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THE EFFECT OF ALTERED EGO STATES
ON THE UTILIZATION OF SUBLIMINAL
REGISTRATIONS OF COLOR.**

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THE EFFECT OF ALTERED EGO STATES ON THE UTILIZATION
OF SUBLIMINAL REGISTRATIONS OF COLOR

by
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A dissertation submitted in partial fulfillment
of the requirements for the degree of
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Problem and Background

The intent of the present study is to investigate the effect of the altered ego states or states of consciousness presumed to be characteristic of schizophrenia on the ability to utilize subliminally presented stimuli.

The state of consciousness of the observer as a variable in recovering subliminal input is suggested in Freud's early work on dreams (1953). Freud was struck by the important part which unnoticed or incidental perceptual residues play in dreams. He remarks:

"In the manifest content of the dream only the indifferent impression was alluded to, which seems to confirm the notion that dreams have a preference for taking up unimportant details in waking life." (1953, p. 174)

While Freud did not elaborate upon the term "indifferent impression," seemingly the term refers to some form or forms of peripheral stimulation. Theory or research is almost totally lacking on the question of the relationship between trivial or incidental impressions and subliminal input as in the tachistoscope, yet it does not seem unreasonable to consider such subliminal registrations as being within the same realm as Freud's indifferent impressions. It could be argued that subliminal input is one, perhaps extreme, example of peripheral intake.

Poetzl (1917) also found that characteristics of stimuli which a person had never been aware of could nonetheless become evident in

dreams. After showing subjects landscapes for approximately 1/100 of a second, Poetzl asked them to draw and describe fully what they had seen. Later dream material of the subjects were said to contain just those aspects of the stimuli which had not been reported.

What this suggests then is that the altered state of consciousness concomitant with sleep somehow facilitates awareness of previously unheeded or filtered out impressions and allows their incorporation into ongoing awareness - in this case, dreams.

Later tachistoscopic studies by Fisher and Paul (1959) were consistent with the experiments of Poetzl in that they demonstrated that aspects of subliminally presented stimuli can appear in subjects' waking imagery and later reported dreams.

Another study (Friedman & Fisher, 1960) investigated the effect of an artificially induced change in state of consciousness on the recovery of subliminal input. Following the administration of LSD-25, an hallucinogen, subjects were said to show an enhanced ability to recover registrations. The authors conclude:

"With increasing regressive disruption of ego functions the perceptual apparatus becomes less capable of keeping subliminal registrations in the background." (1960, p. 102)

This conclusion would seem to contain an implicit contradiction. What is being said is that a weakened ego facilitates one form of perception, i.e. ability to recover subliminal input. In general, ego Psychology would assert that the stronger, more integrated ego should perform its functions (one of which is perception) better than a weaker, less organized one.

The resolution of this contradiction depends upon a refined understanding of the concepts of ego functions and states of consciousness. Klein (1959) asserts that the degree to which subliminally registered stimuli are delivered into conscious awareness does seem to depend in part upon the state of consciousness of the observer. He raises the question as to what states are most conducive to the recovery of subthreshold input and states that the normal "waking state" in which the ego is adapted to and disciplined by reality factors is less amenable to the recovery of registered stimuli than other states. He writes:

"As reality contact and reality requirements are minimized, so attention cathexis can be deployed to registrations, and they can be brought to awareness in a passive, eidetic-like manner." (1959, p. 23)

Klein attempts to account for the facilitative effect which weakened ego functioning has upon recovery of subliminal stimuli using notions concerning the deployment of attention cathexis. He suggests that in the "normal waking" state of consciousness individuals are likely to maintain highly focussed, concentrated attention cathexis. Individuals in this state prefer to "fix" those stimuli which are readily identifiable and unambiguous. Faint or peripheral external stimuli or internal cues on the fringe of awareness, therefore, are less likely to be attended to than clearer, more central stimuli. In the altered state of consciousness in which the ego apparatus is less integrated and disciplined by reality there is a less rigid, more evenly dispersed deployment of attention cathexis. Attention is more free floating and can encompass a wide range of cues even though such

stimulus impressions may be vague.

This state of consciousness in which reality factors are minimized seems akin to the state which psychoanalytic techniques attempt to induce in patients. In the psychoanalytic process a mild regression in the form of relaxed ego controls is encouraged in the patient by the relaxed posture on the couch, the minimization of external stimulation and the free association task itself. Here too the diminution of ego controls is said to facilitate the recovery of thoughts which are on the fringes of awareness and faint memory traces.

The investigations and conclusions of the above authors regarding the enhancing effect which certain altered states of consciousness have on the recovery and/or utilization of subliminal input suggests that at least certain schizophrenic subjects should be superior to normals on such a task. Schizophrenia has been characterized by many authors as a disorder in which contact with reality is lessened and ego functions show disruption and regression. The altered state of consciousness of the psychotic has in fact been likened to a dream state by both Freud (1956) and Jung (1909). If disrupted and regressive ego functioning is assumed to facilitate a state of consciousness in which there is a heightened ability to recover subthreshold stimulation then the hypothesis regarding the differential performance of normals and schizophrenics is tenable.

Because there is much variation in degree and variety of ego impairment and depth of regression among schizophrenics one must assume that there are differences in states of consciousness as well. The psychiatric literature roughly distinguishes two types of states which are said to be associated with two groups: the acute schizophrenics

and the chronic group. Kant, (1944) Langfeldt, (1937) and Kantor et al (1953) among others, agree that the state of consciousness in these two subgroups differs greatly. Intense anxiety, confusion, "clouded" consciousness, unclear sensorium and apperception difficulties are said to be much more evident in the acute or recent schizophrenic than in the chronic patient. Arieti (1959) writes that these characteristics of the acute schizophrenic are perhaps indications of the patient's awareness of the changes brought about by the illness and his fight against the regressive process.

Assuming the distinction to be a generally valid one, it would be difficult to predict whether or not acute schizophrenics would perform consistently better than normals in recovering subliminal registrations. Although their clouded state of consciousness might facilitate their performance, on the other hand their fight to maintain reality contact might constitute a hindrance on a task requiring temporary ego regression.

Chronic patients, on the other hand, are described as evidencing relatively little anxiety, minimal confusion and clear sensorium. There is an apparent acceptance of the illness by the patient, and to some extent the psychotic condition has stabilized. The chronic schizophrenic seemingly has become acclimated to an altered state of consciousness in which reality factors exert less control over perception and cognition than in the waking state of the normal.

One might predict then that the chronic group would be superior to normals on a recovery of subliminal input task. The present study was designed to test this hypothesis. No specific hypothesis is made with regard to the performance of acute patients.

Method

The method employed in this study differs considerably from the methods used by previous workers (Fisher & Paul, 1959; Friedman & Fisher, 1960). These investigators tachistoscopically presented such complex stimuli as landscape scenes or the Rubin double profile and requested the subjects to draw the images which came to mind. Their results suggest that complex stimuli which consist of lines or forms are liable to such primary process distortions as condensation and symbolic displacement. Furthermore, this method necessitated elaborate and unwieldy scoring systems to measure the degree of similarity between the veridical stimulus and the evoked images and dream content.

In the present study the stimuli were color patches, and a forced choice technique was used to test for the recovery of the registrations. This writer will use the term recovery in the sense that the subject was able to make use of the subliminal input by correctly choosing between the alternatives. "Utilization" is perhaps a more accurate label of the process since, unlike the methods used by previous workers, the correct response was available to the subjects in this study. That is, the present task made few demands upon the subjects to make use of their own cognitive processes in recovering the registrations. It was thought that a forced choice method between simple, homogeneous stimuli would minimize distortions which the subjects might make in the process of recovering and reporting the registrations and would, likewise, eliminate complicated scoring procedures.

The stimuli consisted of one inch squares of four Munsell colors, red, blue, green and yellow, mounted individually on white posterboard backings. A Gerbrands Tachistoscope and a Hunter decade interval timer (Model 100 C) comprised the experimental apparatus. The stimuli were arranged in a random sequence with each color appearing three times in the series of 12 trials.¹ The same schedule of presentations was administered to each subject. Following each exposure the subject's task was to choose between two color patches which were before him. The 'choice' colors were arranged in booklet form so that on half of the trials the correct response appeared on the right, for the other half they were on the left in random order. Each of the four colors appeared three times in the test series so that it could be matched once with every other color in the choices.

Following the instructions² the subjects were given five trials during which single colors were presented at decreasing durations which were nonetheless supraliminal (2.5/100 of a second, 2/100, 1.5/100, 1/100, 9/1000). This was done to check for possible color weakness or blindness and, in the case of the schizophrenics, to determine whether they would be cooperative. Six patients, because of either excessive suspiciousness or negativism did not respond during the initial trials or the actual test trials and were not used in the sample.

The test stimuli were then presented at a duration of 5 milliseconds. This exposure time was chosen on the basis of

1

See Appendix A for the schedule of presentations.

2

Complete instructions appear in Appendix B.

pretesting with ten normal subjects. It was found that this interval was well below the threshold for recognition of the color patches. The pages of the choice booklet were turned by the examiner so that the subject was not allowed to see the choices until after the stimulus was presented. In this study the stimuli will be designated as subliminal for both the schizophrenics and the normals in the sense that all subjects felt their responses were "guesses" and verbalized that they had not actually "seen" any colors during the test trials.

Subjects

The task was administered to 25 male chronic schizophrenics, 25 normal male subjects and seven newly admitted or acute schizophrenics.¹ Fifteen of the chronic patients were drawn from the psychiatric wards of Wayne County Hospital and ten came from Ypsilanti State Hospital; the criterion for chronicity being continuous hospitalization for at least five years. The acute patients came from the admitting wards of Detroit Receiving Hospital's psychiatric service. All subjects had a diagnosis of either schizophrenia or Dementia Praecox, and no subjects with a history of central nervous system pathology, chronic alcoholism or mental retardation were included. None of the patients were currently receiving chemo-therapy, and none had undergone shock therapy within the past year.

1

The study as originally planned was to include approximately 50 acute cases divided into two groups on the basis of a scale of prognostic potential. It had been hypothesized that those patients with poor prognosis would show a better performance than patients with good potential for recovery since the former group resembles more closely the chronic patient. Due to difficulties in obtaining acute patients this aspect of the investigation had to be abandoned. The data on the seven acute patients will be reported separately and without regard for estimates of prognosis.

The normal subjects were male undergraduate students at the University of Michigan selected from the Introductory Psychology course subject pool.

The mean age of the normal sample was 19.7 with a standard deviation of 2.5. The mean age of the chronic patients was 40.2 with a standard deviation of 5.9.

Because of the simplicity of the task it was felt that such variables as education, age and intelligence would have negligible effects on performance. The CVS a short form intelligence test which yields a fairly accurate estimate of the WAIS I.Q. was, however, administered to the normal subjects, and WAIS scores were available on 11 of the chronic patients. The correlations between performance and the variables of age and intelligence are included in the results section.

Results

The sum of the correct responses for all 25 Ss in each group for each color is given in Table 1.

TABLE 1
TOTAL CORRECT RESPONSES OF EACH GROUP ON THE FOUR COLORS

Group	Color				Total
	Red	Blue	Green	Yellow	
Normal	29	39	41	37	146
Schizophrenic	30	51	41	59	181
Total	59	90	82	96	327

Analysis of Variance

An analysis of variance based on repeated observations on one factor (color) was conducted.¹ The results are summarized in Table 2.

The results of the analysis indicate the following:

- (A) The schizophrenics performed significantly better than the normals ($p < .01$) which is in support of the experimental hypothesis.
- (B) The colors had a significant effect on performance ($p < .01$). A more detailed analysis of this effect will follow.
- (C) The interaction between colors and the diagnostic groups was found to be non-significant.

¹

Winer (1962) Chapter 7, p. 302.

TABLE 2
SUMMARY OF ANALYSIS OF VARIANCE

Source of Variation	SS	df	ms	F	p
Between <u>Ss</u>	(45.35)	(49)	-		
Between Groups	6.12	1	6.12	7.49	<.01
Error	39.23	48	.817		
Within <u>Ss</u>	(127)	(150)			
Between Colors	15.77	3	5.26	7.23	<.01
Colors X Groups	6.46	3	2.15	2.95	n.s.
Error Within	104.77	144	.728		
Total	172.35	199			

Color Effect

From the analysis of variance we found that the color effect was significant. No direct conclusions concerning color detectability can be drawn from this finding, however, since this analysis confounds preferences for colors with detectability.

The number of times each color was chosen by each group is shown in Table 3.

TABLE 3
TOTAL NUMBER OF TIMES EACH COLOR
WAS CHOSEN BY THE TWO GROUPS

Group	Color				Total
	Red	Blue	Green	Yellow	
Normal	66	76	83	75	300
Schizophrenic	53	87	72	88	300
Total	119	163	155	163	600

In order to test for the presence of any systematic color preference within the groups a X^2 test for goodness of fit was done. If the groups did not systematically prefer any color over another we would expect the colors to be chosen equally often, that is, we would expect frequencies of 75 for all cells in Table 3.

The results of the X^2 test for each of the two groups indicate that the normals did not deviate significantly from the expected frequencies ($X^2 = 1.946$ with 3 d.f. $.5 < p < .75$); that is, no systematic color preferences existed within the normal group.

The schizophrenic group, on the other hand, did show significant color preferences ($X^2 = 14.05$ with 3 d.f. $p < .005$). Yellow and blue were preferred over green and red.

In order to test for the differential discriminability of the colors a data analysis which controlled for color preferences through the use of proportion scores was performed. Table 4 shows the proportion of accurate responses for each of the colors.

TABLE 4
THE PROPORTION OF ACCURACY OF EACH GROUP
ON THE FOUR COLORS

Color	Group	
	Normal	Schizophrenic
Red	44	58
Blue	51	56
Green	49	58
Yellow	51	70
mean	48.75	60.5

Table 4 gives the conditional probability of a color being detected correctly given that it was chosen. Any bias introduced by color preference is, therefore, eliminated.

If the performance was, in fact, based on chance alone, one would expect that each color would be detected correctly 50 per cent of the time. In order to test the hypothesis that $p = .5$ for each of the entries in Table 4 their corresponding Z scores were computed¹ and are given in Table 5.

The Z scores in Table 5 are the number of standard errors by which the obtained proportions deviate from the hypothesized population proportion, i.e. .5. They provide, therefore, a direct test of the hypothesis that color detectability was on a chance level.

¹
Senders (1958, p. 396)

TABLE 5
Z SCORES OF PROPORTION OF ACCURACY MEASURES
FOR THE GROUPS ON EACH COLOR

Color	Group	
	Normal	Schizophrenic
Red	-.975	1.15
Blue	.174	1.22
Green	-.182	1.36
Yellow	.173	3.75*
mean	.433	3.64*

$p < .005$ level

From Table 5 we see that the total performance for the schizophrenic group was significantly above chance expectation ($p < .005$), while the normal group did not perform significantly better than chance. The schizophrenic group's performance was above chance on all colors, yet the only statistically significant findings with respect to the individual colors was this group's high accuracy in detecting yellow.

Age and Intelligence

Because the normal and schizophrenic groups differed rather markedly with respect to age a product-moment correlation between total correct responses and age was calculated for the separate groups. The r was .16 for the schizophrenic group and $-.07$ for the normals. These results suggest that age played a negligible role in the current findings. To the extent that age might have an effect on visual

detection tasks over the wider intra-group age span the literature (Weiss, 1959) suggests that the effect of increasing age would be to lower performance. Since the schizophrenics had a higher average age and yet performed better than the normals it seems that age cannot account for the obtained differences.

A rank order correlation between intelligence scores and performance was $-.63$ for the normal group and $+.34$ for the schizophrenic group. The obtained correlation for the normal group is significant while the correlation within the schizophrenic group is not significant. The normal sample was split into two groups according to whether the I.Q. scores were above or below the median score (134). A rank order correlation between I.Q. and performance was $+.04$ for the below median group and $+.11$ for the above median group. These correlations are not significant. A discussion of these results will appear in the following section.¹

Acute Data

The mean of the correct responses for the seven acute patients tested was 6.28 with a standard deviation of 2.13. This finding did not differ significantly either from chance performance or from the mean of the normal group.

¹

A scatter plot of these data appears in Appendix C.

Discussion

The findings of this experiment are consistent with Klein's general hypothesis that recovery or utilization of subliminal input is facilitated by a state of consciousness in which there is lessened ego control.

The significant result with respect to differential color detectability found within the schizophrenic group was an unexpected finding, and there does not seem to be any theory which would either predict it or account for it. One possible explanation for the schizophrenics' significantly above chance performance in detecting yellow arises from observations by clinicians and from statements by writers on "color Psychology." The schizophrenic's penchant for responding to yellow is reported by Phillips and Smith (1953), and Birren (1950) states that yellow has long been known to be the preferred color of schizophrenics. This is at least suggestive of a heightened sensitivity for yellow in schizophrenics which may account for the color effect finding.

In the discussion to follow the present results will first be examined with respect to their consistency with the major conclusions of other studies - studies designed to refine our understanding of the specific characteristics of ego states which contribute to increased sensitivity to subliminal registrations. The findings will also be discussed as to their relation to several theories in psychopathology. Secondly, this section will deal with the question of whether the present findings have implications for our knowledge or understanding of

schizophrenia. In particular, the issue of the generality of increased subliminal sensitivity among schizophrenics as it is investigated experimentally will be discussed in light of certain methodological considerations.

The phenomenon of ability to recover or make use of subliminal registrations is not restricted to schizophrenics. The capacity is found in varying degrees among normals, and it seems likely that similar processes underlie the phenomenon in both normals and schizophrenics. The current findings can be examined in the light of recent studies on personality correlates of subliminal sensitivity in normal subjects. A study, representative of the work in this area, was conducted by Eagle (1962). On the basis of his findings he describes high sensitivity normal subjects as showing the following qualities: receptiveness to internal cues, capacity for fantasy and vivid imagery, ability to suspend active, secondary process controls, capacity for assuming a passive, uncritical attitude, less emphasis on accuracy or precision in cognitive function, and "non-alertness" during the period when the experimental response is elicited.

The above mentioned characteristics are not incompatible with inferences one could make about the chronic sample in this study derivable from clinical literature on schizophrenia as well as theoretical formulations of the schizophrenic process by psychoanalytic writers (Fenichel, 1945). In psychoanalytic terminology many of these qualities of the subliminally sensitive subject resemble the results of an at least partial, temporary withdrawal of attentional cathexis from external reality (with a concomitant heightening of energy investment in internal stimuli) as well as a partial reversion to a more

primary process mode of psychic functioning.

The present findings as they are accounted for by Klein's notions of attention deployment can be linked to Bleuler's description of the alterations of attention found in *Dementia Praecox*. Bleuler (1909) writes that in cases of schizophrenia where strong affect is lacking there is a lessening of drive and, as a result, a lack of active attention or concentration. With respect to passive attention Bleuler remarks that often the selectivity which normal attention processes exert upon the sensory impressions is diminished "so that almost everything is recorded that reaches the senses." (1909, p. 68).

Likewise, the current findings may be related to Cameron's concept of "overinclusion" as characteristic of schizophrenics. According to Cameron (1947) the personality organization of the schizophrenic is such that there are a large number and variety of "effective excitants" to which the schizophrenic reacts. This overinclusion or inability to delimit sensory and cognitive stimulation to a few relevant ones is similar to the broad scanning, diffuse attention cathexis which Klein asserts to be facilitative of subliminal sensitivity.

Klein's conceptualization may be relevant to our understanding of the relatively high negative correlation found between intelligence and performance in the normal group. It may be that within the college population students with higher I.Q.'s have, in general, a more alert, aggressive orientation. Consequently in spite of the instructions which emphasized relaxation in this task the high I.Q. normals in the sample may have approached the task with a more alert and focussed attentional set. The less bright students may have been more passive,

less alert, and as a result performed much better than the higher intelligence group.

The absence of a relationship between performance and I.Q. within the above and below median normal subgroups together with the +.34 correlation within the schizophrenic sample suggests that no simple linear or monotonic relationship exists between ability to recover or utilize subliminal input and intelligence. Since the present study did not control for intelligence no definitive conclusions concerning this relationship can be drawn. The current findings suggest that the relationships between intelligence and performance in the two groups are of different forms. The existence of an underlying variable which is related to both intelligence and subliminal sensitivity may be postulated. The experimental identification of such a variable and its relationship to attention deployment deserves further investigation.

The question now arises as to whether the findings of the present study have implications for our understanding of the broader population of schizophrenics. This question must be evaluated with several factors in mind.

First, the schizophrenic sample used in this study is, in all likelihood, not representative of the general population of chronic patients and certainly not representative of all schizophrenics. Because the effect on visual processes of the psychopharmacologic drugs commonly used in hospitals is not known the sample was drawn from the relatively few patients who were not on drugs. The lack of medication might suggest that these patients were more passive, less agitated, anxious or violent than others. Since it has been shown that a rather passive, non-critical "set" or orientation is an

important variable in subliminal sensitivity the effect may have been enhanced by sampling restrictions.

In addition to the sampling problem which implies caution in generalizing from the data there are additional factors operating in schizophrenia which are likely to effect the stability of the obtained results. It would seem an over-simplification to assert that all schizophrenics by virtue of their regressed ego condition should consistently show heightened sensitivity to either subliminal or peripheral registrations. Fluctuations in anxiety or drive level, degree of withdrawal and relative absorption with internal fantasy might play an important role in ability to recover subthreshold input.

Finally, the problem of the generalizability of the current findings to different experimental situations must be considered. The task involved in this study was designed to be a relatively simple one, both with respect to the stimuli and the response mode, i.e. forced choice between two color patches. It has been suggested (Fisher & Paul, 1959) that more complex stimuli (forms, patterns and the like) are liable to primary process distortions. The performance of schizophrenics in experiments using more complex stimuli might, therefore, be more difficult to evaluate and interpret because of these distortions.

The generalizability of the results might also be limited to a particular set of response modes. Instructions calling for verbal responses or a free choice among an unspecified set of colors could operate to decrease the schizophrenics ability to recover registrations.

The present findings do suggest that under certain experimental conditions fairly stabilized schizophrenic patients can demonstrate an ability to recover or utilize subliminal registrations which is

superior to the performance of normal subjects.

In conclusion, the current results leave the following problems open for future investigation.

(A) The extent to which the manipulation of experimental conditions ("set," instructions etc.) may increase the performance of normals on tasks of recovery of registrations, i.e. can normal subjects be "trained" in such a way as to achieve a higher level of performance? It seems plausible that certain normal subjects should be able to raise their level of performance under conditions which would encourage a more passive, less alert orientation.

(B) The variable of acuteness vs. chronicity in schizophrenia as it effects performance is still in need of exploration. As has been noted earlier it would be difficult to make specific predictions as to the acute schizophrenics' performance compared with chronics, yet one might expect more variability in the performance of the acute patients. In addition, differences in subliminal sensitivity may also be found in differing diagnostic subgroups (simple, paranoid etc.). Because of the alert suspiciousness and emphasis on cognition which characterizes many paranoids it might be hypothesized that their performance would be below the other subgroups.

(C) The range of tasks and of response modes for which the phenomenon can be established among schizophrenics is another area deserving of investigation. Because of the disturbance in cognition and the more frequent intrusions of primary process distortions in schizophrenic functioning it might well be that on tasks using more

complex stimuli or more elaborate response modes (such as verbalizations of imagery) the schizophrenics will not perform as well as normals.

(D) Finally, the previously mentioned problem of the interaction between I.Q., modes of attention deployment and performance on this task needs exploration.

Summary

The present study was concerned with the effects of altered states of consciousness on the ability to utilize subliminal stimuli. On the basis of previous findings showing that regressed ego states facilitate recovery of subthreshold input it was hypothesized that chronic schizophrenics would perform better than normals on such a task.

Four one inch color patches were individually presented in a Gerbrands tachistoscope at a subthreshold duration of 5 milliseconds. Following each exposure the subject's task was to "guess" what color was presented by choosing one of two which were before him. The four stimuli were randomly arranged in a sequence of twelve trials so that each color could be paired with every other in the choices.

The task was administered to 25 normal males, 25 chronic schizophrenics and seven acute schizophrenics. The results indicated that the chronic patients performed significantly better than chance and significantly better than the normal Ss. The acute sample did not perform at a higher than chance level. An additional finding was that schizophrenics had a significant preference for yellow as well as a significantly higher than chance level of detectability for this color. No such color preferences were found in the normal sample.

The results were discussed with respect to Klein's notions concerning the deployment of attention cathexis in various states of consciousness. According to Klein (1959) the "normal waking" state is not the most conducive one to the recovery of subthreshold input

since in this state attention is likely to be highly focussed and "fixed" on readily identifiable stimuli to the relative excision of fainter sensory impressions. In altered states of consciousness in which ego controls show some regression and disruption (as was assumed to be the case in the schizophrenic sample) attention cathexis is more diffuse and free floating and can, hence, be more easily deployed to a wide range of cues. Klein asserts that this state then allows for better recovery of peripheral, subliminal or incidental stimuli than the normal waking state.

The findings were also discussed with respect to their consistency with current research on personality correlates of sensitivity to sub-threshold registrations and to several concepts of theorists on schizophrenia. The question of the generalizability of the findings was evaluated in light of certain methodological considerations, and some implications for further research were offered.

Appendix A

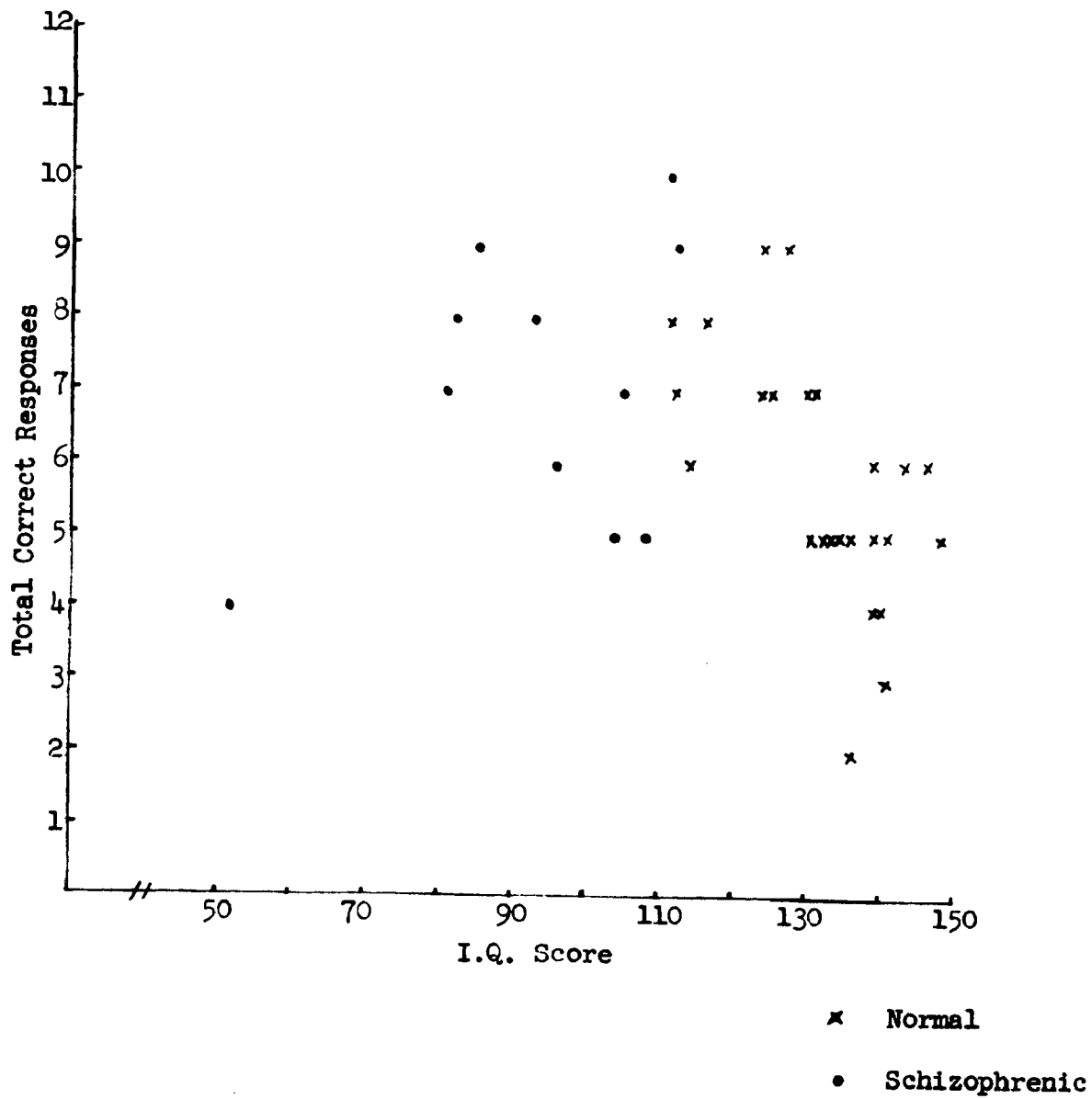
SCHEDULE OF PRESENTATIONS

Stimulus	Choices	
Green	Green	Blue
Blue	Red	Blue
Green	Yellow	Green
Yellow	Yellow	Red
Red	Green	Red
Yellow	Blue	Yellow
Red	Red	Yellow
Green	Blue	Green
Blue	Green	Blue
Green	Green	Red
Yellow	Yellow	Green
Blue	Red	Blue
Red	Red	Blue
Yellow	Yellow	Red
Green	Yellow	Green
Red	Green	Red
Blue	Blue	Yellow

Appendix B**INSTRUCTIONS**

I am going to flash some colors one at a time in the center of this white screen. I want you to tell me what color you saw by choosing one of the two that will be in front of you. You can simply point to the one you choose if you like. After a while the colors will be flashed so quickly that you really won't be able to see them clearly. But that is all right. No one can. What I would like you to do is just sit back and relax and take a guess at what color was flashed by choosing one of the two in front of you. I will ask you if you are ready before I flash each color.

Appendix C

RELATION BETWEEN TOTAL OF CORRECT RESPONSES
AND INTELLIGENCE SCORES

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