, symmetric, and simple.

2. Semantic differentiation (Osgood, Succi, & Tannenbaum, 1957) was used as a method of measuring characteristics of the subjects' cognitive style in terms of the quality and intensity of meaning that the art and music stimuli held for them and in terms of the relationships among these elements of meaning. Eighteen different scales were used in this study (see Appendix C).

3. A Music Attitude Scale (MA Scale) was included as a measurement of attitude to classical music. It comprised 11 items adapted from tests that were originally standardized by Mueller, Mill, Zane, and Hevner (1934) but which have recently been re-standardized and assigned new weights (Farnsworth, 1963) (see Appendix D). It may be noted that although this test does not identify the type of music with which it is concerned, most subjects tend to respond to it as dealing with items of the classical repertoire (e.g., Bach, Tchaikowski).

4. As measures of creativity, tests were chosen which measured a person's capacity for divergent thinking (Guilford, 1950). Divergent thinking is a process central to creativity for it allows a person to respond freely and widely to open questions for which there are no predetermined "correct" answers. As a verbal measure of this capacity the Consequences Test (Christensen, Merrifield, & Guilford, 1958), which requires subjects to list the consequences of novel situations with which they are presented, was used. As a measure more clearly related to the training on art, the Circles Test (Torrance, 1962, p. 219), which requires subjects to sketch objects with the circle as the main element of design, was used.

Subjects

A total of 60 subjects participated in this experiment. They were male and female students of an introductory psychology class and represented a relatively homogeneous age and intelligence grouping. All subjects had scores of 43 or less on the RAS indicating they were not subjects who already preferred complexity to a high degree. (The RAS is scored so that high scores indicate preference for complexity and low scores indicate preference for simplicity.) Subjects were randomly assigned to one of three experimental conditions.

Experimental Conditions

Experimental (Training). This condition (E) consisted of three one-half hour sessions on three consecutive days during which subjects were shown the visual training stimuli accompanied by taped talks which described and clarified the novel and significant attributes of the complexities in each painting (Appendix E). Approximately one-third of the stimuli were handled each day.

Exposure Control. Subjects in this condition (C-E) were given the same treatment with respect to exposure to the stimuli, but did not receive the accompanying talks. Instead they were asked to write down comments and any feelings or associations they might have with respect to them. This was done in order to insure that they would receive a similar amount of social reinforcement from the experiment as the E group.

Test Control. Subjects in this group (C-T) were not required to appear for any experimental treatment sessions. They appeared only at pre- and post-treatment testing sessions.

The instructions which each group received prior to the experiment are re-printed in Appendix F.

Procedure

For all conditions, subjects were run in groups of five. On day one, all subjects completed in the following order, the RAS and the semantic differential measures on the six art stimuli, which were administered by the experimenter, and the MA scale and the semantic differential measures on the six music stimuli which were administered by a second experimenter, allegedly conducting an independent experiment on test construction, so that subjects would not directly perceive the association of music to their training. Subjects were then assigned randomly to experimental conditions. On days two, three, and four the subjects in the E and C-E groups were subjected to their experimental treatments. On day five, post-treatment measures were taken by all subjects on the same tests in the same order and administered by the same experimenters as on day one. In addition, the Consequences Test and the Circles Test were administered by the first experimenter.

Statistical Methods Used

To test whether individual preferences can be modified and whether such modified preferences will generalize to other situations, analyses of covariance were applied to the RAS, the MA scale, and the semantic differential scale scores. To test whether an individual's creative behaviour would be facilitated by the experimental treatment, analyses of variance were completed on each of the six creativity measures.

Modification of an individual's cognitive style, was investigated partially by factor-analytic procedures carried out on the pre- and post-treatment variables across all subjects and by the application of analyses of variance, procedures to the subjects' factor scores on the pre- and post-treatment factors which emerged from the factor-analyses.

CHAPTER III

REDUCTION OF RAW DATA

The data originally yielded 442 raw observations for each subject including:

1. pre- and post-treatment scores on 18 semantic differential scales for each of the following classification of stimuli:

   i. three structured art stimuli
   ii. three unstructured art stimuli
   iii. three structured music stimuli
   iv. three unstructured music stimuli

2. pre- and post-treatment scores on the RAS

3. pre- and post-treatment scores on the MA scale

4. post-treatment scores only on the Consequences Test scored for two factors:

   i. fluency
   ii. originality

5. post-treatment scores only on the Circles Test scores for four factors:

   i. fluency
   ii. flexibility
   iii. originality
   iv. elaboration

In order to reduce the semantic differential scores for each subject to a more economical number and, at the same time, to provide semantic differential scores which were independent of each other, several principal component factor analyses[1] were undertaken on the pre-treatment semantic differential scores. Two out of the three stimuli in each classification were arbitrarily chosen by the experimenter as being the

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[1] In all factor analyses, factors were extracted until eigen values dropped below 1.00.

most representative of their classification. (For example, of the three structured art stimuli, the stimulus with the least number of identifiable objects was excluded.) The semantic differential measures on these stimuli were used in the factor analyses. Thus, four factor analyses were completed, one for each classification of stimuli; across all the subjects[2] and using the 36 pre-treatment semantic differential scores in that classification. The factors which emerged in each of these analyses corresponded quite closely to the activity, evaluation, and potency factors obtained by Osgood, Succi, and Tannenbaum (1957).

To reduce the semantic differential variables further those scales which loaded on more than two of the above factors were eliminated and the scores of the remaining scales on each factor were summed. Thus, as a measure of the activity factor, the scores on the two scales "active-passive" and "dynamic-static" were summed. Similarly, to measure the evaluation and potency factors, the scores on the two scales "beautiful-ugly" and "good-bad" and on the two scales "strong-weak" and "sharp-dull" were summed.

Further factor analyses were undertaken in order to discover a minimum number of stimuli on which subsequent analyses should be undertaken. Separate principal components factor analyses were done on each of the four classifications of stimuli, across all the subjects and using their activity, evaluation, and potency measures on the stimuli in that classification. The results indicated that subjects were not

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[2]In these preliminary data reduction analyses, observations from 15 additional subjects were included, allowing the N = 75 instead of N = 60.

responding to each stimulus, even within the same classification, in the same manner. For approximately half of the stimuli, their scores on the activity, evaluation, and potency measures were uncorrelated. For the remaining stimuli, subjects did not appear to respond along the activity, evaluation, and potency measures independently. Rather, all three measures of one stimulus correlated highly and would load on one or, at the most, two factors. This would suggest that some single, more general dimension other than the three Osgood factors was determining the subjects' responses to these stimuli.

It was decided to use in the analyses only the four stimuli (see Appendices A and B), one from each classification, to which the subjects responded on the basis of this one general dimension. Then, if changes in an individual's cognitive style did occur, such changes would be reflected in, presumably, the emergence of the Osgood factors or some other meaningful distribution of the post-treatment semantic differential scores of the stimuli across many factors.

The number of variables was thus reduced to 34 for each subject, including three pre- and three post-treatment semantic differential measures for each of the four categories of stimuli and all the scores described in lists two, three, and four above. Statistical analyses investigating the main experimental effects of changed preferences, generalization of preferences, and facilitation of creativity were based on these 34 variables.

Ultimately, however, in order to explore in more depth any modification of cognitive style, these variables were submitted to other

separate factor analyses, using all subjects and the pre-treatment variables in one, and all subjects and the post-treatment variables in another. Five pre-treatment factors and seven post-treatment factors emerged. The scores for each subject on the above 34 variables were converted to factor scores on each of these twelve factors, and further analyses of variance were based on these 12 scores.

CHAPTER IV

MAIN EXPERIMENTAL EFFECTS

The primary main experimental effects predicted were that the subjects' preferences for art stimuli would change and that such changes would generalize to music situations.

Effect on Revised Art Scale

Analysis of covariance (Table 2) of post-treatment scores on the RAS using pre-treatment scores on the RAS as the covariate showed that the groups responded differently on the RAS. Although the post-treatment means of both the E and the C-E groups are higher than the C-T group, when the pre-treatment means are considered (Table 3) it is evident that only the subjects in the E group have significantly raised their scores. Analysis of variance of the pre-treatment scores indicated that despite the higher mean of the C-E group the groups do not in fact differ significantly ($F = 1.90$, df 2, 57, N.S.). "t" tests of the differences in the change scores between the E and C-E ($t = 5.27$, df 19, $p < .01$) groups and the E and C-T groups ($t = 4.36$, df 19, $p < .01$) indicate that the E group changed its preferences significantly more than did the two control groups (Table 3).

Table 2

Summary of Analysis of Covariance of Revised Art Scale (RAS)

Source of Variation	df	MS	F	Significance Level
Groups	2	342.64	15.73	$<.01$
Error	56	21.78		

Table 3

Change Scores of Experimental Groups on Revised Art Scale (RAS)

Group	Pre-Treatment Mean	Post-Treatment Mean	Change Score
E	23.65	29.80	6.15
C-E	31.05	29.60	-1.45
C-T	25.45	25.20	-0.25

The increase in scores in the E group indicates that after the experiment subjects in this group changed their preference for designs in the directions of complexity. Thus, the idea that preferences for a particular type of stimulus in a particular situation can be modified through these training procedures, has been supported.

Effects on Music Attitude Scale

Analyses of covariance (Table 4) on post-treatment scores on the MA scale using pre-treatment scores on the MA scale as the covariate showed that the groups responded differently on the MA scale. Again the pre-treatment means must be considered (Table 5) before it is apparent that it is the E group which has raised its scores. The analyses of variance on the pre-treatment means again indicated that these means were not significantly different ($F = 2.34$, df 2, 57, N.S.) and the "t" test on the change scores between the E and C-E ($t = 3.12$, df 19, $p < .01$) and E and C-T ($t = 1.99$, df 19, $p < .05$) groups indicated that the E group changed its attitude significantly more than these groups.

Table 4

Summary of Analysis of Covariance of Music Attitude Scale (MA scale)

Source of Variation	df	MS	F	Significance Level
Groups	2	62.37	4.45	$<.05$
Error	56	14.02		

Table 5

Change Scores of Experimental Groups on Music Attitude Scale (MA scale)

Group	Pre-Treatment Mean	Post-Treatment Mean	Change Score
E	41.50	44.15	+2.65
C-E	44.00	42.35	-1.65
C-T	41.35	41.85	+0.50

It is the subjects in the E group who have endorsed more strongly statements expressing a positive attitude toward music and less strongly statements expressing a negative attitude toward music. This suggests a corresponding change in their own attitudes. Thus, the idea that modification of one type of preference, in this case art preferences, will generalize to other preference situations (music) has been supported.

Effects on Semantic Differential Measures

Given that art preferences and attitudes to music have been modified, these changes might well be expected also to be reflected in the subjects' semantic differential scores. Presumably, the subjects in the E group will attribute to the stimuli more quality and more intensity if their responses on these scales are to be congruent with their responses on the RAS and MA scale.

Table 6

Summary of Analyses of Covariance of Semantic Differential Scales

Variable	Source of Variation	df	MS	F	Significance Level
Activity on art structured stimulus	groups	2	2.012	.26	N.S.
	error	56	7.717		
Evaluative on art structured stimulus	groups	2	8.026	1.24	N.S.
	error	56	6.481		
Potency on art structured stimulus	groups	2	22.481	5.47	$<.01$
	error	56	4.107		
Activity on art unstructured stimulus	groups	2	3.300	.43	N.S.
	error	56	7.640		
Evaluative on art unstructured stimulus	groups	2	10.237	1.33	N.S.
	error	56	7.698		
Potency on art unstructured stimulus	groups	2	4.617	.53	N.S.
	error	56	8.068		
Activity on music structured stimulus	groups	2	8.535	4.82	$<.05$
	error	56	1.768		
Evaluative on music structured stimulus	groups	2	8.288	1.29	N.S.
	error	56	6.408		
Potency on music structured stimulus	groups	2	3.163	1.15	N.S.
	error	56	2.837		
Activity on music unstructured stimulus	groups	2	5.626	.724	N.S.
	error	56	7.773		
Evaluative on music unstructured stimulus	groups	2	8.684	2.16	N.S.
	error	56	4.006		
Potency on music unstructured stimulus	groups	2	2.785	.396	N.S.
	error	56	7.031		

Analyses of covariance (Table 6) on the post-treatment semantic differential measures with the pre-treatment semantic differential measures as the covariate showed, however, that except for the potency measure of the structured art stimulus and the activity measure of the structured music stimulus the groups do not respond differently. (On the latter two measures the means for the E, C-E, and C-T groups are 14.4, 11.05, 12.05 and 9.5, 7.6, 8.1 respectively.) This would suggest that if there are differences among the groups on the semantic differential measures they are more subtle than those revealed by simple univariate analytic procedures. It may be that if changes in the semantic differential scales have occurred, the direction and distance of the changes depend on the subject's initial response system and these more subtle changes would only become apparent in a multivariate analysis.

Effects on Creativity Measures

It was predicted that the experimental effect would be strong enough to affect, not only modification of preferences and generalization of such changes, but also the person's behavioural response on tests which measure creativity. Analyses of variance of the creativity measures (Table 7) indicated that the groups responded differently on three of the six creativity tests: the Consequences originality factor, the Circles originality factor, and the Circles elaboration factor.

Duncan's Multiple Range Test (Table 8) showed that on the Consequences originality factor the E group performed significantly better than the C-E and C-T groups. On the Circles originality and

elaboration factors the E group performed significantly better than the C-E group but not significantly different from the C-T group.

Table 7

Summary of Analyses of Variance of Creativity Measures

Creativity Measure	Source of Variation	df	MS	F	Significance Level
Consequences: fluency	Groups	2	29.317	.918	N.S.
	Error	57	31.930		
Consequences: originality	Groups	2	178.617	15.801	$<.01$
	Error	57	11.303		
Circles fluency	Groups	2	21.317	.902	N.S.
	Error	57	23.620		
Circles flexibility	Groups	2	25.317	2.483	N.S.
	Error	57	10.194		
Circles originality	Groups	2	683.267	5.263	$<.01$
	Error	57	129.820		
Circles elaboration	Groups	2	106.117	3.261	$<.05$
	Error	57	32.539		

Thus, the hypothesis that the creative behaviour of the E group would be facilitated by the experimental treatment is only partially supported. The most striking facilitation of creativity occurs in the subjects in the E group on the Consequences originality factor. The Consequences Test is a verbal one, and scores for originality depend on the subject's ability to produce distantly (remotely) associated responses to a novel stimulus situation. This ability appears to have been greatly enhanced in subjects in the E group as a result of the training which stressed describing and indicating the novel and significant attributes of complex art stimuli. Presumably, such

Table 8

Means and Tests of Significance (Duncan's Multiple Range) on Creativity Measures on which Groups Significantly Differed[1]

Test	Means		
	E	C-E	C-T
Consequences originality	10.10_a	5.25_b	4.65_b
Circle originality	37.80_a	26.60_b	35.10_a
Circle elaboration	21.25_a	16.70_b	19.60_a

[1]Cells in each row having a subscript in common are not significantly different at .05 level.

training had the effect of increasing the comprehensibility of the art stimuli for the subjects by teaching them how to approach complex stimuli. Later, they were able to generalize the same principles of confronting complex stimuli to a test situation measuring creativity in a way which allowed them to cope successfully with the tasks.

Since the subjects in the E group were trained on art, it was felt the facilitating effect of the experimental treatment on creativity would exhibit itself most significantly on the Circles Test. However, the E group does not perform better than the C-T group. An explanation for this might be that in their training the E group had to deal with, for the most part, unstructured art stimuli where they learned to

understand and cope only with impressions and suggestions. They may have maintained this approach when presented with the Circles Test and thus not been able to answer the demands of the instructions which specify drawing "objects". Scores on the Circles Test depend on the presence of structural parts and describing the objects beyond minimum essentials. The E group, perhaps, had learned not to rely on such concrete details.

Duncan's Multiple Range Test showed that on the Circles Test the C-E group dropped significantly below the E and C-T groups. Recalling the negative direction of this group's change scores on the RAS and MA scale (Tables 3 and 5) one might speculate that subjects in the C-E group found the ambiguity of their experimental treatment and the unexplained complexity of the stimuli to which they were exposed so threatening that they withdrew from the situation in order to avoid too high arousal (Maddi, 1968). It may be such a withdrawal which is being reflected in their generally poor performance on post-experimental measures.

CHAPTER V

DISCUSSION AND CONCLUSIONS (PRIMARY EXPERIMENT)

The main focus of this study was concerned with investigating the utility of a paradigm which suggested that molar aspects of the creative process may be understood most comprehensively when they are considered as a function of an individual's cognitive style. This study was designed to facilitate an individual's creative behaviour through modifying his cognitive style in the direction of complexity. The latter was undertaken by exposing subjects to procedures which were designed to modify their stimulus preferences.

On the Revised Art Scale, which was the criterion test for general type of stimulus preference by the subject, the E group significantly changed its scores in the direction of complexity following a training procedure which stressed description and clarification of the novel and significant attributes of the complexities in art stimuli. This finding supported the idea that preferences for a particular type of stimulus in a particular situation can be modified. It is suggested the subjects in the E group were receiving informational feedback from the perceptual manipulations in the training situation which allowed them to understand the complex stimuli better than they had before they were exposed to training. They were able to 'see beyond' the ambiguities which had faced them at first. In all likelihood, they were also being positively reinforced in the situation by having the incomprehensibilities reduced for them. These considerations led them, ultimately, to accept and to prefer these stimuli.

On the Music Attitude Scale, which was the main generalization test of modified preferences to other situations, it was also the E group which significantly changed their scores in a positive direction indicating a corresponding change in their attitude. Thus, the idea that modification of one type of preference will generalize to another situation and be manifest as a change in attitude toward that situation was supported.

Further, the experimental treatment in this study was strong enough to modify not only the E subjects' initial preferences in the art situations and effect a generalization to statements about music stimuli, but was also strong enough to significantly facilitate their performance on the Consequences originality factor.

Within the framework of the paradigm which was presented at the beginning of this study it may be speculated that for the subjects in the E group a re-structuring and re-ordering of their older responses to aesthetic stimuli had occurred and that this reorganization of response systems had applicability beyond the situation in which it was learned. In other words, the subjects in the E group may have been able to generalize the same principles of confronting stimuli, which they learned on the art stimuli, to the novel stimuli with which they were faced on the Consequences Test.

Nevertheless, whether this particular speculation is true or not, the implications of the results of this study are important. They suggest, primarily, that creative responses are not isolated or separable from other aspects of an individual's cognitive style. It

is evident, of course, that a further, critical question, which this study has not been designed to answer, is the matter of the stability of the changes which have occurred. The paradigm presented in Diagram I suggests the changes might be expected to be fairly permanent. However, the problem of the generality and permanence of these changes is a matter for further investigation.

CHAPTER VI

FACTOR ANALYSES

The experimental manipulations of attempting to modify a subject's cognitive style, as indicated by altered stimulus preferences (art) and changes of attitude in another aesthetic situation (music) yielded the expected results of having a significant effect on the subject's creative behaviour.

To obtain information on the structure of what might be termed the "cognitive space" of the subject's aesthetic and creative responses three principle components factor analyses (Varimax or Thozonal rotation) were carried out across all 60 subjects. It must be noted that the subjects in the last two of these factor analyses were not homogeneous as they were subjects from the E, C-E, and C-T groups, all of which had different experimental treatments. To this extent, some confounding may exist in the results. The factors from these analyses are presented in Tables 9, 10 and 11.

Factor Analysis Number One

The first factor analysis was carried out across all subjects on the fourteen pre-treatment variables. Five factors appeared in the analysis of the pre-treatment variables (Table 9). Factor I can best be described as Music-Structured for it had as its highest loadings the activity, evaluation and potency measures of the structured music stimulus.

Factor II had as its highest loading the activity and potency measures of the unstructured art stimulus, so that it may be termed Art-Unstructured.

Factor III, Art-Structured, had its loadings on the activity, evaluation and potency measures of only one stimulus, the structured art stimulus.

Factor IV had its highest loadings on two evaluation measures, the evaluation measure on the unstructured art stimulus, and the Revised Art Scale. Such loadings indicated that an evaluative process, especially in relation to preference for complexity as measured by the RAS was being reflected in this factor, so that it may be termed Evaluation of Complexity.

Factor V, Music-Unstructured, had its highest loadings on the activity and potency measures of the unstructured music stimulus.

Factor Analysis Number Two

The second factor analysis was carried out across all subjects on the same variables as the first factor analysis, using post-treatment scores. Five factors also appeared in the analysis of the post-treatment variables (Table 10). Factor I had as its highest loadings the activity and potency measures of the structured music stimulus. To this extent post-treatment Factor I was similar to pre-treatment Factor I. However, the high loading of the evaluation measure which was present on the pre-treatment factor was absent on the post-treatment factor. Further, additional activity and potency variables now had small loadings on Factor I. For this reason, post-treatment Factor I may best be described as Activity-Potency.

Factor II had as its highest loading the evaluation measure of the unstructured art stimulus and the Revised Art Scale. Its basic

Table 9

Principal Factor Analysis of Pre-Treatment Variables with Rotations to Varimax Criterion[1]

Variable		Factor				
		I	II	III	IV	V
1 ART STRUCTURED	activity			.753		
2 ART STRUCTURED	evaluation			.763		
3 ART STRUCTURED	potency			.681		
4 ART UNSTRUCTURED	activity		.786			
5 ART UNSTRUCTURED	evaluation		.356		.731	
6 ART UNSTRUCTURED	potency		.865			
7 MUSIC STRUCTURED	activity	.863				
8 MUSIC STRUCTURED	evaluation	.725				
9 MUSIC STRUCTURED	potency	.730				
10 MUSIC UNSTRUCTURED	activity					.784
11 MUSIC UNSTRUCTURED	evaluation		.496			.305
12 MUSIC UNSTRUCTURED	potency				.393	.694
13 Revised Art Scale					.899	
14 Music Attitude Scale		.407				

[1]Only loadings greater than .300 are shown.

Table 10

Principal Factor Analysis of Post-Treatment Variables Excluding Measures of Creativity with Rotations to Varimax Criterion[1]

Variable		Factor				
		I	II	III	IV	V
1 STRUCTURED ART	activity					.918
2 STRUCTURED ART	evaluation		.449		.658	.318
3 STRUCTURED ART	potency	.344				.649
4 UNSTRUCTURED ART	activity	.477	.536			
5 UNSTRUCTURED ART	evaluation		.772			
6 UNSTRUCTURED ART	potency	.487	.476		-.599	
7 STRUCTURED MUSIC	activity	.812				
8 STRUCTURED MUSIC	evaluation		.313	.403		
9 STRUCTURED MUSIC	potency	.830				
10 UNSTRUCTURED MUSIC	activity			.861		
11 UNSTRUCTURED MUSIC	evaluation	.406		.450	.320	
12 UNSTRUCTURED MUSIC	potency			.870		
13 Revised Art Scale			.791			
14 Music Attitude Scale		.384			.751	

[1]Only loadings greater than .300 are shown.

configuration appeared to resemble a combination of pre-treatment Factors II and IV, in that it showed a cluster of loadings related to the art unstructured stimulus, (similar to pre-treatment Factor II), high loadings on the Revised Art Scale - and particularly the evaluation measure of the art unstructured stimulus (similar to pre-treatment Factor IV). The additional small loadings of this factor on other evaluation scales, moreover, suggest that it is the evaluative aspects of these factors, originally reflected in pre-treatment Factor IV, that have been somewhat refined and clarified in the post-treatment analysis. On the other hand, the continued presence of loadings on the activity and potency measures of the art unstructured stimulus suggests that this clarification of the evaluative process is in some way related to the meaning of the training stimuli (which are most directly reflected in this stimulus) to the subject. Thus, this factor appears to be a lawful extension of the factors in the pre-treatment analysis, although it is not identical with them, and at the same time suggests that the observed change in factor structure over the two analyses was a direct effect of the training procedures used in this study.

Factor III had as its primary loadings the activity and potency measures of the unstructured music stimulus. It appeared the same as pre-treatment Factor V and was named Music-Structured.

Factor IV had as its highest loadings the evaluation measure of the structured art stimulus, the Music Attitude Scale, and a smaller loading on the evaluation measure of the unstructured music stimulus. These loadings indicated that a second evaluative factor, perhaps

judgment of aesthetics, was being reflected in this factor. However, when it is considered that the MA Scale measures attitudes toward the concept of music, a more unfamiliar type of music than what this population usually experiences, and that the unstructured music stimulus is almost certain to be unfamiliar to this population, then a second evaluative-like process, acceptance of novelty, suggests itself. For these reasons, Factor IV was termed Acceptance of Novelty. The substantial negative loading of the potency measure of the art-unstructured stimulus on Factor IV is difficult to interpret within the above context. It may be speculated that it reflects the subject's learning to minimize his response to the potency of the stimulus on which he was trained, presumably, in its effects on him, and that in some way this is related to his positive evaluation and acceptance of novelty. However, even this speculation appears somewhat forced.

Factor V had as its highest loadings the activity and potency measures of the structured art stimulus. This factor appeared the same as pre-treatment Factor III, so post-treatment Factor V may be termed Art-Structured.

Factor Analysis Number Three

In order to gain some understanding as to how the creativity measures were related to the post-treatment factors, another factor analysis was carried out across all subjects on all post-treatment variables including the creativity measures (Table 11).

Seven factors emerged in this analysis and, with the exception of I and VII, they were virtually identical to the factors that

emerged when creativity measures were excluded (Table 10), except that, now, creativity measures show small loadings on some of the factors. Thus, Factor II was termed Activity-Potency, Factor III was termed Evaluation of Complexity, Factor IV was termed Music-Unstructured, Factor V was termed Art-Structured, and Factor VI was termed Acceptance of Novelty. Factor I had as its loadings several scores of the Circles test, fluency, originality, and elaboration, so that Factor I was termed Non-verbal Structured Creativity. Factor VII had only one appreciable loading, on the Circles flexibility score, and was not readily interpretable.

In this factor analysis of post-treatment variables including creativity measures, the Consequences fluency score, which measures the ability to produce rapidly a number of units of semantic content had small, positive loadings on Factor V, Art-Structured, and on Factor IV, Music-Unstructured. It had a negative loading on Factor III, Evaluation of Complexity. The Consequences originality score, which measures the ability to produce distantly associated responses when presented with new and unusual situations, loads only on Factor VI, Acceptance of Novelty.

Table 11

Principal Factor Analysis with Rotations of Post-treatment Variables Including Measures of Creativity to Varimax Criterion[1]

Variable		Factor						
		I	II	III	IV	V	VI	VII
1 ART STRUCTURED	activity					.868		
2 ART STRUCTURED	evaluation			.484		.385	.494	.349
3 ART STRUCTURED	potency		.345			.617		-.354
4 ART UNSTRUCTURED	activity		.498	.477				
5 ART UNSTRUCTURED	evaluation			.747				
6 ART UNSTRUCTURED	potency		.465	.410			-.563	-.335
7 MUSIC STRUCTURED	activity		.811					
8 MUSIC STRUCTURED	evaluation				.400			.477
9 MUSIC STRUCTURED	potency		.828					
10 MUSIC UNSTRUCTURED	activity				.842			
11 MUSIC UNSTRUCTURED	evaluation		.458	.316	.346		.345	
12 MUSIC UNSTRUCTURED	potency				.817			
13 Revised Art Scale				.815				
14 Music Attitude Scale			.402				.648	

[1] Only loadings of greater than .300 are shown. (Continued)

Variable		Factor						
		I	II	III	IV	V	VI	VII
15 CONSEQUENCES TEST	fluency			-.335	.377	.479		
16 CONSEQUENCES TEST	originality						.656	
17 CIRCLES TEST	fluency	.876						
18 CIRCLES TEST	flexibility				-.354			.550
19 CIRCLES TEST	originality	.879						
20 CIRCLES TEST	elaboration	.919						

CHAPTER VII

ANALYSES OF VARIANCE OF FACTOR SCORES

In order to elaborate upon the effects which were suggested by the above factor analyses, factor scores (normalized with means of 50.000 and standard deviations of 10.000) were obtained for all subjects on the five pre-treatment factors (Table 9) and on the seven post-treatment factors which emerged when tests of creativity were included (Table 11). These scores were submitted to analyses of variance.

The purpose of these analyses was to designate more exactly in which group of subjects it was that the cognitive modification had occurred. Since subjects were randomly assigned to treatment groups there should be no significant differences among groups on the pre-treatment factors, but significant differences might be expected to occur among groups on post-treatment factors, even though the factor analyses were designed to be descriptive of the entire sample of 60 subjects rather than any selected sub-group. The results of these analyses are presented in Table 12.

These results suggest there are no significant differences between groups on any pre-treatment factors, except Factor IV, Evaluation of Complexity. The C-E group is significantly higher than the E and C-T groups on Factor IV. On this factor the means of the E, C-E, and C-T groups were 47.10, 54.37, and 48.53 respectively. This may be due to the facts that the RAS is the primary contributor to the Evaluation of Complexity Factor (Table 9) and that, prior to the experimental treatment, the C-E group already had a much higher mean on the RAS than did the other two groups (Table 3).

Table 12

Summary of Analyses of Variance of Pre- and Post-Treatment Factors

Factor	Source of Variation	df	MS	F	Significance Level
Pre-Factor I	Groups	2	141.968	1.42	N.S.
	Error	57	100.291		
Pre-Factor II	Groups	2	278.906	2.92	N.S.
	Error	57	95.476		
Pre-Factor III	Groups	2	252.406	2.62	N.S.
	Error	57	96.422		
Pre-Factor IV	Groups	2	296.812	3.13	$<.05$
	Error	57	94.845		
Pre-Factor V	Groups	2	.500	0.00	N.S.
	Error	57	105.257		
Post-Factor I	Groups	2	352.062	3.79	$<.05$
	Error	57	92.906		
Post-Factor II	Groups	2	144.968	1.45	N.S.
	Error	57	100.192		
Post-Factor III	Groups	2	16.687	0.16	N.S.
	Error	57	104.677		
Post-Factor IV	Groups	2	84.125	0.82	N.S.
	Error	57	102.309		
Post-Factor V	Groups	2	70.000	0.68	N.S.
	Error	57	102.824		
Post-Factor VI	Groups	2	679.000	8.34	$<.01$
	Error	57	81.439		
Post-Factor VII	Groups	2	41.968	0.40	N.S.
	Error	57	103.798		

On the post-treatment factors although the E group obtained higher factor scores on four out of the seven factors (Table 13), the groups exhibited significant differences on only two factors: Factor I, the non-Verbal Structured Creativity Factor and Factor VI, the Acceptance of Novelty Factor. On the non-Verbal Structured Creativity Factor, which consisted almost entirely of the Circles sub-scores, the means for the E, C-E and C-T groups were 52.85, 45.18, and 51.97 respectively. The poor performance on the Circles Test by the C-E group, may have again been due to their possible withdrawal in an anxiety-arousing situation. On the Acceptance of Novelty Factor, the means for the E, C-E and C-T groups were 56.51, 48.20, and 45.28 respectively.

Table 13

Means of Experimental Groups on Post-Treatment Factors

Factor	Experimental Training	Control Exposure	Control Test
I. Non-Verbal Structured Creativity	52.851	45.182	51.967
II. Activity-Potency	49.319	52.967	47.712
III. Evaluation of Complexity	50.096	50.862	49.041
IV. Music-Unstructured	51.746	50.511	47.741
V. Art-Structured	52.126	48.604	49.269
VI. Acceptance of Novelty	56.512	48.204	45.281
VII. (unnamed)	48.406	50.357	51.236

Summary

Although these analyses of variance do not completely answer the question of where the major change with respect to modification of cognitive style occurred, they do show that the E group is significantly higher on Factor VI, Acceptance of Novelty.

CHAPTER VIII

DISCUSSION OF FACTOR ANALYSES

It is suggested the factors which emerged in the analysis of the pre-treatment variables were quite reliable for two reasons: one; the variables which were used in this factor analysis were carefully chosen on the basis of earlier factor analyses, to offer a meaningful representation of naive subjects' "cognitive space", and two; the RAS loads on the same factor as does the evaluation of the unstructured art stimulus and the MA Scale loads on the same factor as does the structured music stimulus.

The results of the second factor analysis may be used to some extent for assessing the stability of the first analysis and to see whether there are differences between the pre- and post-treatment structuring of aesthetic space. However, interpretation of the results from the second analysis must be limited because of the confounding effect of having it carried out across non-homogeneous subjects. The similarity of the configurations of the pre-treatment factors I, IV, V and III to post-treatment factors I, II, III and V respectively suggests there is considerable stability to these factors. Moreover, the change in the configuration of the loadings of the unstructured art stimulus on post-treatment Factor II from that on pre-treatment Factor II suggests that the training procedures have been effective, in that it tends to indicate that the subjects have learned to look at the training stimuli in a less reactive (activity and potency scales) and more evaluative manner. Further, Factor IV, Acceptance of Novelty, appears to be a new factor

different from any in the pre-analysis. These latter two results would suggest that the subjects' perceptions of and responses to the stimuli are, in some way, different after the experiment than they were before the experiment. Whereas the pre-treatment factors appear to depend on single dimensions which allow the subjects to respond in an holistic manner to the stimuli, the post-treatment factors suggest the subjects are responding to the stimuli in a more subtle way.

Before the experiment, the subjects' perception of the activity-potency dimension, and their evaluation of the stimuli were not independent of each other. After the experiment, however, although the three major Osgood factors did not emerge clearly as such, two evaluative dimensions, one of complexity and one of novelty, had become separate from an activity-potency dimension. It is difficult to interpret these two evaluative factors, although Osgood et al. (1957) have found that the general evaluative dimension may be composed of many different evaluative components. It thus appears that there has been some re-structuring of the subjects' aesthetic space after the experiment and it may be inferred that some modification of cognitive style has occurred. However, it cannot be determined whether this re-structuring of space was limited to the E group since the factor analyses were confounded by the necessity of using all 60 subjects in the analyses.

The analyses of variance of the factor scores showed that the E group was significantly higher on Factor VI, the Acceptance of Novelty Factor, which had as its highest loadings the Consequences originality

measure, the MA Scale, and a significant negative loading on the potency measure of the unstructured art stimulus.

When the E group's performance on the Consequences originality test is related to their mean score on this factor, it suggests that what the subjects who had experienced the experimental training had learned was a new way of approaching the novel, aesthetic stimuli to which they were exposed and that this approach had applicability beyond the situation in which it was learned; its principles could be generalized to the novel stimuli on the Consequences Test. It may further be speculated that this approach to new stimuli consisted primarily of an attitude of acceptance toward them. It may be speculated on the bases of post-treatment Factors II and IV that this acceptance of novelty allowed the subjects in the E group on the Consequences Test to evaluate more positively and to accept their own associations and responses to the stimuli no matter how unfamiliar and novel these may appear to them. On the other hand, subjects who are overwhelmed by the novel stimuli may pass over the significance (meaningfulness) of their responses because they are evaluating them in a negative or null manner.

In the factor analysis of post-treatment variables including creativity measures, the Consequences fluency score, which measures the ability to produce rapidly a number of semantic contents, was associated positively with the Art-Structured and Music-Unstructured Factors and negatively with the Evaluation of Complexity Factor. It is difficult to interpret these loadings unless one speculates that it is the perception of identifiable and familiar objects which

appear in the stimuli of Factor V and the sensitivity to movement and rhythm implicit in Factor IV which share a common dimension with ideational fluency. The negative relationship of ideational fluency with evaluation of complexity does not appear so incongruous, for if one habitually recognizes, judges and prefers complexity, which is what this factor implies, the very intricacies of such thought processes may, in most cases, impede fluency.

The Consequences originality score, which measures the ability to produce distantly associated responses when presented with new and unusual situations, loads only on Factor VI, Acceptance of Novelty. The manner in which acceptance of novelty may facilitate originality has been speculated upon in the above discussion.

The Circles Test, finally, tends to form a dimension in itself. The implication is that the Circles Test, which is non-verbal, measures an isolated skill which is independent of the other post-treatment factors which emerged in this analysis.

Summary

In summary, in spite of the confounding which may exist in the results of these factor analyses because of the non-homogeneity of the subjects, there is evidence that the factors are reliable and stable. To the extent that there are differences between the pre- and post-treatment structuring of "cognitive space" by the subjects, it may be inferred that a modification of the subjects' cognitive style has occurred. The nature of the post-treatment factors suggested that subjects had learned to respond to the stimuli in a

more subtle way. That this change was effected in the E group was inferred from the fact that on Factor VI, Acceptance of Novelty, the E group differed significantly from the C-E and C-T groups. The results of the factor analyses add some credence to the hypothesis presented in Chapter V which suggested that what the subjects have learned in the experimental situation is a restructuring and re-ordering of their older response systems. This latter, and the particular relationships of the creativity measures to the post-treatment factors, supports the general thesis of this study that creative responses are not isolated or separable from an individual's cognitive style but, rather, may be understood most comprehensively when they are considered a function of an individual's cognitive style.

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A P P E N D I C E S

APPENDIX A

Art Stimuli on Which Subjects were Trained

1. Cézanne, Paul. Still Life; Jug of Milk and Fruit.
2. Cézanne, Paul. Still Life; Apples and Primroses.
3. van Gogh, Vincent. Sun Flowers.
4. van Gogh, Vincent. A Portrait.
5. Gauguin, Paul. The Yellow Christ.
6. Picasso, Pablo. Crouching Woman.
7. Picasso, Pablo. Young Woman Standing in Profile to the Left.
8. Matisse, Henri. Carmellina.
9. Mattise, Henri. Decorative Figure on Ornamental Ground.
10. Kirchner, Ernst. Painter and Model.
*11. Braque, Georges. Le Guéridon.
12. Braque, Georges. Café-Bar.
13. Picasso, Pablo. Le Guéridon.
*14. Leger, Fernand. The City.
*15. Picasso, Pablo. Seated Woman, 1926.
16. Picasso, Pablo. Seated Woman, 1941.
17. Klee, Paul. Around the Fish.
**18. Miró, Joan. Dutch Interior.
19. Kandinsky, Vasily. Light Picture, No. 188.
*20. DeKooning, William. Gotham News.
21. Motherwell, Robert. Elegy to the Spanish Republic XXXIV.
**22. Johns, Jasper. Device Circle.

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*Indicates those stimuli used as TEST stimuli.

**Indicates those stimuli which were finally used in the statistical analyses.

APPENDIX B

Music Pieces Used as Generalization Stimuli

Numbers 1, 3, and 5* were the second, the fourth, and the sixth bagatelle from Anton Webern, Six Bagatelles, Op. 9, 1913.

*Number 2. Henry Cowell. The Banshee.

Number 4. Pierre Henry and Pierre Schaeffer. Classical: Trifle in C.

Number 6. Ronald LoPresti. Sketch for Percussion.

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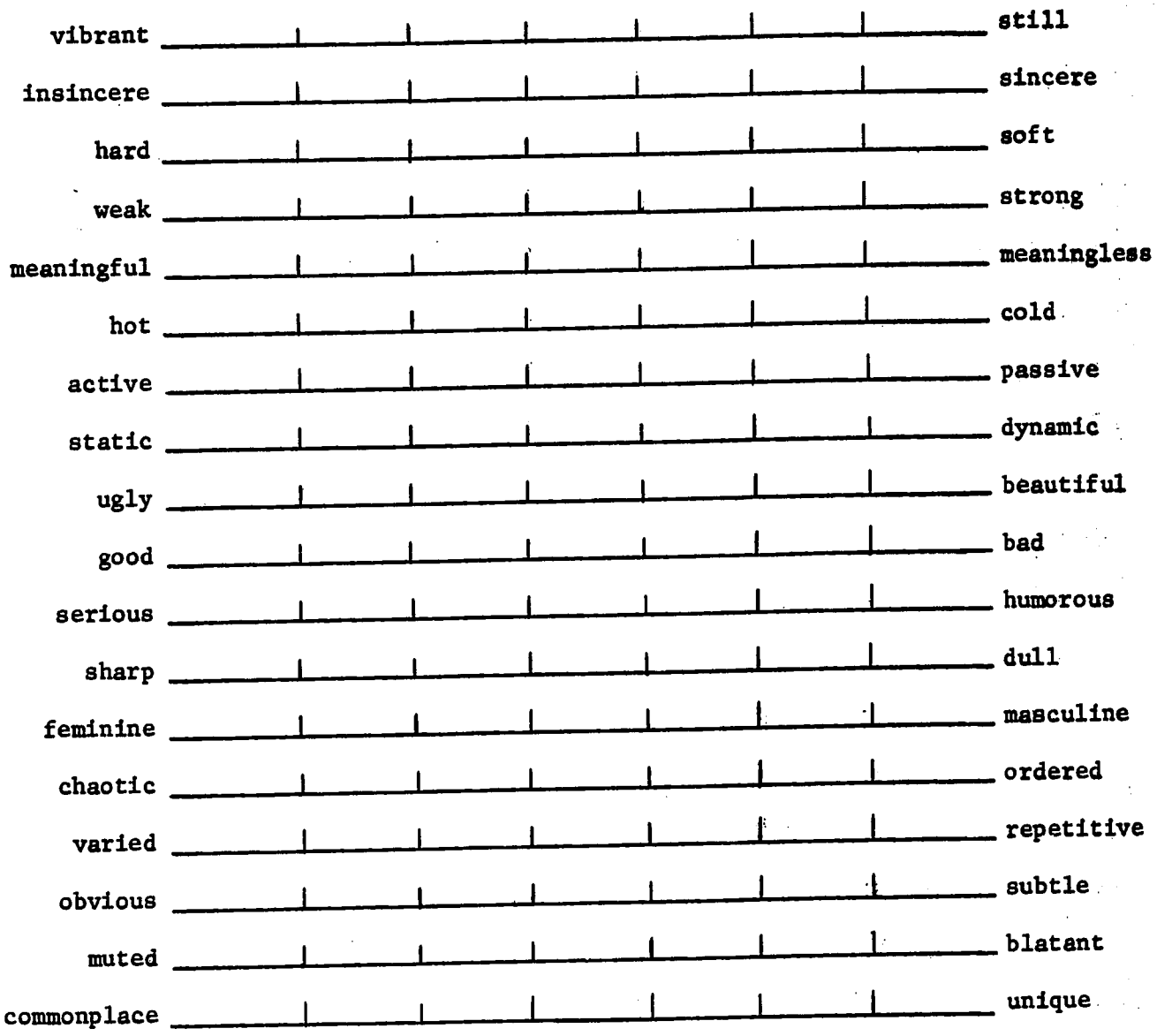
*Indicates those stimuli which were finally used in the statistical analyses.

A P P E N D I X C

Semantic Differentiation Scales



APPENDIX D

MUSIC ATTITUDE SCALE

SCALE

Directions: Read each of the following statements carefully. After reading, INDICATE THE DEGREE TO WHICH YOU PERSONALLY AGREE OR DISAGREE WITH THEM. The answers you give will be kept confidential.

Circle your answer: do not omit any items and never put more than one circle on a single scale.

1. I am indifferent to the higher types of music.

strongly agree	agree	undecided	disagree	strongly disagree

2. I should say that appropriate music always adds to my enjoyment of any drama or ceremony of any sort.

strongly disagree	disagree	undecided	agree	strongly agree

3. To me there are few things which could be more boresome than grand opera or symphony concerts.

strongly disagree	disagree	undecided	agree	strongly agree

4. Most types of music are effeminate and have little possible interest for persons engaged in the more active pursuits of life.

strongly agree	agree	undecided	disagree	strongly disagree

5. To me music is too formal and artificial; it seems to have lost its natural appeal to the tastes and feelings.

strongly agree	agree	undecided	disagree	strongly disagree

6. I have a casual interest in music.

strongly disagree	disagree	undecided	agree	strongly agree

7. From time to time I feel a need to listen to music or produce it myself.

strongly agree	agree	undecided	disagree	strongly disagree

8. I believe strongly in the beneficial and pleasurable effects of music.

strongly disagree	disagree	undecided	agree	strongly agree

9. To me there is little so beautiful or worthwhile in life as good music.

strongly agree	agree	undecided	disagree	strongly disagree

10. I think the importance of music has been over-estimated.

strongly agree	agree	undecided	disagree	strongly disagree

11. In music I find the best expression of some of the realities of life.

strongly disagree	disagree	undecided	agree	strongly agree

APPENDIX E

EXCERPTS FROM TRAINING TALKS (EXAMPLES)[1]

5. Gauguin, Paul. The Yellow Christ.

... it can be seen the movements suggested in this painting are slow, the forms rounded, the colours, lively but quietly balanced around the figure of the yellow-Christ ...

11 Braque, Georges. Le Guéridon.

... lines are straight. Only at critical points do they break into accents of curves. For example, here they suggest the roundness of the edge of the table. They move in and out of the painting ... probe space ... explore upward ...

16. Picasso, Pablo. Seated Woman, 1941.

... setting is unstable ... twisted nervously in her chair. Her fingers are crossed into black Xs with massive legs and feet which seem to root her forever in this mad environment ...

20. DeKooning, William. Gotham News.

... Restlessness of action and colour ... resolved toward the right.... Violence in the brutality of the brush-strokes ... and the feeling that this is an organism ... wounded but living .... There is generosity too, and extravagance ... he has created a newspaper's world ... attracted to possibilities rather than facts ...

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[1]Parts of the training talks were paraphrased or adapted from Listening to Pictures by Jean Sutherland Boggs which contains the text of thirteen CBC broadcasts on the subject of modern art.

APPENDIX F

INSTRUCTIONS FOR SUBJECTS ON DAYS TWO, THREE, AND FOUR

Group E

The aim of this experiment in which you are taking part is to investigate your attitudes toward graphic art. Yesterday you will remember that you designated what meanings various slides held for you. Today I am going to show you slides of art reproductions again ... but accompanied with descriptions about some of their more interesting points. The talks may have the effect of changing the meanings of the paintings for you or they may not. In some people, attitudes may change as a result of what we will do and in others attitudes may remain the same. We are trying to learn about the effects the talks will have on you. Incidentally, you will not be examined in any way on names, dates or other information I am going to mention. I simply want you to relax, and try to feel and understand some of the unusual and expressive qualities about the paintings which I will point out as we go along.

Group C-E

The aim of this experiment in which you are taking part is to investigate your attitudes toward graphic art. Yesterday you will remember that you designated what meanings various slides held for you. Today I am going to show you slides of art reproductions again ... but on this occasion I want you to write down your thoughts about them. What objects, sounds, smells, do you associate with it? What would it

be like if it was three-dimensional and you could touch it? What do you think the artist was attempting to do? to say? The paintings will mean different things to different people. We are trying to learn about the effects they will have on you after you have thought about them for awhile. Incidentially this is in no way an examination. I simply want you to relax and let your imagination work with what you see.

(In order to increase subjects' exposure to verbalization in this area parts of the above directions will be repeated before changing slides.)