ABSTRACT

LEVELING-SHARPENING AS RELATED TO

REPRESSION AND PROJECTION

by Alan P. Spivak

Leveling-sharpening is a cognitive control referring to a particular mode of perceptual or memory organization. Levelers are characterized by maximal assimilation effects and by memory organizations in which fine shades of distinctions among individual elements are lost, while sharpeners tend to maximize stimulus differences and to maintain temporal discreteness among their perceptual experiences.

Leveling-sharpening should relate to two mechanisms of defense described in psychoanalytic theory, repression and projection. Leveling shares with repression the property of delaying impulse discharge, but differs in that it is not a reaction to the anticipation of anxiety; both serve to reduce the content

of consciousness. Projection plays a role in postponing drive satisfaction as does the sharpening control. In projection, the offensive impulse is perceived in another person rather than in one's self; the individual is sensitized to an external threat in place of anxiety or guilt associated with instinct expression. These properties of projection and sharpening serve to sensitize perceptually an individual to his environment.

The study consisted of three phases. In the Control Assessment phase, subjects were selected for the leveling, sharpening, and control groups on the basis of extreme scores on the Schematizing Test, a task requiring subjects to estimate the sides of squares in a gradually increasing series. Some time later, during the Defense Assessment phase, subjects took the Defense Preference Inventory (DPI), a questionnaire used in conjunction with the Blacky Pictures. Finally, in the Perceptual Defense phase, subjects responded to a set of four stimulus pictures tachistiscopically presented under instructions to call out which of the four, one a conflict-stimulus and three neutral, stood out

the most. The test procedure controlled for possible effects of psychological and physical properties of the stimuli independent of sensitization.

Hypotheses predicted a relationship between leveling and preference for repression, and sharpening and preference for projection, but an exhaustive analysis of DPI responses indicated that no subject in the investigation chose consistently either repression or projection. Thus, the hypotheses regarding DPI responses were not testable. The failure to select repressers and projectors via the DPI suggests that this instrument may have better success in identifying "general" defenders in a more neurotic population.

Two hypotheses predicted a relationship between leveling and perceptual avoidance behavior, and sharpening and perceptual vigilance. The results indicated that, consequent to sensitization of the conflict picture, levelers, sharpeners, and controls differed significantly ($p<.05$) in their responses to that stimulus. The Mann-Whitney U-test showed that levelers, compared to controls,

tended to call out the conflict stimulus less frequently ($p<.05$) after sensitization; sharpeners did not differ from the controls.

An additional analysis of the data determined whether similar results could be obtained for individuals in the total sample of sixty subjects. Seventeen repressers and sixteen projectors were identified by their tachistiscopic behavior. The X^2 test showed that the relationship between leveling and repression was significant ($p<.01$); nearly twice as many repressers were included in the leveling group as in the combined sharpening and controls groups. Frequency of projection did not differ significantly among the experimental groups.

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INTRODUCTION

Leveling-sharpening is a cognitive control referring to a particular mode of perceptual or memory organization. Since psychoanalytic theory defines defense mechanisms as ways of handling conflict via cognitive organization, it would seem that the notions of cognitive control and defense share certain features. Leveling and repression, for example, both entail a merging of subjective experiences, while sharpening and projection involve maintenance of distinctiveness among experiences. The present study tests these possible relationships. Before considering the experiment in detail, a review of these formulations is in order.

Cognitive Control

Over the past fifteen years George S. Klein and his colleagues at the Menninger Foundation have directed their research energies to investigations of generalized response dispositions which they term "cognitive attitudes" or "cognitive controls." The word "control" refers to the embeddedness of cognitive functions in a structural arrangement aimed at the regulation or adaptation of the individual to his environment. As structures, cognitive controls are held to be: 1) relatively enduring in a developmental sense; 2) generally stable over a given class of situations; 3) invariant with regard to changes in situational contexts.

> Cognitive controls refer to a level of organization that is more general than the specific structural components underlying perception, recall, and judgment. The invariant which defines a control has to do with the manner of coordination between a class of adaptive intentions and a class of environmental situations. They are the individual's means of programming the properties, relations, and constraints of events and objects in such a way as to provide an adaptively adequate resolution of the intentions which brought him into an encounter with reality (Gardner, Holzman, Klein, Linton, and Spence, 1959).

Klein (1954) has delineated the relationship of cognitive control to need. Whereas a control, like a need, has a directive function, its central feature is not an energy discharge that results in gratification. Nor are controls linked to specific satisfaction-giving objects; rather they are formed by the "impact of adaptive problems for which they become instruments of resolution " (Klein, 1954, p. 262).

A control is not inferred from the content component of perceptual, memory, or fantasy responses as is a need, but rather from the formal qualities of a response. Hence in efforts to detect controls stimuli may be either drive-related or neutral; as long as an adaptive requirement has been built into the task a control can be elicited. Furthermore, cognitive controls do not necessarily reduce tension in the sense of producing a momentarily relaxed state. While they do equilibrate in the sense of resolving a disturbance created by a problem, they may operate in its solution by maintaining rather than by releasing tension.

In a preliminary study of cognitive control principles, Klein (1954) selected people who differed in contrasting ways in response to task-irrelevant stimuli. In this study a color-word interference test was used to select subjects, who read aloud as quickly and as accurately as possible colors which were printed in incongruent color names. For example, if the word b-l-u-e appeared in yellow ink, the subject was to read "yellow." High-interference prone subjects had much difficulty ignoring the word context, taking more time to read the colors than members of the contrasting low-interference group.

Half of each of these two groups next were made extremely thirsty by eating a dry but attractive meal; the remainder were not. Thus, the final groupings consisted of "high-interference-thirsty," "high-interference-sated," "low-interference-thirsty," and "low-interference-sated" subjects. Klein then observed differences in various test situations: size estimations, tachistiscopic recognitions, free-associations, and incidental recognition.

The size-estimation task required size judgments of a variable circle of light in comparison to a standard disc. The symbols that appeared on each disc were either thirst-related--for example, a coke bottle, -- or neutral, matched for size, brightness, or color. Subjects made judgments in a perceptual condition and a memory condition. The results were strikingly clear in showing that the high-interference group markedly underestimated size, where the low-interference group overestimated; within these main groups the tendencies held for both thirsty and sated subjects. Thirst was not significant in and of itself, but only seemed to exaggerate an adaptive mode that appeared for those in the sated condition.

Klein maintained that in looking for a general effect of need upon perception one would have to conclude that no difference between sated and thirsty subjects was found. Only when the basic group distinctions are considered does the particular effect of need arousal make itself known. The other tasks included in the study produced comparable results. For

instance, low-interference-thirsty subjects were more efficient than members of the other three groups in breaking away from a need-related tachistiscopic stimulus to respond to peripheral stimuli.

Feeling that the original designations of high- and low-interference were too "stimulus bound" to account for all of his data, Klein replaced them with the more generic terms of control by constriction and flexible control, respectively. Constricted-control subjects differed from the flexible control group even in their styles of free-associations to the need-related word "dry", and the neutral word "house." The constricted-control associations clustered around the stimulus word, while the flexible-control associations more often departed from the stimulus. The sated-flexible control subjects were clearly more facile in their associations than any of the other groups.

These preliminary findings concerning individual differences in the effects of thirst in a variety of cognitive tasks initiated numerous investigations in the realm of cognitive control. Temerlin (1956) found

that the variability and flexibility of patient's free-associations during the first 20 interviews of psychotherapy related significantly to variability in judgments of successive trials of autokinetic movement; subjects whose initial behavior in treatment was highly inflexible and stereotyped showed lesser variability in their autokinetic estimations than more flexible subjects.

Hardison and Purcell (1959) selected subjects on the basis of dependency scores on the Edwards Personal Preference Schedule, and gave the Color Word Preference Test to measure effectiveness in ignoring interfering response tendencies. They then tested the effects of negative verbal reinforcement on the Block Design test of the Wechsler-Bellevue Intelligence Scale. They found that the independent flexible group of subjects tended to improve their performance under stress, while a performance deficit occurred among a dependent constricted group. The major importance of their finding was that the effects of stress upon performance did not appear if individual differences in control were ignored.

As of the present time, various investigators have identified and explored six cognitive controls: scanning, tolerance for unrealistic experiences; equivalent range, constricted-flexible control, field dependence-independence, and leveling-sharpening. Gardner, Holzman, Klein, Linton, and Spence (1959), in a comprehensive study of cognitive consistency, administered criterion tests for each of these controls to a sample of sixty subjects, thirty of each sex. They found that all six principles manifested themselves in the cognitive behavior of the sample. Factor analysis revealed clear factors of scanning and tolerance for unrealistic experience among men; among women factors of field articulation, leveling-sharpening, and equivalence range were discerned. Perhaps the single most significant implication of this study is the finding that the controls were independent of one another. One could not accurately predict scanning behavior, for example, from responses to a leveling-sharpening task. Thus, in order to gain thorough knowledge of an individual's cognitive orientation to his environment--

his "cognitive style"--one must sample all of the various controls involved in a person's behavior.

Several recent studies (Gardner and Long, 1960a; Gardner and Long, 1960b; Gardner, 1961) point to the fact that individual differences in cognitive behavior manifest themselves even in traditional psychophysical tasks. Gardner and Long (1960a) discovered that in an inverted T-illusion when the vertical line is the standard its size is overestimated more frequently than when the horizontal line is the standard. The authors conclude that the individual's strategy of attention deployment in such situations may be an important determinant of responses to such figures as the inverted-T; and that traditional illusion effect measures are inadequate in that errors of the standard have been uncontrolled. The data support the notion that the cognitive control of scanning determines the differences in effect. These same investigators (Gardner and Long, 1960b) found support for their conclusion in a similar study using the L-illusion. Their results support Plaget's notion that errors of the standard are products of patterns of

attention deployment (centration and decentration) in the course of viewing such figures.

Gardner (1961) extended his work on cognitive controls and illusions in a study in which he successfully predicted that individual differences in one type of illusion were related to the control of field articulation, as measured by the Rod and Frame Test, whereas subjects' responses to another type of illusion were determined by the scanning control as measured by a Size Estimation Test.

Leveling-sharpening

Previous psychophysical studies have demonstrated that an interpolated stimulus more intense than the comparison stimuli results in a shift of point of subjective equality (PSE) toward the intervening stimulus, thereby raising it (positive time error). An interpolated stimulus less intense than the comparison pair lowers the PSE (negative time error). Time error seems related to the way the subject perceives the progression of different weights. Köhler (1923) described progression

in terms of gradients. The interpolated stimulus intrudes into the comparison process causing the subject to experience a series of vacillation in intensities. The subject's ability to ignore this intervening stimulus is reflected in his time error, and appears to be a function of his readiness toward assimilation. Holzman and Klein (1954) predicted a relationship between leveling-sharpening and visual time-error effects. They did find a positive time error when the interpolated field was of greater intensity than the standard and comparison stimuli, and a negative time error when the interpolated field was less intense. However, while the results were in the expected direction for Condition I (no interpolated stimulus) and Condition II (large interpolated stimulus), levelers and sharpeners differed significantly only in Condition III (less intense interpolated stimulus), with levelers showing a significantly greater negative error than sharpeners.

In a similar study of broader scope, Holzman (1954) measured time errors of extreme groups of levelers and sharpeners in tasks representing the visual, kinesthic,

and auditory modalities. He found in all three modalities that an interpolated stimulus more intense than the standard and comparison stimuli resulted in positive time error, whereas an interpolated stimulus less intense than the standard and comparison stimulus produces negative error. Once more, the closer the intensity of the interpolated stimulus to the comparison series, the greater the amount of assimilation. Holzman also found that levelers clearly showed greater time error assimilation effects in the three modalities than the sharpeners and there was a positive tendency for the same subject to respond with the same degree of assimilation in each modality.

Thus, the findings of the two preceding studies are consistent with the notion that cognitive controls are general dispositions of personality, guiding responses in a variety of behavioral situations. Holzman and Klein (1954) have offered an account of leveling and sharpening consistent with neurophysiological models of time error. Lauenstein, for example, accounted for time error by assuming that neighboring traces in the brain fields

assimilate to one another, reducing the gradient between them. Holzman and Klein proposed that sharpeners are distinguished by brain fields which sustain boundaries easily and hence preserve distinctness and differentials among traces, whereas leveling occurs in brain fields that foster more permeable and weakened trace boundaries, and consequently, facilitate assimilation and gradient reduction among traces.

Holzman and Klein (1954) extended this hypothesis noting that cross-modal consistency among levelers and sharpeners suggests that "traces gua traces have similar structural and dynamic properties regardless of whether they are induced by visual, auditory or kinesthetic stimulation" (p. 391). This view implies the quantity of assimilation that will occur is dependent upon the organizing principles of brain field dynamics.

One implication of this conception of the neural component of leveling and sharpening is that in situations in which firmness of stimulus boundaries is manipulated, levelers should show the most interference. For example, it should be expected that retroactive inhibition would

be a greater problem for levelers than for sharpeners. Nicks (1961) explored this hypothesis in combination with Osgood's theory of memory, which maintains that in a learning situation in which S units are held constant while R units are varied, retroactive inhibition increases as meaningful similarity between R units in IL and OL decreases. The Schematizing Test defined groups of levelers and sharpeners. Subjects learned paired-associates lists containing consonants as S units and two syllable adjectives as Rs. The S units were identical in IL and OL lists but Rs varied. Nicks found support for his prediction that the amount of retroactive inhibition increases as the tendency toward leveling increases, but found no evidence for the hypothesis that the increment in amount of retroactive inhibition as IL becomes less similar to OL increases as the tendency toward leveling increases. There was also no indication of a relationship between leveling-sharpening and learning ability.

Nickerson (1960) related cognitive control to retroactive interference in a non-verbal task, using

four experimental groups formed on the basis of a leveling-sharpening test and the Taylor Manifest Anxiety Scale. Subjects were then tested in a visual size judgment task similar to that used by Postman and Page (1947) to demonstrate retroactive inhibition in psychophysical judgment. The task consisted of comparing a series of rectangles to a standard first on the basis of width, then length, and then width again. According to Postman and Page, the second series of judgments should lead to retroactive interference and some decline in accuracy of judgments in the third series.

Nickerson's results showed that 1) sharpening and low anxiety subjects had greater accuracy of visual size judgment; 2) the factors interact, accurate prediction of behavior requiring a knowledge of both; 3) leveling and sharpening were more pronounced on easy parts of the test while effects of manifest anxiety were significant only on the more difficult parts. Unfortunately, retroactive interference could not be demonstrated to have occurred in Nickerson's experiment.

A study exploring the relationship of cognitive control to serial learning has also been undertaken by Gardner and Long (1960), who compared levelers and sharpeners in serial learning on two 8-word lists. Though sharpeners tended to give more responses, they made significantly fewer backward errors than the levelers. Although the groups did not differ significantly in number of forward errors, 81% of the forward errors made by the sharpeners were displacements of one position compared with 58% for the levelers, a difference significant at $p<.01$. These results become all the more salient when one considers that the levelers and sharpeners used in this experiment were not extremes, being divided into groups at the mean of the leveling-sharpening distribution.

In an interesting and not dissimilar study (Gardner and Lohrenz, 1960) levelers were tested on the serial reproduction of a story, the experimenter reading a story to Leveler 1, who told it to Leveler 2, and so on, with two minutes intervening between hearing and telling a story. The same procedure was followed

with the sharpeners in a separate session. Stories were scored by dividing them into major themes and rating each along several measures. Compared to sharpeners, levelers showed: 1) fewer themes; 2) fewer correct themes; 3) more transposed or contaminated themes.

The positive results in the preceding study occurred despite the fact that six months elapsed between assessment of leveling-sharpening and telling the story to the subjects. This fact suggests that the leveling-sharpening control has enduring properties and the Schematizing Test, the criterion measure of the control, is reliable. Further evidence for the relative permanence of cognitive control comes from a study (Holzman and Gardner, 1960) in which levelers were asked to tell the story of the "Pied Piper" as they remembered it from their childhood. As in the preceding investigation, the story was divided into thematic units for scoring number of elements correctly remembered. Sharpeners were superior to levelers in recall of the Pied Pier theme, in number of correct elements

included, in remembering the key retribution theme, and in the length of story told; in fact, stories told by sharpeners were more than half again as long as those of levelers. As Holzman and Gardner point out, some subjects may have heard the story more frequently during childhood than others and some may have reheard the story more recently than others; however, the probability of these uncontrolled variables having contaminated this study is lessened by the similarity of subjects in age, socioeconomic status, and common membership in a sorority at a small midwestern university. Thus, it seems that in addition to playing a role in assimilating percepts and cognitions in laboratory situations, leveling-sharpening also makes itself known in the organization of old memories.

Although the two preceding studies lend evidence for the stability of cognitive control measures, Gardner and Long (1960) present the only study in the literature specifically designed to assess the stability of scores on tests used to measure these controls. Thirty-eight of eighty female subjects who had been tested three

years earlier were retested. The following are the cognitive controls in the study, with the defining tests given in parentheses: Equivalence Range (Object Sorting); Scanning (Size Estimation); Leveling-Sharpening (Schematizing Test); Constricted-Flexible Control (Color-Word Test). The product-moment correlation coefficients for all measures concerned proved statistically significant, ranging from .75 to .36. The *rs* for the Schematizing Test measures were Percentage Accuracy, r = .52; Mean Percentage Increment Error, r = .36; Lag, r = .45.

As the authors emphasize, the Schematizing Test is not repeatable in the same sense as the other tests, since some subjects seem suddenly to catch on to the fact that they are not keeping up with the actual size increase and quickly adjust their estimates upwards, while others remain unaware of the inaccuracy of their judments throughout the test.

Although most investigators who have worked with the leveling-sharpening dimension report generally positive results, one notable exception is Lichtenstein (1961), who studied the effect of three cognitive

controls--Leveling-Sharpening, Flexible-Constricted Control, and Tolerance for Unrealistic Experience--upon several dependent variables. Lichtenstein found no relationship between Leveling-Sharpening and the ability to extract embedded stimuli from a larger stimulus pattern. In addition, he found no relationship between leveling and repression. The latter measured by a difference score between the Hysteria and Psychasthenia scales of the MMPI, in contrast to Holzman's positive results with the Rorschach. Lichtenstein did note, however, that levelers had consistently higher MMPI profiles than sharpeners.

Cognitive Controls and Defense Mechanisms

An essential aspect of psychoanalytic theory is its recognition of the fact that drives and impulses are subject to modulation and delay. When an individual perceives the demands of an instinct as conflicting with the demands of his external world, he unconsciously employs various operations, defense mechanisms, to block

discharge of these instinctual impulses, in order to avoid subsequent feelings of anxiety and guilt. While defenses, then, are one means of achieving postponement of need gratification, the theory allows that all other structures have a delaying function also. Since cognitive controls are conceived of as structures, just as are habits, attitudes, etc., they, too, must be presumed to play a role in postponing drive satisfaction. That cognitive control is not synonymous with defense, in the sense of being a reaction to the anticipation of anxiety, is apparent when one considers the Klein (1954) study discussed previously. It will be remembered that while thirst did influence behavior, subjects responded to the various tasks in ways essentially similar to their reactions in non-aroused situations.

Recently Gardner et al. (1959) have outlined five ways in which the control-defense relationship may be viewed.

A. Control and defense may represent the same process seen from different vantage points --adaptation and conflict. For example,

Hartmann (1939, p. 14) has observed that aside from its defensive function, intellectualization "has another, reality-oriented aspect also, showing that this mechanism of defense against instinctual drives may at the same time be regarded as an adaptive process."

B. As defenses develop genetically they may generalize in the sense that "character defenses" may become preferred modes of adaptation.

C. Cognitive controls may reflect individual differences in the operation of the "conflict-free ego sphere" (Hartmann, 1939) and may thus be preconditions for the emergence of defensive structures.

D. Control principles and defenses may differ in respect to their antecedent conditions. The antecedent of defense is always an internal conflict issuing out of the ego's attempt to ward off anticipated anxiety

by imposing a restriction on the gratification of a drive. On the other hand, the antecedent conditions of cognitive control principles need not derive from conflict, but rather reality issues, such as the solving of a problem, the satisfaction of a biological need, or the performance of a task.

E. Controls and defenses may represent two aspects of a higher-order principle governing a large segment of secondary-process functioning.

Leveling and Repression

Freud first made his discovery of repression late in the nineteenth century. He had found that hysterical patients who were required to free-associate often were not able to recall significant events from their pasts. When these memories finally did manage to enter awareness, they produced anxiety or guilt.

Freud concluded that these painful memories were expelled from consciousness shortly after the painful events occurred and that a counter-force continued to be applied to these memories, making them resistant to free-association. The process of initiating and maintaining the "counter-cathexis" was termed repression.

Freud also discovered that when patients free-associated to these recovered memories, memories of childhood sexual experiences appeared. He reasoned that a prerequisite for the operation of repression was the existence of a previously repressed memory of an unpleasant sexual experience which would be stimulated by a new but similar experience.

Later Freud modified his original view of repression, consequent to his new discovery that infantile sexual memories were generally reflections of fantasy rather than reality. He now conceived of repression as directed against the sexual instinct and its mental representatives, "derivatives," which were constantly seeking discharge in action or cognition. Since everyone shared these same sexual impulses, repression was

no longer regarded merely as an agent of a neurotic personality, but was now thought also to be a process crucial for normal development (Freud, 1905).

It was clear to Freud that repression occurs relatively late in childhood as it borrows its tools from ego functions which need be quite highly operative, but which do not necessarily have roots in pathogenic conflict. Some of these are memory, judgment, and attention. Once more, for repression to take place, the systems unconscious and preconscious must be well differentiated. As has already been discussed, leveling and sharpening are terms used to describe the loss or preservation of distinctions among a series of stimuli. Levelers are characterized by maximal assimilation effects and by memory organizations in which fine shades of distinctions among individual elements disappear. Thus they ignore size differences in the successively presented squares in the Schematizing Test and show large assimilation effects in Time-Error Tests.

Freud dealt with repression as the withdrawal of consciousness from an idea associated with an

unpleasant affect. Repression is assisted by the attraction of an already unconscious idea. Freud wrote (1915, p. 87):

> We have to consider . . . the attraction exercised by what was originally repressed upon everything with which it can establish a connection. Probably the tendency to repression would fail of its purpose (i.e. to remove a potentially dangerous idea from consciousness) if these forces did not cooperate, if there were not something previously repressed ready to assimilate that which is rejected from consciousness.

Both repression and leveling entail the assimilation of a new idea or experience with an older one by virtue of the relationship between them. As a consequence, the assimilated element loses its individuality, and hence its availability to consciousness as a discrete entity.

> It seems plausible to assume that repression as a typical way of coping with internal conflict can occur most easily in persons whose memory organization is congenial to this kind of easy assimilation. Where such a process is not a natural outcome of the person's basic patterns traumatic material may appear (Gardner, et al., 1959, p. 129).

Clinical experience has described ways of recognizing repression through thought organization. Rapaport et al. (1945) and Schafer (1948), for example, report

that hysterical neurotics or hysterical characters, in whom repression predominates as a mode of defense, experience difficulty in extracting single ideas from memory frames of reference. It is not uncommon, for example, that when asked "Where is Egypt?" in the information subtest of the Wechsler Adult Intelligence Scale, such persons say, "Somewhere in the East," or when asked "Where is Brazil?" say, "In a jungle, somewhere--near Argentina."

In an effort to investigate experimentally the relationship between leveling and repression, Gardner et al. (1959) measured repression using specific indicators of the Rorschach test, and leveling using scores on the Schematizing Test and a Kinesthetic Time-Error Test. Eight of 30 male subjects relied upon repression as their principal defense. Of these eight, six were in the upper half of the distribution of leveling-sharpening index scores. This result, while not significant ($p > .05$), was in the expected direction. Eight of eleven female subjects using repression as a predominant defense were levelers as defined by one criterion

($p<.125$), nine were levelers by another criterion ($p<.05$). Eight of these women ($p<.125$) were in the leveling half of the distribution of assimilation scores derived from kinesthetic time errors. Thus, although the numbers of men and women judged to rely upon repression as their primary defense were small, results for both sexes indicated an association between leveling and repression.

In a replication study, Holzman and Gardner (1959), using performance on the Schematizing Test, selected ten extreme levelers and ten extreme sharpeners from a group of eighty female university students. Repression was here, as before, determined from Rorschach responses. All six subjects evaluated as extreme repressers were also extreme levelers. As in the preceding study, however, the converse was not true; not all extreme levelers relied upon repression as the principal defense. Of the remaining fourteen subjects rated lower in reliance upon repression, ten were sharpeners and four levelers.

Holzman and Gardner assumed in both of these studies that the problem of creating a situation in which repression is activated and then identified and

measured is insurmountable. The only effective way of identifying and measuring repression is by inferring it "from the presumed effects of lifelong reliance upon this defense: constriction of ideation, absence of intellectualizing, unreflectiveness, naivete, relatively unmodulated affect" (Gardner, et al., 1959, p. 130). Consequently, what they looked for was a general inhibition or constriction of ideational activity (especially of that kind which is reflective and serves adaptive, reality purposes) which forestalls the possibility that a remotely associated derivative may provide a path for the conscious experiencing and discharge in behavior of the impulse. Thus, to aid their clinical judgment in selecting subjects who were repressers, the investigators used such specific Rorschach indicators as notable lack of specificity, failures, poor integrative efforts, fewer than twenty-five responses.

Yet, in choosing these criteria, Holzman and Gardner may have contaminated their measure of repression with cognitive behavior not related to conflict.

For instance, the non-specificity of a response such as "standing at the table or something," may reflect characterological repression. On the other hand, it may just as easily be attributable to a perceptual organization in which fine shades of distinctions among individual elements are lost, a characteristic of leveling, a cognitive control. Likewise, whereas a record with fewer than twenty-five responses may be caused by pervasive repression, it is also possible that individuals producing such test protocols do so not because of latent conflict which the test arouses, but because they find it difficult to extract any memory (association) from their total memory reservoir.

In essence then, it is difficult to judge whether the Rorschach test assessed repression or leveling in these studies. If it were actually measuring the latter, one could only conclude that leveling as defined by the Schematizing Test was related to leveling as defined by the Rorschach. Thus, some other technique is needed to elicit and measure repression.

Assessment of Defense

The Defense Preference Inventory

Goldstein (1952) devised the Defense Preference Inventory to be used in conjunction with the Blacky Pictures (Blum, 1949) for obtaining a measure of defense mechanisms used in dealing with conflicts related to the various stages of psychosexual development, as presented in psychoanalytic theory. Goldstein found that while most of the individuals whom he tested with the instrument used a variety of defenses across the psychosexual dimensions, a significant minority selected the same defense throughout the test. The latter group, the "general defenders," tended to show more disturbance than the specific defenders in their spontaneous stories for the Blacky Pictures. Since the instrument unlike the Rorschach is of the forced-choice variety, all subjects make an equal number of responses. Also, unlike the Rorschach, the content and formal aspects of each alternative are predetermined for the subject. It would seem unlikely, therefore, that an

individual's tendency toward leveling or sharpening could exert its influence on this test in the person's selection of a defense, whether the defense be repression or some other. Rather, it would seem that defense preference is determined by a reaction to an aroused conflict situation. If this line of reasoning is correct, the Defense Preference Inventory should be a suitable instrument to assess defense in studies exploring the relationship of leveling-sharpening and defense.

Perceptual Defense

Perhaps Gardner et al. (1959) and Holzman and Gardner (1959) were premature in abandoning the possibility of observing defensive behavior in a manner more direct than that which the Rorschach test provides. Studies by Blum (1954, 1955, 1957) and others (Nelson, 1955; Smock, 1956) suggest analysis of a behavioral sequence that seems a more appropriate method of measuring repression. In this approach, an unconscious psychosexual impulse is inferred to have been aroused, the

arousal being detectable, it is felt by these investigators, in measurable changes in perceptual behavior. This inference seems theoretically, justifiable in the context of a statement by Fenichel (1946):

> There are defensive attitudes against painful perceptions just as there are defenses against any pain. Nevertheless . . . defenses against perceptions seem to be performed first and foremost in the service of defenses against instincts (p. 124).

Within this theoretical orientation Blum (1954) suggested that there are two opposing ego processes in perception. In one process the ego manifests differential sensitivity to those environmental cues suggestive of unconscious impulses; the ego is ready, therefore, to invoke defensive measures should such impulses, or their environmental cues, approach awareness. The second process, a shutting-off or rejection of the threatening perception of the environmental cue, occurs when the stimulus value of the cue becomes sufficiently intense as to approach awareness. These processes have been labelled "perceptual vigilance" (Blum, 1954), "selective vigilance" (Bruner and Postman, 1947), or "perceptual defense" (Postman, Bruner, and McGinnies, 1948),

and have been the subject of one of the most intensive series of investigations in recent years.

Clausman (1960), agreeing with Blum's formulation of contrasting ego processes in perception, contends that even when an external conflict-related stimulus approaches awareness avoidance or vigilance can occur, depending upon the defense preference of the individual involved. In addition to Clausman, Carpenter, Wiener, and Carpenter (1956) demonstrated that under similar stimulus conditions some individuals show avoidance behavior, while others show vigilance as modes of perceptual defense. These two investigations have helped to provide a cornerstone for the present research.

Sharpening and Projection

At first Freud conceived of repression as synonymous with defense. He considered two types of repression. The more basic he called primal repression, referring to the denial into consciousness of an instinct. The second

was termed repression proper, the pushing into the unconscious of cognitive or affective elements, derivatives, associated with the content of primal repression. Later, Freud changed his view concerning repression and considered it to be but one of a number of techniques which might be utilized by the ego to protect itself from threat. Anna Freud (1946) elaborated on this view. She designated as defense all techniques used by an individual to ward off dangerous impulses, repression referring to a specific kind of defense. Further:

> At particular periods in life and according to its own specific structure, the individual ego selects now one defensive methods and now another . . . these it can employ in its conflicts with instincts and in its defense against the liberation of affects.

These other techniques of defense are projection, reaction formation, isolation, and intellecutalization. Of all the varieties of defense, repression, projection, and isolation would seem most likely to produce effects in perceptual behavior. Schafer (1948), for example, noted that isolation contrasts with repression in effect on consciousness. Isolation accomplishes a

separation of affects from ideas, so that ideation which is potentially anxiety-activating becomes more acceptable. Thus, while repression tends to reduce consciousness, isolation broadens it.

Gardner et al. (1959), attempting to expand the control-defense hypothesis beyond leveling and repression, predicted a relationship between isolation and the cognitive control of scanning, a reinterpretation of an earlier conceived focusing control. A scanner is a person who deploys attention to many aspects of the stimulus field and who has been shown not to commit himself to a clear-cut affective experience. Again using the Rorschach test to assess defense, isolation, and the Schematizing and Time Error tests to define levelers and sharpeners, Gardner et al. found that of nine males who relied heavily on isolation, eight were scanners ($p<.02$); similarly, five of six females who were isolators were also extreme scanners. Despite the positive findings obtained in this investigation, it would do well to ask here, too, whether the Rorschach criteria were measuring the effects of a defense or of a cognitive control.

In repression, the external stimulus is warded off just as the threatening instinct is warded off. In projection, the offensive impulse is perceived in another person rather than in ones self. The individual is sensitized to an external threat in place of anxiety or guilt associated with instinct expression. It is this sensitivity to the external world that is reflected in perceptual behavior. Isolation and its variant intellectualization could possibly have two different effects upon perceptual behavior. Through the use of this defense, the derivatives of an impulse are freely admitted, but the emotional or affective components lose their connection. It becomes possible to tolerate many aspects of impulses that would be extremely distressing otherwise. On the one hand, isolation may lead to a disinterest in common external objects or stimuli in favor of more abstract pursuits. On the other, it may lead to a relatively heightened sensitivity to external stimuli, because these lack the emotional attachments present to some extent in most other people. Table 1 shows the effects of three defense mechanisms on impulse and cue.

Table 1.--The effect of three defense mechanisms on impulse and cue

Defense Mechanism	Treatment of Impulse	Treatment of External Cue
Repression	denied awareness	denied awareness
Isolation	admitted to awareness	shown either disinterest or sensitization
Projection	admitted to awareness	sensitization

In contrast to leveling and repression,

> sharpening refers to a propensity to maximize stimulus differences, an attunement to small gradients of differences between figure and ground. . . . Sharpeners are not tied to single possibilities in organizing a field; they prefer complex to simple organization. If required they can sustain an organization intact over a considerable period of time (Holzman, 1954).

It can be seen that these properties of sharpening have much in common with projection in that both serve as mechanisms of the individual that perceptually sensitize him to his environment.

Statement of the Problem

The foregoing survey points to theoretical and empirical evidence for a relationship between mechanisms of defense, which allegedly arise from intrapsychic conflict, and cognitive control mechanisms which are said to derive from conflict-free ego structures. Up to the present, investigators in this area have restricted themselves primarily to the study of the leveling control as related to repression, and, to a lesser extent, to the relationship between the scanning control and isolation. In each of these studies, however, an individual's most characteristic defense was estimated by Rorschach indicators. Unfortunately, many of the signs used as criteria for evaluating defenses involved appraisal of cognitive behavior which itself may have been influenced by a control rather than a defense. That is, constriction of ideation on the Rorschach may not always spring from prolonged reliance upon repression; it conceivably may arise from the same principle that evokes leveling on the Schematizing Test, or may itself be

simply a further representation of leveling. Hence what is needed in experiments of this sort is a measure of repression free of the cognitive variable. Presumably a situation in which a past conflict is aroused and its immediate perceptual consequences observed would meet this requirement.

Since cognitive controls are held to be general processes which may be connected with any defense, it would seem that research on defense mechanisms in addition to repression is called for. Because the discussion has indicated that isolation may have two consequences in perception, any attempt to use it as an independent variable in perceptual research is bound toward confusion. Projection, on the other hand, seems well suited to the task. Individuals in whom this defense predominates may be expected to be relatively open to the perceptual stimuli in their environment. Once more, the effect of such behavior may easily be juxtaposed with that of repression. These considerations lead to the specific hypotheses formulated below to test the relationship of leveling and sharpening to repression and projection:

Hypotheses

Hypothesis I

Compared to sharpeners and individuals from the middle of the leveling-sharpening continuum, extreme levelers will prefer repression as a defense.

Hypothesis II

Compared to levelers and individuals from the middle of the leveling-sharpening continuum, extreme sharpeners will prefer projection as a defense.

Hypothesis III

At a stimulus magnitude well above awareness but below veridical threshold, subjects who tend to report a conflict stimulus rather than a neutral stimulus will be extreme sharpeners.

Hypothesis IV

At a stimulus magnitude well above awareness but below veridical threshold, subjects who tend to

report a neutral stimulus rather than a conflict stimulus will be extreme levelers.

PROCEDURE

The study consisted of three phases: 1) Control Assessment, 2) Defense Preference Assessment, and 3) Perceptual Defense Assessment. In Control Assessment, subjects were selected for the leveling, sharpening, and control groups on the basis of extreme scores on the Schematizing Test. Some time later, during the Defense Assessment phase, subjects took the Defense Preference Inventory. Finally, subjects responded to tachistiscopically presented stimuli in the Perceptual Defense phase.

Control Assessment

The Schematizing Test

The Schematizing Test, adapted by Holzman (1954) from a procedure used by Hollingworth (1913), requires subjects to estimate the sizes of a graduated series of 14 squares shown one at a time. The sides of the squares range from 1.18 inches to 13.73 inches when

projected on a screen from slides. At the beginning of the test, the five smallest squares are shown, first in ascending order and then in two random orders, yielding 15 judgments that constitute Series 1. Then without interruption, Square 1, the smallest, is replaced by Square 6, which is one step larger than any previously seen. This process is repeated ten times for a total of 150 judgments by withdrawing the smallest square and substituting a one-step larger square after each series of 15 judgments until the complete range of sides is traversed. The actual side differences between adjacent squares is an average of 20 per cent, well above the differential limen of a sample of pilot subjects. The sides, in inches, of squares used are presented in Appendix A.

The rationale for the Schematizing Test appears in a monograph by Gardner et al. (1959) who consider two aspects of a subject's response: 1) his perception, and 2) the nature of the yardstick he uses to report it. The latter component is particularly apparent when two equally sensitive subjects employ quite different scaling

units. In fact, Gardner et al. found that a group of pilot subjects instructed to employ fixed scale units while taking the Schematizing Test did not differ in mean accuracy from a group using "free report."

In considering the perceptual component of a response, one may conceptualize a subject's failure to reproduce the progressive increase in size of squares as an assimilation effect (Koffka, 1935). That is, the tendency to lag behind "may result from assimilations between the perceptual processes representing new squares and the trace aggregate representing the smaller squares seen previously" (Gardner, et al., 1959, p. 25). Thus, the leveler, who is characterized by an extreme tendency to underestimate in his size judgments may be the subject who is characterized by large assimilation effects. The other major component of response in the test, the accuracy with which the subject ranks the sizes of the successive stimuli, may have several determinants. Low accuracy can result from the subject's inability to make discriminations bound on small stimulus differences, or he may have no consistently stable conception of the

prior stimuli, hence cannot place new stimuli correctly in the series. Another possibility is that low ranking accuracy indicates unsustained attention which leads to errors in registration of individual squares; the subject's attention may vary over any series of 15 judgments. Also, his memory of some preceding squares may be sharper than that of others; those squares which registered more vividly would have the greatest influence on the ranking and hence result in low accuracy. Finally, low accuracy could result from large assimilation effects involving memory traces of preceding squares and new stimuli.

Despite these possible differences in determinants of the two principle facets of response, Gardner et al. conclude that "the repeated low but significant correlations between increment error and accuracy scores in earlier studies suggests that assimilation proneness is an important factor in both."

Subjects. The general sample consisted of 101 volunteers from several sections of an introductory psychology course; included were 54 males and 47 females.

Administration of Test. Subjects were tested in groups of approximately twenty in a dark room. Sitting at desks, they faced a black screen upon which the squares appeared and recorded their judgments on sheets numbered from 1 to 150. The instructions (Gardner, et al., 1959) were read to the subjects as follows:

> We wish to see how well you can judge the size of squares. We're going to show you a number of squares on the screen and we want you to tell us how big they are.
>
> The squares may range anywhere between 1 inch and 18 inches. This doesn't mean you will necessarily get a square which is 1 inch or 18 inches, though you may. The squares will always be somewhere within this range.

The 1-inch square and the 18-inch square were then exposed for about 5 seconds each.

> We will show them to you again. You will see 150 squares during the course of the hour and you have 150 numbered spaces on your sheet. Write your estimation of the size of each square in its own numbered space. Thus for square No. 1 record its size in inches next to No. 1, etc.
>
> Don't go back over your judgments to change them. In changing them you are more likely to be inaccurate. Please don't compare your estimates with anyone or make any comment during the hour. Make your judgments independently.
>
> Now to remind you once again of the range in which the squares will fall, we will show you again the smaller and the larger ends of the range.

The 1- and 18-inch squares were then exposed twice, allowing 5 seconds for each exposure.

> Now we are ready to begin. You will see each of the following squares for only a few seconds. Look at it all the time it is on the screen and make your estimation when it disappears. The next square you see will be No. 1.

The experiment then began. Two minute rest periods were given after trials 40 and 75.

Scoring. The two scores for the test are: 1) Ranking accuracy, and 2) Lag, a modification of an increment error score used in earlier studies. Procedures for their computation appear in Appendix B. These two scores formed the basis for selecting extreme groups of 20 levelers and 20 sharpeners, and 20 controls from the middle of the leveling-sharpening continuum. All 60 of these subjects took part in the remainder of the experiment.

Defense Preference Assessment

The Defense Preference Inventory

The Defense Preference Inventory (DPI) is an objective inventory for use in conjunction with the Blacky Pictures (Blum, 1949). The instructions encourage subjects to identify with Blacky's feelings and actions in pictures which each represent a different psychosexual stage. Subjects rank a series of five statements given by Goldstein (1952) to describe some feeling or behavior representing a particular type of defense mechanism described in psychoanalytic theory. Short time limits and systematic rotation of the five defenses throughout the inquiry reduce the possibility of response bias affecting responses. The five alternatives defenses are: Avoidance (a generic term coined for repression and denial), Regression, Reaction Formation, Projection, and Intellectualization. Clausman (1960) has described this instrument in detail. While the complete DPI is presented in Appendix C, the set of items pertaining to oral eroticism is included here for illustration. (The names of the appropriate defenses appear in parentheses in the margin.) After writing a two-minute story about the oral erotic Blacky Picture,

the subject ranks the following DPI items according to these instructions:

> Rank all of the statements according to how well they seem to fit the situation.
>
> 1 - fits best
> 2 - fits second best
> 3 - fits third best
> 4 - fits fourth best
> 5 - fits worst

(Int.) A. Blacky makes sure he eats heartily to facilitate growth of healthy bodily tissues which will fortify him for activities which might lie ahead.

(Reg.) B. Blacky tends to act in the same helpless infantile way as when he was first born, often stuffing himself more than is good for him.

(Proj.) C. Blacky is busy getting his dinner here, but he thinks it is really Mama who makes him eat so much all the time.

(RF.) D. As Blacky eats, he thinks to himself that its time he went after his own food rather than having to depend on Mama.

(Av.) E. When Blacky is busy with other things, he often forgets to come to eat but here he's making up for lost time.

Reliability. Information concerning reliability and validity comes mostly from an extensive research program at the University of Michigan (Blum, 1956).

Two test-retest measures resulted in product-moment correlations of .45 and .46. Of the first choices on one administration, 73 percent occurred as either first or second choices on the second administration. Last choices were nearly as stable as first choices.

Validity. Several studies have successfully used the DPI, offering construct validity for the instrument. Blum (1954, 1955, 1956, 1957) and Nelson (1955) found a relationship between avoidance preferences on the DPI and perceptual defense tasks in which Blacky Pictures were used as stimuli. In the first fraternity study at the University of Michigan, avoidance preference was significantly associated with forgetting of pictures in a recall task and with selection of neutral rather than conflict-relevant solutions in word completion and anagram experiments.

In the first investigation using DPI items, Goldstein (1952) found that subjects who tended to use the same defense across psychosexual dimensions were more disturbed, as judged by their responses to Blacky Pictures, than subjects who were more variable

in their defense preferences. He designated the former "general defenders" and the latter "specific defenders." Shire (1954) more systematically investigated personality differences between these two types of defenders, demonstrating that general defenders showed greater maladjustment than specific defenders on spontaneous Blacky stories and on the Rorschach test. Segal (1954) used the Blacky Pictures and the TAT to equate general and specific defenders on the basis of hostile and dependent impulses. During a personal interview situation general defenders were less able to express hostility or dependency toward their mothers.

While validity studies just reviewed concerned themselves with avoidance as a defense preference, there are two investigations exploring projection. A study by Cohen (1956) indicated that subjects having a preference for projection show more negative interpersonal reactions than individuals preferring different defense mechanisms. Clausman (1960), in a perceptual defense study, showed that both avoidance and vigilance behavior can occur in perception, and that the type of perceptual behavior

relates to ego defense mechanisms. Of particular relevance for the present investigation is his finding that subjects who preferred projection as a general defense on the DPI displayed vigilant behavior in perception, whereas subjects preferring avoidance responses on the DPI were similarly avoidant in regard to perceptual stimuli.

Administration. The 60 subjects selected by way of the Schematizing Test were given the DPI, following Blum's procedure (1956). Subjects, tested in groups with Blacky Pictures projected on the screen, wrote their spontaneous stories in test booklets provided by the experimenter, then ranked the DPI items. The following instructions were read by and to the subjects:

> I am going to show you a series of pictures about a dog named Blacky. These are like the cartoons you see in the paper. I will present one picture at a time, and I want you to make up a short story about each one. Tell what is happening in the picture and why it is happening. Since this is a test of how good your imagination can be, try to write vividly about how the characters feel. You will have two minutes for each story. It is desirable to write as much as possible within the time limit.

I will signal when there are only thirty seconds left to finish a story.

After the two minutes for the story are up, you will be asked to turn the page, where you will find a series of five statements describing some possible feelings or reactions of Blacky in the cartoon you just saw. I want you to rank those statements as to how well you think they represent the way Blacky seems to be feeling or acting in that situation. Naturally, there are no right or wrong answers involved. Just write a "1" alongside the statement that fits best, a "2" alongside the second best, a "3" for third best, a "4" for the one that fits fourth best, and a "5" for the one that fits worst. Regardless of how well or poorly the statements seem to fit, be sure to rank them "1" through "5." Never leave a statement unranked. You will have 55 seconds for each set of rankings so you will have to work rapidly. I will indicate when there are only ten seconds left.

Remember then, for each picture you will have two tasks--first to write a two minute, imaginative story about how Blacky is feeling or acting, and second, to rank order the five statements about the picture. Never turn a page until I give the signal and never look back at what is already done.

Groups of "general" defenders were formed in accord with two criteria adopted from Clausman (1960). The first criterion was the number of first place ranking of a particular defense mechanism to the various psychosexual dimensions. Subjects who selected the same defense mechanism five or more times as their

first choice were classified as "general defenders." The second criterion, the coefficient of concordance, was applied to subjects in the "general" defender group who had selected either avoidance or projection as the preferred defense. The coefficient of concordance (W) is a quantitative measure of the degree of agreement between sets of ranks. The cut-off point for inclusion in one of the two groups was a value of W that was significant at the .05 level, the general defender being a person who is consistent in his use of a particular defense.

Perceptual Defense Assessment

Tachistiscope and Stimuli

The viewing apparatus was a Gerbrands tachistiscope. The adapting and viewing fields were illustrated at intensities of .58 foot lamberts and .73 foot lamberts respectively, after Wilson (1955); these illuminances preclude the interference of dark adaptation by permitting some adaptation to a less bright surface between

exposures. The stimuli were presented at an exposure speed of .20 seconds. Blum (1954) and others (Nelson, 1955; Smock, 1956) found this speed to represent a level of awareness which is below veridical threshold.

Four 1" by 2" black and white drawings adapted from the Blacky Pictures (Blum, 1950) were used as perceptual stimuli (See Appendix F). The conflict picture shows Blacky as he appears on Card V (Masturbation Guilt). The neutral pictures depict Blacky in two different standing positions and one reclining position. The four pictures were printed on white photographic paper and then mounted on a series of eight white poster boards (8-1/2" x 11"). The relative positions of the pictures were systematically rotated from card to card (See Table 2).

Table 2.--Pattern of rotation of the four stimulus pictures

Card	Top	Bottom	Right	Left
1.	C	N-1	N-2	N-3
2.	N-1	N-2	N-3	C
3.	N-2	N-3	C	N-1
4.	N-3	C	N-1	N-2
5.	N-2	N-1	N-3	C
6.	N-1	N-3	C	N-2
7.	N-3	C	N-2	N-1
8.	C	N-2	N-1	N-3

Administration

In the three sets of 32 trials, Set 1 established a baseline, since it was necessary to determine whether any of the four pictures exert a differential "pull" on responses; Smock (1956) attributed his failure to replicate the Blum (1954) study to this problem. Using a procedure adapted from Koons (1960), the experimenter told the subject:

> I want you to look into the eyepiece and focus on the black dot you will see in the center of the field. When we begin a series of trials I want you to continue to fixate on the dot at all times. Do not move away from the eyepiece until you are told to do so. I am going to flash some pictures very quickly at a fraction of a second. There will be four pictures shown simultaneously at each flash--one at the Left, Right, Top, and Bottom. What I want you to do is simply to say which one of the four stands out the most. Obviously with the very fast speeds we are going to use you probably won't be able to get any real idea of what the pictures are, so you may feel quite uncertain of your judgments. But in every case make a guess. All I am interested in is your immediate impression. You will see different patterns of combinations of pictures during the series of flashes. Remember to say just Left, Right, Top, or Bottom, according to which picture appears to you to stand out the most. When I say Ready, focus on the dark spot in the center of the screen. That will give you the best chance to see all four pictures at once. I will flash the pictures right after the ready signal.

Before each of the three sets of trials, the subjects adapted for 45 seconds to the illuminance of the adaptation field. There was a 30-second rest after each block of 16 trials in all three sets.

Upon the completion of Set 1, it was necessary to give the second set of 32 trials to determine whether exposure to one of the pictures in itself resulted in a significant change in response tendency due to the subject's interpretation of a picture's content. Thus, before commencing Set 2, the subject was handed a copy of a stimulus card, selected at random from those presented in the tachistoscope, and told: "Here is one of the cards you have been looking at."

The card was withdrawn after 30 seconds and the experimenter said: "We will now repeat the same process. Remember to keep your eye focused on the black dot. Ready?"

After Set 2, the subject read silently the following instructions designed to sensitize the <u>conflict</u> picture; he also looked at a 6" x 9" photographic enlargement of it.

> You are holding one of the pictures from among the several which you just saw at fast speeds. It belongs to a psychological test which consists of a series of cartoons portraying the adventures of a dog named Blacky. In this picture Blacky is discovering sex; he is masturbating. Blacky really enjoys what he is doing but at the same time he feels very guilty and frightened of being discovered by his Mama and Papa whom he knows would disapprove and punish him for his behavior.
>
> Now, without saying anything out loud, look at the picture and try to recall when <u>you</u> might have felt the way Blacky does here. Just think to yourself about similar experiences of your own. I will not ask you afterwards about your thoughts.

Two minutes were allowed the subject to read the sensitization instructions and reflect upon them. Next, subjects underwent the third and last set of 32 trials, under the following instructions:

> We will now begin a new series of trials. Remember to say just Left, Right, Top, or Bottom, according to which picture appears to you to stand out the most. When I say "Ready" focus on the dark spot in the center of the screen. That will give you the best chance to see all four pictures at once. I will flash the pictures right after the ready signal.

Intertrial intervals in all sets were approximately five seconds.

RESULTS

The data from the Schematizing Test were analyzed to form the three experimental groups. The statistics in Appendix D show that the two Schematizing test measures, Lag and Ranking Accuracy, are not highly related; a subject who scores well above the median on one measure may be almost anywhere on the other distribution of scores. Since the Lag score is thought to reflect more adequately the tendency for one percept to merge with others over time,[1] it became the stricter of the two criteria for inclusion of a subject into an experimental group. Thus the group of levelers consisted of the 20 subjects with high Lag scores (above the 73 percentile who also scored below the median on the Ranking Accuracy measure. Similarly, the sharpener group contained those twenty subjects who scored toward the bottom of the Lag score distribution (below the 34

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[1] Personal communication from Riley Gardner.

percentile) and were above the median in Ranking Accuracy. The control group had the 20 subjects from the middle of both distributions. There were approximately the same number of males and females in each group.

Defense Preference Assessment

Hypotheses I and II predict a relationship between leveling and repression, and sharpening and projection, but the application of essentially what were the same criteria for the selection of "general" defenders that others (Blum, 1955; Nelson, 1955; Clausman, 1960) have used successfully, indicated that no subject in the present investigation chose consistently either repression or projection (See Appendix E). Further the mean ranks for the five defense preferences assessed by the DPI did not differ significantly, as Table 1 shows. In addition, computation of the Kendall coefficient of concordance for each subject showed that none was consistent in his defense preferences. Finally, the H-test indicated no significant differences ($p>.05$)

in ranks on any defense preference among levelers, sharpeners, and controls (Table 3). Thus, the hypotheses regarding DPI responses were not testable.

Perceptual Defense Assessment

Hypotheses III and IV predict a relationship between leveling and perceptual avoidance behavior, and sharpening and perceptual vigilance. Before these hypotheses could be tested appropriately, the possible effects on responses of certain extraneous variables were considered. In order to determine whether subjects' responses were biased in favor of a particular position, that is, left, right, top, or bottom of the tachistiscopic field, positional responses were compared for each of the three sets of trials. The Friedman test disclosed no significant differences in the "pull" of the four positions. These results appear in Table 4.

Table 3.--Comparison of defense preference ranks for levelers, sharpeners, and controls

Group	Defense Mechanism: Avoidance Mean	Reaction Formation Mean	Regression Mean	Intellectualization Mean	Projection Mean	χ_r^2 [2]	df	p
Leveler	3.27[1]	3.19	2.80	2.80	2.85	.97	4	>.05
Sharpener	3.27	3.13	2.80	2.73	3.03	.84	4	>.05
Control	3.35	2.87	2.72	2.74	3.25	.78	4	>.05
	H[3] .06	1.4	.04	.03	1.7			
	df 2	2	2	2	2			
	p[4] >.05	>.05	>.05	>.05	>.05			

[1] Means are presented for Comparison Purposes only.

[2] Chi square for ranks: The statistic of the Friedman two-way analysis of variance by ranks.

[3] H: The statistic of the Kruskal-Wallis H-test for k independent samples.

[4] Probabilities associated with a two-tailed test of signifcance.

Table 4.--Responses by total group to stimulus positions

Set of Trials	Position of Stimulus										
	Left		Right		Top		Bottom		χ_r^2[1]	df	p[2]
	Mean	Σ Ranks	Mean	Σ Ranks	Mean	Σ Ranks	Mean	Σ Ranks			
Set 1	8.3[3]	54.0	7.7	48.0	8.1	49.0	7.9	49.0	.80	3	>.05
Set 2	7.9	51.0	8.4	46.0	7.8	53.0	7.9	50.0	.78	3	>.05
Set 3	8.2	53.5	8.1	50.5	7.7	48.0	7.8	48.0	.61	3	>.05

[1]Chi square for ranks: the statistic of the Friedman two-way analysis of variance by ranks.

[2]Probabilities associated with a two-tailed test of significance.

[3]Means are presented for comparison purposes only.

The responses to the first 32 tachistiscopic trials, Set 1, enable the assessment of the possibility that the physical properties of one or more of the stimulus pictures exerted a differential pull on responses. The presence of such a response bias would require either modification of the stimuli or else the use of responses to Set 2 as a baseline for analyzing the effect of the sensitized stimulus on defensive behavior. The Friedman two-way analysis of variance tested the hypothesis that the four response choices were drawn from similar populations. As Table 5 indicates, there were no significant differences in frequency of choice of the various stimulus pictures in any of the groups. The Friedman test applied to the data of Set 2 and Set 3 also showed no significant difference in response tendency to the various stimuli (Tables 6 and 7).

The results of Set 2 were compared with Set 1 to determine whether the introduction or inspection of an apparently neutral stimulus, not yet sensitized by instructions, produced a response bias. This procedure checked whether a subject responded to psychological

Table 5.--Analysis of choices on the first set of 32 trials

Group	Stimulus Picture						
	Conflict	N - 1	N - 2	N - 3	$\underline{X}^2_r$ [1]	df	p [2]
	Ranks	Ranks	Ranks	Ranks			
Leveler	53.0	51.5	48.5	47.0	.66	3	>.05
Sharpener	46.5	48.0	53.5	52.0	.99	3	>.05
Control	51.0	49.0	49.5	50.5	.09	3	-.05
Total	150.5	148.5	151.5	149.5	.05	3	>.05

[1]Chi square for ranks: The statistic of the Friedman two-way analysis of variance by ranks.

[2]Probabilities associated with a two-tailed test of significance.

properties inherent in the stimuli, even though these appeared innocuous. The Wilcoxon test for matched pairs tested the difference between the data of Set 1 and Set 2. Table 8 shows that the two sets do not differ significantly.

Having controlled for position bias, physical properties of the stimuli, and psychological effects of the stimuli, it was possible to determine whether sensitization of the conflict stimulus, that is, interpretation of its meaning to the subject, resulted in a differential response to that stimulus. Subtracting the frequency of choice of the conflict picture on Set 3 from the frequency of choice on Set 1 produced a difference score which differed significantly ($p<.05$) among the experimental groups, as tested by the H-test (Table 8). In addition, since Set 1 and Set 2 did not differ significantly with respect to choice of conflict picture, it would follow that changes in choice from Set 2 to Set 3 should also differ in the three experimental groups. In Table 8 the H-test indicates a difference between levelers, sharpeners, and controls

($p<.05$), while no such difference holds between Set 1 and Set 2. Thus, it is apparent that, as predicted, only after sensitization to the conflict picture prior to Set 3 did levelers, sharpeners, and controls differ significantly in their responses to that stimulus.

The Mann-Whitney U-test was employed to determine whether levelers and sharpeners differed significantly from controls in response to the conflict stimulus consequent to sensitization. Levelers, compared to controls, tended to call out the conflict stimulus less frequently ($p<.05$) after sensitization, whereas the sharpeners did not. Thus Hypothesis IV predicting a relationship between leveling and avoidance (repression) of the conflict stimulus was supported, while Hypothesis III, predicting a relationship between sharpening and vigilance (projection) was not.

An alternative analysis was performed on the data to determine whether significant differences could be found between baseline and post-sensitization responses for <u>individuals</u> in the total sample of sixty subjects. The McNemar (1955) test computed for each

subject indicated that seventeen significantly ($p<.05$) reduced their choice of the conflict stimulus in Set 3 compared to Set 1. Conversely, sixteen subjects chose the conflict stimulus significantly more often in Set 3 than in Set 1. The former group of subjects seemed to be repressers, the latter group projectors.

A X^2 test for k independent samples showed no significant differences in frequency of projectors among the experimental groups; however, Table 9 shows that the relationship between leveling and repression was significant ($p<.01$). Nearly twice as many repressers were included in the leveling group as in the sharpening and control groups combined.

Table 6.--Analysis of choices on the second set of 32 trials

Group	Conflict	N - 1	N - 2	N - 3	χ_r^2[1]	df	p[2]
	Σ Ranks	Σ Ranks	Σ Ranks	Σ Ranks			
Leveler	53.0	49.0	54.0	44.0	1.86	3	>.05
Sharpener	47.5	54.0	47.0	51.5	.99	3	>.05
Control	45.0	53.5	47.5	54.0	1.77	3	>.05
Total	145.5	156.5	148.5	149.5	.65	3	>.05

[1]Chi square for ranks: The statistic of the Friedman two-way analysis of variance by ranks.

[2]Probabilities associated with a two-tailed test of significance.

Table 7.--Analysis of choices on the third set of 32 trials

Group	Stimulus Picture: Conflict Σ Ranks	N - 1 Σ Ranks	N - 2 Σ Ranks	N - 3 Σ Ranks	$\underline{X_r^2}$[1]	df	$\underline{p}$[2]
Leveler	46.0	53.0	49.0	52.0	.90	3	>.05
Sharpener	53.0	49.5	51.5	46.0	.81	3	>.05
Control	47.0	51.0	52.0	50.0	.42	3	>.05
Combined	146.0	153.5	152.5	148.0	.08	3	>.05

[1]Chi square for ranks: The statistic of the Friedman two-way analysis of variance by ranks.

[2]Probabilities associated with a two-tailed test of significance.

Table 8.--Changes in the number of choices of the conflict picture over the three sets of trials

	Mean Change		
Group	Set 1 - 2	Set 1 - 3	Set 2 - 3
Leveler	0.1	0.6	0.5
Sharpener	0.5	-0.6	-0.4
Control	-0.3	-0.1	0.1
H^1	3.9	6.1	
df	2	2	2
p	>.05	<.05	<.05

[1]H: The statistic of the Kruskal-Wallis H-test for k independent samples.

Table 9.--Relation of repression on perceptual defense task to leveling on schematizing test

Perceptual Defense Task	Schematizing Test				
	Levelers	Sharpeners and Controls	$\underline{X}^2$	df	p
Repressers	11	6	8.63	1	<.01
Non-repressers	9	34			

DISCUSSION

Hypotheses I and II predicting a relationship between leveling and repression, and between sharpening and projection were not testable, because an exhaustive analysis of DPI responses indicated that no subject in any of the three experimental groups ranked first consistently in either repression or projection across the various psychosexual dimensions. Nor did the DPI reveal a consistent first place selection for any of the three remaining defenses measured by the test. Further, the average ranks for the various defenses do not differ significantly. These results, taken together, point to the conclusion that the "general" defender (Goldstein, 1952), one who uses the same defense throughout each of the psychosexual stages, was not present in this sample. To the extent then that the "general" defender category is a valid indicator of maladjustment, the college population from which subjects in the present study were drawn is essentially "normal." As is

stated in the manual of the Blacky Pictures (Blum, 1949), the technique itself is primarily intended to reveal an individual's predisposition to psychosexual disturbance along a series of dimensions inherent in personality development, not to diagnose psychosis or classify into psychiatric categories; the assumption is that everyone has to come to grips, at least to some degree, with the problems tapped by the Blacky Pictures. It thus appears that if one is looking for consistency in use of a particular defense mechanism, he must either sample other than undergraduate or else use a larger sample than ours. In Clausman's (1960) study, for example, the sample size was more than three times that of the present investigation.

As Hypothesis III predicted, levelers tended to show perceptual avoidance behavior to the conflict stimulus after sensitization. It would make little sense from the standpoint of psychoanalytic theory, however, to attribute such behavior to repression had all subjects shown perceptual avoidance, since repression is considered to be an intrapsychic rather

than an interpsychic phenomenon. Thus, the fact that individual levelers also showed a reduction in post-sensitization choices of the conflict stimulus lends additional credence for the presence of repressive behavior on the tachistiscopic task.

It is of interest that repression manifested itself in the Perceptual Defense phase but not in the Defense Assessment phase of the study. These contrasting findings may be due to the fact that the subjects used a wider range of defense mechanisms. A person who consistently represses, regardless of the specific nature of the impulse being warded off, is likely to have a character problem. Such individuals may be relatively rare in the population here sampled. Supposedly, characterologically embedded repression produces a particular kind of cognitive and affective process. As Schafer (1954, p. 193) put it:

> The repressed continues to exist outside conscious awareness . . . and to seek conscious representation and discharge through derivatives, that is, through associatively connected impulses, thoughts, and feelings; the individual's defensive requirements may then necessitate repression of these derivatives along with

> the original objectionable instinctual demands.

Schafer continues in the same vein.

> Any act of repression cuts off a part of the personality from growth toward maturity; . . . being cut off thus from ego-regulated participation in life experiences, the repressed retains its original infantile character. Highly repressed adult personalities typically present a child-like appearance. Their emotional experience, for example, tends to remain relatively diffuse and labile . . . . Also, because the world of ideas has been and always remains so terribly threatening--any thought or fantasy being a potential channel of expression of the rejected impulse--and because intellectual curiosity and mastery are thereby continuously discouraged, their thinking tends to be naive, ego-centered, unreflective, affect-laden and cliche-ridden.

It is notable that the above description is specifically applicable only to individuals who manifest a "generalized repressive strategy" (Schafer, 1954, p. 193). There are, of course, those who utilize repression in various combinations with other prominent defense mechanisms and for whom pervasive repression is apparently not necessary. These may be the individuals who demonstrated reduced awareness for the conflict picture viewed in the tachistiscope. They are persons whose repressive tendencies are limited

to a certain conflict area, at least as far as their perceptual behavior is concerned. Among these individuals, however, who showed a greater drop in choice of conflict stimulus than other subjects, repression did not occur as an all-or-nothing phenomenon; the mean reduction in number of responses to the conflict stimulus from Set 1 to Set 3 was merely 3.2. Yet these results are compatible with two properties of repression, as described by Freud.

> We can lay down no general rule concerning the degree of distortion and remoteness necessary before the resistance of consciousness is abrogated. In this matter a delicate balancing takes place, the play of which is hidden from us; its mode of operation, however, leads us to infer that it is a question of a definite degree of intensity in the cathexis of the unconscious--beyond which it would break through for satisfaction. Repression acts, therefore, in a highly specific manner in each instance; every single derivative of the repressed may have its peculiar fate--a little more or a little less distortion alters the whole issue. (1958, p. 88-89)

In addition to the specific quality of repression Freud also described its mobile property.

> The process of repression is not to be regarded as something which takes place once for all, the results of which are permanent, as when

> some living thing has been killed and from that time onward is dead; on the contrary, repression demands a constant expenditure of energy, and if this were discontinued the success of the repression would be jeopardized, so that a fresh act of repression would be necessary. We may imagine that what is repressed exercises a continuous straining in the direction of consciousness, so that a balance has to be kept by means of a steady counter-pressure. A constant expenditure of energy, therefore, is entailed in maintaining a repression, and economically its abrogation denotes a saving. (1958, p. 89-90).

Thus, it is in keeping with the specific and mobile properties in the Freudian notion of repression that subjects' perceptual behavior varied somewhat during the third set of trials of the Perceptual Defense phase of the present investigation.

The fact that a significant relationship exists between repression and leveling has implications for the interpretation of projective tests. Repression and other defense mechanisms as seen in tests differ in that one cannot observe repression occurring. A patient may be seen regressing, for example, or intellectualizing by what he says; repression is known when it becomes apparent that something is missing. One must, therefore,

identify repression either from its broad long-term effects on personality functioning and structure, or through some limited current effects which appear in response to specific test stimuli. Since leveling and repression, however, appear to be related phenomena having similar observable properties, one must be cautious not to confuse the two when analyzing test protocols. Thus, a notably constricted, unideational, affectively labile test picture may not be indicative of a repressive character but rather of a tendency to level, that is, to reduce the distinctiveness of individual percepts and cognitions for reasons unrelated to conflict. More specifically, an individual classified as a leveler in the present study may produce a Rorschach protocol with fewer than twenty-five responses. Whereas many clinicians would interpret this behavior as indicative of pervasive repression, it is also possible that the individual concerned was not reacting to conflict aroused by the test, but rather is one who finds it difficult to extract any memory from his total memory reservoir, even in such neutral situations as the Schematizing test.

Hypothesis IV, which predicted a relationship between sharpening and projection, was not confirmed. Although sixteen projectors were identified in the sample, they distributed themselves nearly evenly among the leveling-sharpening groups. The rationale underlying Hypothesis IV was that both sharpening and projection are mechanisms that sensitize an individual to his environment. It may be, however, that the nature of this sensitization need be more carefully considered. Rather than being related to a cognitive control that concerns the merging or non-merging of temporally separated perceptual experiences, that is, leveling-sharpening, projection may be associated with the tendency to deploy attention more-or-less simultaneously to many aspects of the stimulus field--a property of the scanning control (Gardner, et al., 1959).

The present study did not intend to shed light on how control and defensive structures develop. As Holzman (1962) suggests, leveling and repression may actually be the same process, viewed from adaptive

and defensive vantage points, or possibly leveling developed as an adaptive use of repression. Another possibility is that leveling and repression derive from a common origin, which differentiated into two processes during the course of maturation. Holzman maintains the most likely explanation is that repression utilizes leveling properties for part, but not all of its operation. A memory system characterized by considerable assimilative activities, in which memory elements fuse together, seems to offer an effective vehicle for the defensive removal from awareness of painful memories.

One avenue of approach to this problem of development may lie in exploring the relative permanency of repression and leveling. It is believed, for example, that one consequence of intensive psychotherapy is the lifting of deeply-ingrained repressions. This suggests the possibility of selecting a sample of neurotic levelers whose primary mode of defense is repression, and retesting them on the Schematizing Test after they have undergone a successful psychotherapeutic experience.

A significant decrease in leveling tendency would suggest that this cognitive control is not innate or necessarily enduring and would support the hypothesis that either leveling and repression are essentially the same phenomenon or that leveling stems from repression rather than the reverse being true. No change in the tendency to level would imply that leveling developmentally is a precursor of repression.

What can be concluded from the present study is that defensive behavior deriving from anxiety-arousing stimuli is predictable from knowledge of responses to neutral stimuli presented in a relatively anxiety-free context. Thus, the Klein-Gardner concept of cognitive control offers a fruitful approach to the assessment of certain features of personality structure and function. It provides a frame of reference for the exploration of individual differences in the employment of various defense mechanisms. Whereas, up to the present, investigators have limited themselves to searching for

relations between a given control and a given defense mechanism, future research should expand to include the effect of patterns or combinations of cognitive controls on defensive behavior.

SUMMARY

Leveling-sharpening is a cognitive control referring to a particular mode of perceptual or memory organization. Levelers are characterized by maximal assimilation effects and by memory organizations in which fine shades of distinctions among individual elements are lost, while sharpeners tend to maximize stimulus differences and to maintain temporal discreteness among their perceptual experiences.

Leveling-sharpening should relate to two mechanisms of defense described in psychoanalytic theory, repression and projection. Leveling shares with repression the property of delaying impulse discharge, but differs in that it is not a reaction to the anticipation of anxiety; both serve to reduce the context of consciousness. Projection plays a role in postponing drive satisfaction as does the sharpening control. In projection, the offensive impulse is perceived in another person rather than in one's self; the individual

is sensitized to an external threat in place of anxiety or guilt associated with instinct expression. These properties of projection and sharpening serve to sensitize perceptually an individual to his environment.

The study consisted of three phases. In the Control Assessment phase, subjects were selected for the leveling, sharpening, and control groups on the basis of extreme scores on the Schematizing Test, a task requiring subjects to estimate the sides of squares in a gradually increasing series. Some time later, during the Defense Assessment phase, subjects took the Defense Preference Inventory (DPI), a questionnaire used in conjunction with the Blacky Pictures. Finally, in the Perceptual Defense phase, subjects responded to a set of four stimulus pictures tachistiscopically presented under instructions to call out which of the four, one a conflict-stimulus and three neutral, stood out the most. The test procedure controlled for possible effects of psychological and physical properties of the stimuli independent of sensitization.

Hypotheses predicted a relationship between leveling and preference for repression, and sharpening and preference for projection, but an exhaustive analysis of DPI responses indicated that no subject in the investigation chose consistently either repression or projection. Thus, the hypotheses regarding DPI responses were not testable. The failure to select repressers and projectors via the DPI suggests that this instrument may have better success in identifying "general" defenders in a more neurotic population.

Two hypotheses predicted a relationship between leveling and perceptual avoidance behavior, and sharpening and perceptual vigilance. The results indicated that, consequent to sensitization of the conflict picture, levelers, sharpeners, and controls differed significantly ($p<.05$) in their responses to that stimulus. The Mann-Whitney U-test showed that levelers, compared to controls, tended to call out the conflict stimulus less frequently ($p<.05$) after sensitization; sharpeners did not differ from the controls.

An additional analysis of the data determined whether similar results could be obtained for individuals in the total sample of sixty subjects. Seventeen repressers and sixteen projectors were identified by their tachistiscopic behavior. The X^2 test showed that the relationship between leveling and repression was significant ($p<.01$); nearly twice as many repressers were included in the leveling group as in the combined sharpening and controls groups. Frequency of projection did not differ significantly among the experimental groups.

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APPENDIX A

Schematizing Test

Order of Presentation of the 14 Squares

Sizes in Inches

1.	1.18	29.	2.83	57.	4.59	85.	5.52
2.	1.57	30.	1.97	58.	3.19	86.	3.19
3.	1.97	31.	1.97	59.	3.83	87.	6.62
4.	2.36	32.	2.36	60.	2.83	88.	4.59
5.	2.83	33.	2.83	61.	2.83	89.	5.52
6.	1.97	34.	3.19	62.	3.19	90.	3.83
7.	1.57	35.	3.83	63.	3.83	91.	3.83
8.	2.83	36.	2.83	64.	4.59	92.	4.59
9.	1.18	37.	2.36	65.	5.52	93.	5.52
10.	2.36	38.	3.83	66.	3.83	94.	6.62
11.	1.18	39.	1.97	67.	3.19	95.	7.95
12.	2.83	40.	3.19	68.	5.52	96.	5.52
13.	1.97	41.	1.97	69.	2.83	97.	4.59
14.	2.36	42.	3.83	70.	4.59	98.	7.95
15.	1.57	43.	2.83	71.	2.83	99.	3.83
16.	1.57	44.	3.19	72.	5.52	100.	6.62
17.	1.97	45.	2.36	73.	3.83	101.	3.83
18.	2.36	46.	2.36	74.	4.59	102.	7.95
19.	2.83	47.	2.83	75.	3.19	103.	5.52
20.	3.19	48.	3.19	76.	3.19	104.	6.62
21.	2.36	49.	3.83	77.	3.83	105.	4.59
22.	1.97	50.	4.59	78.	4.59	106.	4.59
23.	3.19	51.	3.19	79.	5.52	107.	5.52
24.	1.57	52.	2.83	80.	6.62	108.	6.62
25.	2.83	53.	4.59	81.	4.59	109.	7.95
26.	1.57	54.	2.36	82.	3.83	110.	9.53
27.	3.19	55.	3.83	83.	6.62	111.	6.62
28.	2.36	56.	2.36	84.	3.19	112.	5.52

Appendix A (continued)

113. 9.53
114. 4.59
115. 7.95
116. 4.59
117. 9.53
118. 6.62
119. 7.95
120. 5.52
121. 5.52
122. 6.62
123. 7.95
124. 9.53
125. 11.44
126. 7.95
127. 6.62
128. 11.44
129. 5.52
130. 9.53
131. 5.52
132. 11.44
133. 7.95
134. 9.53
135. 6.62
136. 6.62
137. 7.95
138. 9.53
139. 11.44
140. 13.73
141. 9.53
142. 7.95
143. 13.73
144. 6.62
145. 11.44
146. 6.62
147. 13.73
148. 9.53
149. 11.44
150. 7.95

APPENDIX B

Computation of Schematizing Test Measures

Percentage Ranking Accuracy

Divide the test protocol (150 judgments) into ten series of 15 judgments each. Divide each of these series of 15 into three sub-series of 5 each. Count the number of correct rankings within each sub-series and sum across all 10 series. Divide this sum by 150 to get the percentage of correct rankings. A high score represents the sharpening end of the score dimension. A low score represents the leveling end of the dimension.

If two or more stimuli are judged the same size within a sub-series, they are given 1/2 the accuracy credit they would obtain if they were not tied and properly ranked--so long as they appear at the appropriate place in the rankings. E.g.,

Appendix B (continued)

S's judgments	Accuracy Credit
Series 1	
Sub-series 1	
1	1
2	1
3	
3	1
5	1
	4
or,	
1	1
2	1
3	
3	1.5
3	
	3.5

Lag

For each S, the 150 judgments that comprise the test are divided into 10 series of 15 judgments each. Ignore the first series. Compute the mean of the judged sizes for each of the last 9 series. Convert these means to logarithms. Compute the regression of the logarithms of these 9 series means on the series numbers (2-10). In the resulting regression equation, $Y = b_{yx}X + a_{yx}$, only the slope (b_{yx}) is used. The Lag Score is the difference (signs observed) between the

Appendix B (continued)

slope for the actual stimuli (0.0767) and the slope for the logarithms of Ss's means (i.e., .0767 - S's slope). A small value (or a minus value) is assumed to represent the sharpening end of the score dimension. A large value is assumed to represent the leveling end of the score dimension.

Percentage Ranking Accuracy and Lag should be negatively correlated.

Example of Lag Scoring

X		Y
Series Number	Series Mean (S's Judgments)	Log Series Mean (S's Judgments)
2	2.38	.38
3	2.48	.39
4	2.65	.42
5	2.91	.46
6	2.93	.47
7	3.79	.58
8	4.67	.67
9	5.30	.72
10	6.15	.79
ΣX 54		ΣY 4.88
ΣX^2 384		
ΣXY 32.53		

Appendix B (continued)

$$b_{yx} = \frac{N\Sigma XY - (\Sigma X)(\Sigma Y)}{N\Sigma X^2 - (\Sigma X)^2} = \frac{9(32.53) - (54)(4.88)}{9(384) - (54)^2} = \frac{29.25}{540} = .0542$$

Lag Score = .0767 - .0542 = .0225

APPENDIX C

Defense Preference Inventory

Rank all of the statements according to how well they seem to fit the situation.

1 - fits best
2 - fits second best
3 - fits third best
4 - fits fourth best
5 - fits worst

I

A. Blacky makes sure he eats heartily to facilitate the growth of healthy bodily tissues which will fortify him for activities which might lie ahead.

B. Blacky tends to act in the same helpless infantile way as when he was first born, often stuffing himself more than is good for him.

C. Blacky is busy getting his dinner here, but he thinks it is really Mama who makes him eat so much all the time.

D. As Blacky eats, he thinks to himself that it is time he went after his own food rather than having to depend on Mama.

E. When Blacky is busy with other things, he often forgets to come to eat, but here he's making up for lost time.

Appendix C (continued)

II

A. When Blacky gets angry, he often throws a temper tantrum like he did in his earlier days.

B. Blacky tries to pretend that he's ferocious, but when Mama is around he is sure to be overly gentle, calm, and well-behaved.

C. Blacky is a firm believer in the idea of releasing one's aggressions, so he feels justified in ripping Mama's collar here.

D. Blacky is so intent on chewing the collar to pieces that he doesn't even realize that it belongs to Mama.

E. In Blacky's own way of thinking, his family has been treating him so unfairly that he feels entitled to chew up the collar.

III

A. It may look like Blacky is relieving himself between his parents' houses, but possibly he's just digging a hole to bury a bone.

B. Blacky knows Mama and Papa are not going to like the spot he chose, but to his way of thinking a dog's physical well-being is extremely important.

C. The consequences of Blacky relieving himself there might very well make him wish he were a young puppy again.

D. Blacky thinks his behavior is perfectly all right because he senses that Mama and Papa have been unreasonably irritated with him, even though their actions didn't show it.

Appendix C (continued)

E. Blacky figures that Mama and Papa will be pleased to find him so clean and neat about covering his mess.

IV

A. Blacky is feeling irritable, but he'll cheer up when he realizes that Mama and Papa love each other so much.

B. Though Blacky is the one behind the bushes, he's still upset by the thought that his parents are hiding their lovemaking from him in order to keep him out of the group.

C. At the moment Blacky is upset watching his parents together, but he'll soon forget his anger as he starts playing again.

D. As Blacky watches, he works himself into a fit of anger and helpless rage which will force Mama to take care of him again.

E. Blacky feels justified in getting angry here because he wants his parents to enjoy the other activities that he had planned.

V

A. Blacky has come to believe that frequent explorations of this sort are necessary to learn more about the role of his sexual anatomy in the functioning of his body.

B. Though licking himself, Blacky isn't affected by sexual sensations and will soon move on to other parts of his body.

C. Blacky will soon give up this childish practice and will devote his time to more constructive activities.

Appendix C (continued)

D. Blacky is enjoying his discovery, but he knows that others often get very upset and guilty over such actions.

E. When Blacky gets puzzled by a strange new experience like this, he naturally thinks back to the "good old days" before such problems existed.

VI

A. Blacky is intently watching this scene, waiting to see if Tippy's appearance will be improved as a result.

B. Blacky's anticipation of this happening to him will lead him to act like a puppy too young to have his tail removed.

C. Blacky's own reaction here is merely one of interest, but he thinks that seeing such an act would make other dogs panicky whenever they got around a knife.

D. Blacky is frightened here, but he knows that experiences like this will toughen her for future trials and tribulations.

E. At first Blacky is terrified by seeing the knife, but he soon decides that it must be some new kind of game.

VII

A. Blacky is so perplexed and frustrated by the toy that he may lose control of his temper the way he did when he was a pup.

B. Blacky wants to mind his own business but he figures the toy dog is trying to start a fight by blocking his path.

Appendix C (continued)

C. Blacky is eagerly calling the family's attention to his new toy dog, which he is very proud of.

D. Blacky feels justified in this furious outburst against the toy dog because, after all, discipline is vital to the development of a well-rounded personality.

E. Blacky is delighted to have this little companion to whom he can give advice, love, and affection.

VIII

A. Standing off at a distance like this, Blacky is impressed primarily by the fact that his family is such an intimate group.

B. Blacky is pleased to see Mama and Papa being affectionate to Tippy, since he feels that Tippy deserves a turn at getting attention.

C. Blacky believes that insight into his own jealousy of Tippy will enable him to handle himself better in competitive situations later on.

D. As Blacky watches the rest of the family, he'll act like a helpless infant so they will have to treat him like a baby the way they once did.

E. Blacky suspects that Tippy has been trying to win over Mama and Papa because Tippy is envious of their feelings toward Blacky.

IX

A. Blacky feels that he wouldn't be in the spot he's now in if others hadn't led him astray.

B. Blacky's unhappiness will force him to drift into other thoughts which don't bother him as much.

C. Though he's suffering now, Blacky will come to realize that his code of ethics is needlessly strict and confining.

D. After an experience like this, Blacky will become a model of virtue and will scrupulously avoid any wrongdoing.

E. This experience proved so disturbing to Blacky that it will be a long time before he is able to act his age again.

APPENDIX D

Statistics of the Schematizing Test Measures

	Measure	
Statistic	Lag	Ranking Accuracy
Median	0.015	0.821
Range	-0.0431 to 0.0853	0.604 to 0.945
Odd-even Reliability	r = .92	r = 90
Correlation between Lag and Ranking Accuracy	r = .31	

APPENDIX E

Distribution of First-Choice Rankings on the DPI

Group	Defense preference frequency[1]																			
	Repression				Projection				Reaction Formation				Regression				Intellectualization			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Leveler		2	3		2	1			2		1	1			4		1	3		
Sharpener	2	1	1		2	3			3	1	1		2	1	1		1	1		
Control	1	2	2	1	3	1	1		3	1	2			1				2		

[1]Frequency possibilities are listed from 1 to 4, since no subject gave any defense more than four first place rankings.

APPENDIX F

Tachistiscopic Stimuli

Conflict

N - 1

N - 2

N - 3