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CHARACTERISTICS OF THE EIDETIC PHENOMENON*

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This study was undertaken to determine by experiment (1) the distinguishing characteristics of three forms of imagery: eidetic, memory, and after-images; and (2) the ways in which the memory and after-images of eidetic differ from those of non-eidetic subjects.

Allport, surveying the literature, summarizes the characteristics of the EI (eidetic image) in relation to the MI (memory image) and the AI (after image) as follows:

The EI differs from the ordinary visual memory image in that (a) it possesses a pseudo-perceptual character, i.e., it is definitely localized in visual space even though recognizable as a subjective phenomenon; (b) it is generally superior in clearness and richness of detail; (c) its clearness is less dependent upon "structuration" or organization in its content; (d) it is generally more mimetic, i.e., more accurate in its reproduction of detail; (e) it is generally more brilliant and more accurate in coloration; (f) it requires more rigid fixation for its arousal; (g) it is more dependent upon favorable projection ground for its arousal and shows a greater degree of "coherence" with this ground. It differs from the ordinary after image in that (a) it may be aroused by a complicated and detailed object; (b) it is superior in clearness and richness of detail; (c) it continues longer in the visual field; (d) it is subject to voluntary recall after the lapse of considerable time; (e) it requires a shorter length of exposure and less rigid fixation for its arousal; (f) it is more dependent upon factors of interest and "naturalness"; (g) it is subject to voluntary control and can be made to change its content by an effort of attention.

It tends to resemble the MI in respect to its "associative" characteristics. In fact it behaves very much like a purely central

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image in that (a) the content is to a considerable extent selected according to its affective (interest) value; (b) the content can be altered within the limits of experience by an act of will; (c) the content is influenced by preceding images. It tends to resemble the AI in respect to its "physiological" characteristics, for (a) it appears always in visual space; (b) when it is held in the field of vision there is a marked tension in the muscles of the eye; and (c) it may be either positive or negative in coloration.

The differences as well as the resemblances show variation in degree. At one time the EI seems to lie closer in its general characteristics to the AI and at another time to the MI; and yet the points summarized above afford adequate ground for regarding the EI as a distinct phenomenon. The fact that it is transitional in character does not vitiate its individuality (1).

Klüver says: "This assumption of the Marburg school that here is a sufficiently large number of criteria at hand for differentiating the AI and the MI from the EI is merely an assertion and not a fact" (6, p. 705).

In criticism of Jaensch's methodology, Allport points out that Jaensch had the subjects experience a physiological AI first, in order that they might understand what is meant by "seen." Allport believes that it is probable that the attitude aroused through the first experiment determines the localization of the EI (criticism of lack of control over serial order) (2, 5).¹ To avoid this, we did not present the AI first.

PROCEDURE

A group of 75 colored sixth-grade pupils in the Monroe Grammar School of Washington, D. C., was examined for the presence of eidetic imagery. From these pupils an experimental (eidetic) and a control (non-eidetic) group, each consisting of three girls and five boys, was selected. The eidetics and controls were paired on the basis of sex, age (ranging from 10:3 to 15:3 with 12:1 median), and schooling. The experimental and control groups had about the same average intelligence on the Kuhlmann-Anderson Intelligence Test: the mean IQ for the eidetics was 99.8 and for the non-eidetic

¹For a bibliography and summary of the investigations on the eidetic phenomenon, the reader is referred to: Klüver (5).

The stimuli were presented at 50 cm. from the eyes and exposed for ten seconds. The subjects were instructed not to stare at any part of the stimulus. At the end of the exposure period the stimulus was removed and the subject asked what he saw on the projection screen. If no report was made, as was the case for all the non-eidetic controls, the subject was asked to report what he could remember. All details of color and size were recorded. This comprised the first MI report (immediate recall or memory image). The details of the EI, the reports of what the subjects could see on the projection screen after the removal of the stimulus, were also recorded. The duration of the image was noted, and its size was measured with a compass; in all cases the subject made the measurements himself. After the EI had completely disappeared, the subject was asked to report what he remembered of the stimulus (the first MI report).

The Marburg procedure (4) as described by Klüver (6, pp. 644-648) was followed, except that the AI test did not precede the EI test. This departure from the prescribed procedure was made in order that no retinal fatigue would affect the appearance or character of the image resulting from conditions of no fixation. This caution exempts the present experiment from criticism of serial order, to which some previous investigations have been open. "Medium daylight," as described by Jaensch, was employed throughout, the source of light being behind the subject. The head of the subject was held stationary.

One week after the testing for EI and the first MI, the subjects were unexpectedly asked to report what they remembered of the original stimuli. These were recorded as the second MI reports (recall one week after original stimulation).

In a later experiment Stimuli I and IV were exposed under the same conditions (10 sec. at 50 cm.) except that the subjects were instructed to stare at the black fixation mark. In this way the color, size, contour, and duration of the AI were studied. To determine the relation of Emmert's law to eidetic ability these stimuli were also exposed at distances of 20, 35, 100, and 150 cm. Stimuli V, VI, X, and XII were also shown with instruction to stare at or fixate a detail selected by the experimenter.

Differentiating Characteristics of EI, MI, and AI. In the solution of the first problem of this investigation, to determine experi-

mentally how the EI differs from the MI and the AI, the data resulting from the procedure just described were treated as follows:

1. Comparison of reactions to stimuli I-IV (homogeneous color) and V to XIV (non-homogeneous) at 10-second exposure with no fixation, of eidetic and of control subjects.

2. Comparison of the reactions to stimuli V-XIV (10 seconds without fixation) of eidetic subjects, with the first MI reports of controls. This was done to determine the effect of eidetic ability and the "stamping in" of impressions resulting from the report of eidetic phenomena on the MI of eidetic in contrast to those of the control subjects.

3. Comparison of reactions to stimuli I and IV (10 seconds without fixation) of eidetic subjects and the same stimuli (10 or 15 seconds with fixation) of the control group.

4. The same as (3) except with the use of stimuli V, VI, IX, and XII. It was assumed that the image persisting after the removal of a stimulus, viewed under conditions of no fixation, is the eidetic image, while that persisting after the removal of a stimulus viewed under conditions of fixation is the after image.

Characteristics of the EI and AI of Eidetic and Control Subjects. To throw light on the second problem of this investigation, the ways in which the MI and the AI of an eidetic subject differ from those of a non-eidetic subject, the data were treated as follows:

1. Comparison of first MI reports of stimuli I-IV (homogeneous) and of V-XIV (complicated) of eidetic and control subjects.

2. Comparison of the second MI reports of eidetics and controls.

3. Comparison of the differences between first and second MI reports of eidetics and controls.

4. Comparison of reactions of eidetics and controls to stimuli I, IV, VI, X, and XII at 10- or 15-second exposure with fixation.

RESULTS

The Eidetic Image. Table 1 presents the results of 10-second exposure without fixation. It will be noted that all the images except two, under these conditions, are negative. The difference between eidetics and controls is that the former report negative after-image with much greater frequency, of much longer duration,

and of greater variability in size. There are no qualitative differences between the two groups.

Table 2 records the imagery reported by eidetic subjects after the removal of complicated stimuli (V-XIV), viewed without fixation for 10 seconds.

TABLE 1
HOMOGENEOUS STIMULI (I-IV)
Ten seconds without fixation

	Eidetics	Controls
No. images reported (max. possible 32)	25	16
Mean duration	19.24 sec.	12.94 sec.
Range of duration	7.40 sec.	5.40 sec.
No. of positive images	0	0
No. of negative images	23	16
No. of images neither positive nor negative	2	0
Mean size of images at 50 cm.	10.15 cm. sq.	10.69 cm. sq.
Range of sizes at 50 cm.	7.5-12 cm. sq.	9-12 cm. sq.

TABLE 2
EIDETIC SUBJECTS COMPLICATED STIMULI (V-XIV)
Ten seconds without fixation

Stimulus	Mean dur. (sec.)	Range of dur. (sec.)	Mean no.	Range	Details		
					Pos.	Neg.	Wrong
V	35.0	5-115	3.4	2- 6	17	0	3
VI	42.5	10-110	7.5	2-11	45	0	0
VII	48.1	15-110	4.7	1-10	37	1	0
VIII	55.0	15-135	8.0	2-16	54	2	0
IX	50.0	20-130	7.7	2-12	62	0	0
X	45.0	25-120	5.6	1- 9	45	0	1
XI	51.3	25-120	7.0	4- 8	55	1	0
XII	53.8	35-100	9.0	2-16	69	0	0
XIII	43.1	20- 60	7.1	3-11	57	0	0
XIV	38.1	5- 60	8.0	3-13	62	0	0

In the experimental group eidetic images were reported for 92.5 per cent of all stimuli presented. In no case did a control subject report an eidetic image. It is clear, therefore, that our experimental group was made up altogether of subjects with good eidetic ability while no eidetic ability was manifest in any of the control subjects.

The mean duration of images from all of the stimuli shows consistency but the range is very extensive, in one case a subject reporting an image of 135 seconds' duration. The number of details re-

ported in the EI also has a wide range. Of the 511 details reported in all the EI, 503 were of the same color as in the stimulus. This corroborates the contention that the EI is characteristically positive in color.

A comparison of the data presented in Table 2 with those of Table 1 reveals a singular situation. Both the homogeneous and the complicated stimuli used in this experiment were presented to and viewed by eidetics and non-eidetics under the same condition, a 10-second exposure without fixation; yet the non-eidetics as well as the eidetics reported images after the removal of the homogeneous stimuli, while in no case did a non-eidetic subject report an image aroused by the complicated stimuli. The images aroused by complicated stimuli were positive more than 98 per cent of the time. This indicates that, under conditions of no special fixation, images aroused by *complicated* stimuli only may be called eidetic and that eidetic images are characteristically positive in color.

Table 3 presents the size of the details of the eidetic image as compared with the size of the objects in the original stimuli.

TABLE 3
SIZE OF EIDETIC IMAGE

Stimulus	Detail	Mean size (cm.)	Range (cm.)	Actual size (cm.)
V	Tiger	16.0	17.5-20.5	22.0
	Boy	14.0	13.0-14.0	15.0
VI	Elephant	10.0	0	7.5
	Tree	23.0	20.0-25.0	21.0
	Boy	4.6	4.0- 5.0	3.0
	Tiger	12.5	10.0-15.0	6.5
VII	Boy	14.0	13.0-15.0	21.5
	Tiger	8.3	5.0-14.0	13.0
	Umbrella	6.3	5.0- 7.5	9.0
VIII	Monkey	5.6	2.5- 7.5	2.5
	Umbrella	5.6	5.0- 6.0	7.0
IX	Tiger	8.3	7.5-10.0	9.0
	Boy	4.5	2.5- 5.0	3.0
	Tree	18.8	12.5-22.5	23.5
X	Girl	19.8	19.0-20.0	26.0
	Dog	11.6	10.0-13.0	17.0
XI	Girls	18.0	15.0-22.5	24.0
XII	Man	19.6	13.0-30.0	29.5
	Lady	17.4	15.0-23.0	25.0
XIII	Girls	18.9	11.5-30.0	25.0
XIV	Boy	4.7	2.5- 5.0	6.0
	Man	9.9	5.5-12.5	17.0

Table 3 reveals the wide discrepancies between the reported size of the details of the EI and the actual size of the details in the stimuli. The EI reports show wide variation in size from subject to subject and from stimulus to stimulus. The EI can not be said to be accurate in size. In 16 of the 22 details studied the EI is reported smaller than the actual size of the details of the stimuli. There is apparently no connection between the nature of the object and the tendency to overestimate or underestimate its size.

The EI aroused by stimulus X was examined for voluntary changes. When the subject reported the presence of an AI of the dog in the picture, he was asked to see if he could "make the dog move." This was successfully accomplished in every case. When asked what they had done to bring this about all subjects reported that when the eyes were moved to the left the dog jumped to the left, and when moved to the right, the dog jumped to the right. This seems to indicate that the EI is subject to voluntary change in position, corresponding to the direction of eye movement.

Comparison of EI and MI. Table 4 presents reports of EI of eidetics aroused by complicated stimuli as compared with the MI reports of non-eidetics made upon the removal of the same stimuli.

TABLE 4
COMPARISON OF EI OF EIDETICS WITH MI OF CONTROLS

Stimulus	Mean number of details		Range of details	
	EI of eidetics	MI of controls	EI of eidetics	MI of controls
V	3.4	5.8	2- 6	3- 8
VI	7.5	8.9	2-11	5-14
VII	4.7	8.9	1-10	6-13
VIII	8.0	9.6	2-16	6-14
IX	7.7	9.5	2-12	6-16
X	5.6	11.6	1- 9	6-16
XI	7.0	11.6	4- 8	6-16
XII	9.0	13.9	2- 6	7-27
XIII	7.1	9.9	3-11	4-17
XIV	8.0	9.1	3-13	5-16

This comparison of EI of eidetics with MI of non-eidetics was made in order that any influence which the EI and its report might have upon the MI of eidetics would not enter into the comparison of EI and MI.

All non-eidetics reported MI after each exposure. Out of 80 ex-

posures 74 EI were reported by eidetics. This indicates that the MI seems to be more readily aroused than the EI. MI are consistently reported in more detail than the EI, though the EI is more variable in the number of details reported. The mean sizes of the details of the MI and EI were measured, though not shown in the table. There is considerable inaccuracy in the reported sizes of both the MI and the EI in about the same degree. Inaccuracies are just as likely to be in the direction of overestimation of size as of underestimation, in the case of both the MI and EI. Both the MI and EI are positive in color.

Comparison of EI and AI. The reactions of eidetics to stimuli I and IV (homogeneous color), and V, VI, X, and XII (complicated), viewed for 10 seconds without fixation were compared with the reactions of non-eidetics to the same stimuli viewed for 10 or 15 seconds with fixation. The data are shown in Table 5 and Table 6.

TABLE 5
IMAGES OF EIDETICS AND OF CONTROLS—STIMULI I AND IV (HOMOGENEOUS COLOR)

	Eidetics	Controls
Condition of arousal	10 seconds—no fixation	10 seconds—fixation
No. of images reported	13	16
Mean duration	20.2	17.0 sec
Range of duration	7-35 sec.	8-30 sec.
Mean size at 50 cm.	9.9 cm. sq.	10.7 cm. sq.
Range of sizes at 50 cm.	7.9-12 cm. sq.	7.7-12 cm. sq.

TABLE 6
COMPARISON OF EI OF EIDETICS AND AI OF CONTROLS—STIMULI V, VI, X, XII (COMPLICATED)

	Stimulus V		Stimulus VI		Stimulus X		Stimulus XII	
	EI	AI	EI	AI	EI	AI	EI	AI
No. of images	5	7	6	6	8	1	8	2
Mean duration	35.0	8.6	42.5	12.0	45.0	10.0	53.8	16.5
Range of duration	5-155	5-20	10-110	3-31	25-120	0	35-110	15-18
Mean no. details	3.4	2.3	7.5	2.7	5.6	3.0	9.0	3.5
Range of details	2-6	2-3	2-11	2-3	1-9	0	2-16	2-5

A 10-second exposure is sufficient, without fixation for the eidetics and with fixation for the non-eidetics, to arouse these images. Non-eidetics reported AI in every instance but eidetics in 13 cases out of

TABLE 9
MI OF COMPLICATED STIMULI (RECALL AFTER ONE WEEK)

Stimulus	No. re- porting		No. not reporting		Range of details		Mean no. details		No. pos. details		No. neg. details		No. neither pos. nor neg.		No. wrong details	
	*E	C	E	C	E	C	E	C	E	C	E	C	E	C	E	C
V	2	3	6	5	4- 7	2- 6	5.5	4.3	11	12	0	1	0	0	0	0
VI	8	6	0	2	5-15	4-12	9.4	6.5	75	38	0	0	0	0	0	1
VII	5	3	3	5	4-10	5- 8	7.8	6.3	39	18	0	0	0	1	0	0
VIII	5	5	3	3	2- 8	2- 7	6.2	4.4	30	21	0	1	1	0	0	0
IX	0	3	8	5	0	5- 6	0	5.3	0	16	0	0	0	0	0	0
X	6	2	2	6	1-10	3- 6	5.9	4.5	32	7	0	1	2	0	1	1
XI	6	6	2	2	2-10	3- 5	6.5	3.5	31	21	0	0	1	0	7	0
XII	6	3	2	5	6-20	2- 9	12.9	4.7	76	12	0	0	0	0	1	1
XIII	3	3	5	5	1- 4	2- 5	2.7	3.3	7	10	0	0	2	0	0	0
XIV	1	1	7	7	0	0	10.0	9.0	10	9	0	0	0	0	0	0
Total	42	35	38	45			66.9	51.8	311	164	0	3	6	1	9	3

*E and C indicate the reports of Eidetics and Controls, respectively.

TABLE 10
INCREMENTS AND DECREMENTS BETWEEN FIRST AND SECOND *MI* (TABLES 8 AND 9)

Stimulus	No. re- porting		No. not reporting		Mean no. details		No. pos. details		No. neg. details		No. neither pos. nor neg.		No. wrong details	
	*E	C	E	C	E	C	E	C	E	C	E	C	E	C
V	-6	-5	+6	+5	-0.9	-2.1	-40	-39	0	+1	0	0	0	0
VI	0	-2	0	+2	+0.6	-2.3	+5	-32	0	0	0	0	0	+1
VII	-3	-5	+3	+5	-0.6	-2.1	-28	-49	0	0	0	+1	0	0
VIII	-3	-3	+3	+3	-0.2	-2.0	-20	-29	0	+1	0	0	0	0
IX	-8	-5	+8	+5	-8.4	-3.1	-67	-51	0	0	0	0	-1	-1
X	-2	-6	+2	+6	-3.1	-4.5	-35	-60	-2	-1	+2	0	+1	+1
XI	-2	-2	+2	+2	-3.9	-6.9	-50	-60	0	0	-1	-2	+7	0
XII	-2	-5	+2	+5	-3.9	-12.1	-55	-118	-1	-1	-1	-1	0	0
XIII	-5	-5	+5	+5	-7.7	-7.1	-75	-72	0	0	+2	0	-1	-1
XIV	-7	-7	+7	+7	+0.4	-0.6	-66	-67	0	0	-1	-1	0	0
Total	-38	-45	+38	+45	-27.7	-42.8	-431	-577	-3	0	+1	-3	+6	0

*E and C indicate the reports of Eidetics and Controls, respectively. A minus (—) sign indicates a decrement; a plus (+) sign indicates an increment.

decrement in the number of details in the MI reported by eidetics one week after presentation as compared with the number of details reported in the MI immediately after the presentation of only 27.7 as over against a similar decrement for the controls of 42.8. However, the eidetic group shows an increment of six wrong details as compared with none for the non-eidetic. Retention (one week later) is somewhat better for eidetics than for non-eidetics; the MI reports of the eidetics were somewhat richer in both accurate and wrong details than those of the non-eidetics. Intelligence was not a factor since the two groups were equated in this regard.

It is generally believed that the AI of eidetics deviates from Emmert's law while that of non-eidetics is in conformity with this law. Table 11 throws light upon this question.

TABLE 11
HOMOGENEOUS STIMULI, VIEWED WITH FIXATION

	Eidetics	Controls
No. AI reported	16	16
Mean duration of AI	21.0 sec.	17.0 sec.
Range of duration of AI	6-45 sec.	8-30 sec.
No. positive AI	2	0
No. negative AI	14	15
No. AI neither pos. nor neg.	0	1
Mean size at 20 cm.	11.6 cm. sq.	10.9 cm. sq.
Range of sizes at 20 cm.	10-13 cm. sq.	9-12 cm. sq.
Mean size at 35 cm.	11.3 cm. sq.	10.7 cm. sq.
Range of sizes at 35 cm.	10-13 cm. sq.	8.5-12 cm. sq.
Mean size at 50 cm.	10.9 cm. sq.	10.7 cm. sq.
Range of sizes at 50 cm.	10-12.2 cm. sq.	7.7-12 cm. sq.
Mean size at 100 cm.	11.5 cm. sq.	10.0 cm. sq.
Range of sizes at 100 cm.	10-13.5 cm. sq.	7-12 cm. sq.
Mean size at 150 cm.	11.3 cm. sq.	9.8 cm. sq.
Range of sizes at 150 cm.	10-12.5 cm. sq.	6.5-12 cm. sq.

Emmert's law is seen not to hold for eidetics. The mean size of the AI reported by eidetics, unlike the non-eidetics, fails to show the successive gradual decrement with increasing distance of the image from the eyes, demanded by Emmert's law. The mean duration of the AI of eidetics is 4.0 seconds longer than that of non-eidetics; the range of duration is 17 seconds greater. Two of the 16 AI reported by eidetics and none of those of the non-eidetics were positive in color; this lends only slight support to the belief of investi-

TABLE 12
COMPLICATED STIMULI VIEWED WITH FIXATION

	V			VI			X			XII		
	*E	C		E	C		E	C		E	C	
No. reporting	7	7		7	6		7	1		8	2	
No. not reporting	1	1		1	2		1	7		0	6	
Mean duration	21.3	8.6		24.4	12.0		27.7	10.0		32.0	16.5	
Range of duration	8-30	5-20		10-40	3-31		15-35	0		5-50	15-18	
Range of details	2-12	2-3		2-5	2-3		3-4	0		2-14	2-5	
Mean no. details	5.6	2.3		3.3	2.7		6.1	3.0		6.2	3.5	
No. pos. details	29	2		15	0		33	0		31	0	
No. neg. details	10	13		8	12		6	3		18	7	
No. details neither pos. nor neg.	0	1		0	4		2	0		1	0	
No. subjects requiring 10 sec. fixation	5	5		6	2		6	0		7	2	
No. subjects requiring 15 sec. fixation	2	2		1	4		1	1		1	0	
Mean size of fixated object	4.0	4.8		8.6	6.8		11.5	0		5.8	3.5	
Range of sizes of fixated object	3.5-4.5	4-6		7.5-10.5	5-9.5		10-13	0		5.5-6	0	
Actual size of fixated object	5 cm.	5 cm.		7.5 cm.	7.5		17 cm.	17 cm.		8 cm.	8 cm.	

*E and C indicate the reports of eidetics and controls, respectively.

gators that the AI of eidetics are positive, while those of non-eidetics are negative.

Table 12 summarizes the AI of eidetics and controls aroused by complicated stimuli after 10 or 15 seconds' fixation.

In response to complicated stimuli, AI are much more frequently aroused in eidetics than in non-eidetics. The mean of the mean duration of the AI to all stimuli reported by eidetics is 26.37 seconds and by non-eidetics 11.8; the range of duration is also much greater for the eidetics. The mean of the mean number of details reported for all stimuli is 5.3 for the eidetics and 2.9 for the non-eidetics; the range of number of details is also very much greater. Of the 153 details reported by eidetics, 108 were positive and 42 negative. Of the 42 details reported by non-eidetics, two were positive and 35 negative in color. The AI of eidetics are much more detailed than those of non-eidetics, and are likely to be positive. It was also noted that the eidetics reported AI of many details in the pictures when only one detail had been fixated, but none of the non-eidetics reported such a complete arousal of AI. Non-eidetics also require longer fixation for the arousal of AI of complicated stimuli than eidetics.

DISCUSSION

A comparison of the responses to homogeneous stimuli (I-IV) with and without fixation shows very little difference, although images of greater duration are more commonly reported by eidetics than by non-eidetics. AI are supposed to be aroused by fixating homogeneously colored stimuli. Since the responses to the same stimuli under conditions of no fixation do not vary from those under conditions of fixation, except that very occasionally a positive image is reported under the latter conditions, for both eidetic and non-eidetic subjects, all such images aroused by homogeneous stimuli without fixation should properly be called AI. The AI under conditions of fixation and no fixation are somewhat shorter for non-eidetics than for eidetics. Nearly all such images are negative. It seems clear, therefore, that true EI are not aroused by homogeneously colored stimuli under conditions of no fixation, but images so aroused are really AI. Positive images may properly be called EI, negative AI.

Allport says it is the general belief among investigators that the EI is richer and more accurate in details than the MI. Our results show, on the contrary, that the immediate MI are richer in detail than the EI, both being about equally inaccurate in size of reproduced image. The EI is also supposed to require more rigid fixation, to be more dependent upon favorable projection ground and less dependent upon organization of content, than the MI. We used the same fixation conditions, background, and stimuli for the arousal of both kinds of imagery and failed to confirm these points, for we obtained a greater number of MI than of EI and they were also richer in details—all under exactly the same experimental conditions for both types of imagery. None of these factors distinguish the EI from the MI. The differences appear more subjective—the perceptual character of the EI and the imaginal character of the MI—as evidenced by the postural attitude of the subject and the character of his verbal responses.

With respect to the differences between the EI and the AI, Allport, in summarizing the views of investigators, says that the EI may be aroused by a complicated and detailed object. Our results, however, show that the AI as well as the EI may be aroused by a complicated and detailed object, though much less frequently. The important distinction is that the details of the AI are negative in color. Furthermore, the non-eidetics limit their reports, in the case of complicated stimuli, to those details fixated. The AI is much more likely to be aroused by homogeneous stimuli and the EI by complicated stimuli. The second difference cited by Allport, that the EI is superior in clearness and richness of detail, is amply supported by our data, as is also the contention that it continues longer in the visual field and that it requires a shorter and less rigid fixation for its arousal. The contention that the EI is more dependent upon interest and “naturalness” than the AI was difficult for us to test; our results do not altogether support this assertion, however, since we found at least one case of a subject who failed to report EI to stimuli which later aroused AI; an inspection of our data does not enable us to draw any connection between interest and “naturalness,” and the EI. The distinction that the EI is subject to voluntary control also fails to receive unqualified support from our results. The EI is subject to voluntary control but the AI may also be sub-

ject to such control since one of our non-eidetics was able to change the position of his AI voluntarily. In general, our results lend support to most of the criteria alleged to discriminate the EI from the AI, but they emphasize one difference which seems to have been insufficiently stressed by others, namely, that the EI is positive in color and the AI negative.

With respect to the MI of eidetics and non-eidetics, we found the immediate MI of the non-eidetics to be somewhat better than that of eidetics but the MI of eidetics one week later were superior to those of the non-eidetics. Since the two groups were equated for sex, age, schooling, and intelligence, and since they were subjected to the same stimuli under the same experimental conditions, this difference can be attributed only to the possession and description of EI.

With respect to the difference in the character of the AI, of eidetics and non-eidetics, our results support the contention of other investigators that the AI of non-eidetics is in conformity with Emmert's law while the AI of eidetics is not. The AI is much more frequently aroused by complicated stimuli in eidetics than in non-eidetics. The AI of eidetics also surpasses those of non-eidetics in duration and number of details. Most details in the AI of eidetics are positive and in non-eidetics negative. Both groups report voluntary changes of position of the AI, and for both, the AI is smaller than the original stimulus, though nearer its actual size in the case of eidetics. Longer fixation is sometimes necessary for the arousal of AI of complicated objects among non-eidetics than among eidetics. Eidetic subjects, unlike the non-eidetic, often experience a complete arousal of the AI when but one detail of the stimulus is fixated. In general our results support the belief that the AI of eidetics is positive in color and of long duration as contrasted with the negative and brief AI of non-eidetics. Non-conformity to Emmert's law, generally used as a preliminary device for the selection of eidetic subjects, also receives support from our results.

CONCLUSIONS

1. The images aroused by a 10-second exposure of homogeneous stimuli, viewed without fixation, reported by both eidetic and non-eidetic subjects, did not possess the characteristics of an EI. The

similarity of these images to those aroused by the same stimuli in 10-second exposure with fixation indicates that these images are AI.

2. The MI is more commonly aroused and is richer in detail than the EI. Both are equally inaccurate in reproduction of size, require no fixation, and are aroused with equal frequency in 10-second exposure. Both are positive in color.

3. The AI as well as the EI may be aroused by a complicated and detailed stimulus; the EI is superior in richness of detail and in clearness, it is of longer duration and requires less rigid and shorter fixation than the AI. We do not find the EI more dependent upon interest and "Naturalness." There appear no negative images which may be called AI; all negative "EI" are in reality AI.

4. The immediate MI of non-eidetics are slightly more numerous, more detailed, and more accurate in size than those of eidetics. The remote MI of eidetics (retention one week after stimulation) were markedly superior in frequency, number, and range of details than those of the non-eidetics.

5. The AI of eidetics usually required less time for arousal, lasted longer, were more often positive in color, deviated from Emmert's law, were much more frequently aroused by complicated stimuli, and were more detailed than the AI of non-eidetics. The AI of both groups were inaccurate in size although those of the eidetics more nearly approximated the actual size of the stimulus. The images of both groups were subject to voluntary change in position.

6. The criteria generally accepted as distinguishing the EI from the MI are not valid.

7. The criteria generally accepted as distinguishing the EI from the AI are for the most part corroborated by this study.

8. The MI and the AI of eidetics are different from those of non-eidetics and these differences can only be attributed to the possession or absence of eidetic ability, since other factors were held constant.

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LES CARACTÉRISTIQUES DU PHÉNOMÈNE EIDETIQUE

(Résumé)

Seize élèves nègres de la sixième année scolaire, mis en paires pour l'âge, le sexe, et l'intelligence, huit eidétiques (groupe expérimental) et huit non-eidétiques (groupe de contrôle) ont été testés pour les images eidétiques, les images consécutives, et les images de mémoire dans les mêmes conditions. Les résultats indiquent que les images de mémoire sont le plus facilement réveillées et sont plus riches en détail que les images eidétiques. Toutes deux sont également d'une grandeur inexacte, se montrent après une exposition de dix secondes, n'exigent nulle fixation spéciale, et sont d'une couleur positive. D'accord avec d'autres investigateurs, on a constaté que l'image eidétique continue plus longtemps dans le champ de vision, et exige une fixation plus courte et moins rigide que l'image consécutive. On doit considérer eidétiques les images visuelles positives.

Les images immédiates de mémoire des non-eidétiques sont plus nombreuses, plus détaillées, et d'une grandeur plus exacte que celles rapportées par les non-eidétiques. Dans le test de rétention huit jours après les eidétiques ont été supérieurs aux non-eidétiques à l'égard du nombre et de la richesse des détails de l'image de mémoire. L'image consécutive de l'eidétique, comparée à celle du non-eidétique, exige moins de fixation, dure plus longtemps, est plus souvent positive, s'écarte de la loi d'Emmert, est plus facilement réveillée par les stimuli variés, se montre avec un plus grand détail et est d'une grandeur plus exacte. Ces différences entre l'image eidétique, l'image de mémoire, et l'image consécutive chez les sujets eidétiques et non-eidétiques doivent être attribuées à la seule variable—la capacité eidétique.

MEENES ET MORTON

EIGENSCHAFTEN DER EIDETIK

(Referat)

Sechzehn Negerschüler des gleichen Alters, Geschlechts und der gleichen Intelligenz, acht Eidetiker (experimentelle Gruppe) und acht Nichteidetiker wurden für Anschauungsbilder, Nachbilder und Vorstellungen unter denselben Umständen untersucht. Die Ergebnisse weisen darauf hin, dass die Vorstellungen leichter zu erregen und reicher an Details sind als die Anschauungsbilder. Beide sind gleich genau an Grösse, erscheinen zehn Sekunden nach Darbietung, erfordern keine besondere Fixierung, und sind

positiv an Farbe. In Beistimmung mit anderen Forschern wurde festgesetzt, dass das Anschauungsbild länger im Gesichtsfeld dauert und kürzer und weniger feste Fixierung erfordert als das Nachbild. Positive Nachbilder werden als eidetisch angesehen.

Die unmittelbaren Vorstellungen der Eidetiker sind grösser an Zahl, detaillierter und genauer an Grösse als diejenigen, die von den Nichteidetikern wurden. Bei der Untersuchung der Beibehaltung eine Woche später übertrafen die Eidetiker die Nichteidetiker an Zahl und Reichtum der Details der Vorstellung. Das Nachbild der Eidetiker im Vergleich zu dem der Nichteidetiker erfordert weniger Fixierung, dauert länger, ist öfter positiv, weicht von Emmerts Gesetz ab, ist leichter durch mannigfache Reize zu erregen, scheint mit grösseren Details, und ist genauer an Grösse. Diese Unterschiede zwischen dem Anschauungsbild, der Vorstellung, und dem Nachbild bei Eidetikern und Nichteidetikern müssen der einzigen Variable, der eidetischen Anlage, zugeschrieben werden.

MEENES UND MORTON