AN INVESTIGATION OF CERTAIN PERSONALITY FACTORS AS CORRELATES OF PERCEPTUAL RESPONSES

by

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INTRODUCTION

The problem of defining and explaining perception has challenged psychologists ever since psychology first became a science.

It is understood that the stimulation of a sensory end-organ results in the conduction of electrical impulses from the end-organ through nerve fibers to the cerebral cortex. Normally, different kinds of stimuli activate different sensory end-organs, the impulses from which arrive at different places on the cortex; that is, sound will activate one organ and light will activate another, and the wave-length of light which corresponds to the sensation of red activates organs different from those activated by the wave-length corresponding to blue. Even granting, however, that the neural impulses set off by the stimuli reach the points on the cortex which are at the ends of the various fibers, one still wonders how the impulses resulting from one stimulus seem to be grouped together subjectively and to be differentiated from the impulses resulting from other stimuli; and how, even with the grouping of the impulses produced by similar stimuli, one perceives an organization so stable as to be given a name. How is it that one sees, not just a patch of tan surrounded by green, but a tan "table" against a green "wall"? Is this perceptual organization, this "thing" quality of awareness, learned? Or, is it a necessary consequence of the physical structure of the organism?

The idea that perceptual organization is principally a matter of experience was held by certain philosophers, such as Locke and Hume, but, in recent years, has perhaps been identified most closely with the name of Helmholtz, the great German physiologist;[1,2] a forceful nativism is, on the other hand, characteristic of "Gestalt" theory, advanced by the German psychologists, Wertheimer, Köhler, and Koffka.[3,4,5]

According to the empiricistic theory, the individual must learn to order his sensations. He discovers that certain sensations always occur in conjunction with certain other sensations. For example, a baby may learn that a certain pattern of sensations (caused by, say, a window) will always occur as he is receiving certain

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1. E. G. Boring, Sensation and Perception in the History of Experimental Psychology, pp. 31, 119.

2. H. von Helmholtz, Popular Lectures on Scientific Subjects, pp. 175-276.

3. W. Köhler, Dynamics in Psychology.

4. F. S. Keller, The Definition of Psychology, pp. 78-98.

5. H. H. Spitz, "The Present Status of the Köhler-Wallach Theory of Satiation." Psychological Bulletin, LV (January, 1958), 1-28.

sensations which he will later identify as pressure on his back and as his head being turned to his right. He learns to coordinate what he sees with what he touches; a certain patch of color in a particular pattern can be anticipated to give certain tactual sensations. His binocular vision permits him to obtain two separate views of surrounding objects; and through experience, he learns that an object with a slightly different image for each eye feels different from an object which appears the same to both eyes. Thus, although a baby has sensations resulting from the conduction of nerve impulses caused by external or internal stimuli, he probably does not organize the sensations into meaningful patterns until he has had enough contact with them to note regularities of pattern and sequence.

Gestalttheorie, the opposing view, states that organisms perceive innately, organizing sensations in terms of configurations or wholes (*Gestalten*), instead of parts. Perception, according to the Gestaltists, is due to the building up on the cerebral cortex of an electrical field, the boundaries of which correspond "isomorphically" to the boundaries of the object viewed. The electrical field is not confined to, nor composed of, the neurons which conduct the impulses and which end in the cortex; it is instead a field of electrical potential in the medium surrounding the neurons. Its mere physical existence is supposed to create the perception of the object viewed.

It has been difficult for psychologists to decide between these two schools of thought in terms of evidence from normal, everyday perceptual experience. It has thus become common to turn to certain unusual, "illusory" phenomena for enlightenment. In the study of perception, it has been discovered that people often experience events in a manner which is objectively "incorrect." Most people, for example, have the subjective experience of perceiving motion when two neighboring objects appear alternately or in succession, with a certain space and time interval between appearances (the so-called "phi-phenomenon"). For most people, too, the viewing of one object will distort the perception of another object viewed immediately afterward ("figural after-effect"). Can the two theories of perception described above account for these anomalies of perception? The proponents of both theories claim that their respective theories can do so; in fact, Gestalt psychology developed originally from Wertheimer's attempt to explain the phi-phenomenon.[6]

For the empiricistic, or learning, school, these perceived inaccuracies are simply special cases of learning to associate and to order sensations. One has learned that usually, if an object appears first in one

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6. C. E. Osgood, Method and Theory in Experimental Psychology, p. 243.

place and then in another, it has moved from the first point to the second; therefore, he may see movement when objectively there is none. Likewise, when one examines one object for a minute or two, he begins to think of that object as a norm or standard; and any difference which an object examined immediately after has will be distorted by comparison.

Köhler and Wallach have explained the figural after-effect within the framework of Gestalt psychology. They have postulated a condition of cortical "satiation," produced by the electric current which is supposed to flow around the boundary of the cortical projection of an object. Thus:

> The electric potential will be higher on one side of the boundary than on the other and an equalizing current will spread through the immediately adjacent tissue and fluid. This current produces a condition of electrotonus in the tissue; it polarizes cell walls and so decreases the electrical conductivity of the tissue. So the area adjacent to the location of the I-figure [first figure viewed] becomes resistant or satiated, and the currents generated by the T-figure [second figure viewed] will be forced into the less satiated region farther away from the I-figure location.[7]

Phi-phenomenon is explained in a related manner. Here, the perception of movement is attributed to the spread of an electrical field between one peak of cortical

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7. R. S. Woodworth and H. Schlosberg, Experimental Psychology, p. 425.

activity, caused by the first stimulus, and another peak caused by the second stimulus.[8] Thus, for Gestalt psychology, and for Köhler in particular, the ability to perceive is a reflection of the ability of the cortex to conduct electrical currents.

Important objections have been levelled against Köhler's theory. How, for example, does the electrical current spread across the fissures and crevices of the cortex?[9] More important, how does the current spread from the occipital lobe of one hemisphere to the occipital lobe of the other, as it would need to during some perceptual events, when there is no connection between them?[10] How does the electrical field collect itself to stimulate the proper motor nerve fibers to produce the correct behavioral response?[11] And how can the theory account for a phenomenon similar to figural after-effect with _moving_ objects, when the movement should, according to the theory, prevent localized satiation?[12]

The empiricistic theory, too, is far from flawless. The theory is often objected to on the grounds that the immediacy and simplicity of perception makes it seem

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8. _Ibid._, pp. 514-515.

9. _Ibid._, p. 426.

10. K. R. Smith, "Visual Apparent Movement in the Absence of Neural Interaction." _The American Journal of Psychology_, LXI (January, 1948), 73-78.

11. Woodworth and Schlosberg, _op. cit._, p. 426.

12. K. R. Smith, "The Satiational Theory of Figural After-Effects." _The American Journal of Psychology_, LXI (April, 1948), p. 283.

impossible that perception could have been learned.[13] It has, also, been demonstrated that, in very young babies and animals, in animals reared in the dark, and in people who are blind until adulthood, there may be certain perceptual organizations which occur instantaneously. The organism appears to be able, for example, to discriminate immediately between figure and ground and to pursue a moving object with its eyes.[14] One of the main criticisms of the theory is its vagueness: the theory states simply that perception is due to learning, and presents evidence that certain perceptions follow a period of experimentation; but it has not been able, in most instances (satiation, for example), to specify exactly what learning experience is necessary to produce a perception.

The question of perception, then, is far from being settled, and, therefore, any experiment which can shed light on the problem is of great interest and importance.

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13. Osgood, op. cit., p. 228.

14. D. O. Hebb, The Organization of Behavior, p. 28.

BARTHOL'S STUDY

In the Journal of Personality, September, 1958, Richard Barthol[15] describes an experiment designed to: (a) test the Köhler-Wallach hypothesis of cortical conductivity by seeking a correlation between two different kinds of perception, and (b) test an hypothesis of sex differences in brain structure, by finding whether the nature of the correlation in men differs from the nature of the correlation in women. His first measure of perception was the threshold for change from movement to simultaneity in phi-phenomenon; the time interval for a pair of alternately blinking lights at which the viewer reports a change from the subjective experience of one light moving to the experience of two lights blinking almost simultaneously. His second measure was the amount of kinesthetic figural after-effect following a two-minute satiation period: the degree to which a two-minute satiation period of rubbing a wide block will distort the subsequent measurement of a more narrow one. He used, as subjects, twenty male and twenty female undergraduate and graduate psychology students.

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15. "Individual and Sex Differences in Cortical Conductivity." Journal of Personality, XXVI (September, 1958), pp. 365-378.

His results showed a significant correlation between the two measures of perception, when the total group was segregated by sex. He obtained a correlation coefficient (r) of +.55 for the men, and of −.61 for the women, both significant at the .01 level of confidence; the difference between r's, of 1.16 points, was significant at the .001 level. These findings meant that the men who had a large kinesthetic after-effect tended to have a high simultaneity-movement threshold for the phi-phenomenon, and those who had a small kinesthetic after-effect tended to have a low simultaneity threshold; but that the women who had a large after-effect tended to have a low simultaneity threshold, and those who had a small after-effect, a high simultaneity threshold.

In a replication of the experiment, with a different experimenter and using thirty-five male and thirty-one female undergraduate psychology students as subjects, r's of −.41 ($p < .05$) for women and +.23 (insignificant) for men were obtained. The difference between the two r's was significant at the .01 level.

Barthol concludes from the results of the two studies that: (a) there is a relationship between the phi-phenomenon and the kinesthetic figural after-effect, and (b) there are significant sex differences in that relationship. The first conclusion, he says, supports the assumption that basal cortical conductivity is a fundamental characteristic of the individual, and the second conclusion indicates that there are significant differences in the pattern of cortical conductivity as between men and women.

Although Barthol prefers a Gestaltist explanation for his results, he does not rule out the possibility of their having resulted from learning. He does feel, however, that a learning theory cannot adequately account for such complex findings. He states that it is hard to conceive of a conscious or unconscious set which would affect reports in such a way that reversed correlations would result: neither the subject nor the experimenter had any way of knowing the meaning of his responses in terms of accuracy, conformity, or desirability.

Inasmuch as many psychologists accept the hypothesis that perception is learned, and as Barthol himself does admit the possibility of its applying to his results, it would be well to examine it more closely in connection with his data. Would it not be possible to conceive of a particular activity in which both boys and girls might engage, and another activity in which the boys who engaged in the first would probably <u>not</u> engage, but in which the girls who participated in the first <u>would</u> probably engage? A concrete, albeit far-fetched, example could be this: Some small boys and some small girls play ball. The young <u>girl</u> who plays ball, being more aggressive and out-going, would, let us say, be apt to join a group of children in playing "store," whereas the non-agressive girl might avoid both the ball-playing and the store-playing; ball-playing and store-playing would thus be positively correlated among girls. The young boy who plays ball is perhaps the "normal" boy--one who scorns store-playing as "sissy;" the boy who avoids ball-playing might be non-agressive and lacking in self-confidence when playing with other boys, yet might feel quite at ease when playing store with girls; thus, ball-playing and store-playing would be negatively correlated among boys. This example is not necessarily a true statement of fact, and it certainly is not intended to explain the particular sex differences which Barthol found. It does, however, illustrate the point that, within a particular culture or subculture, a certain experience for a boy may frequently be accompanied by another experience, while the occurrence of the one experience for a girl may actually tend to preclude the occurrence of the second. Reversed correlations in experience are thus possible, and might conceivably lead to reversed correlations in perceptual habits.

These considerations lead to an interesting question. If there is a sex difference in the correlation between Barthol's two measures, and if this difference is due to learning rather than to physical structure, might there not be a similar difference in the correlation between the two measures for: (a) women who are extremely masculine in interests and attitude, and (b) women who are extremely feminine? It would be expected that the correlation coefficient for the extremely masculine women would tend to resemble that of the men in Barthol's study, and that the coefficient for the feminine women would be similar to that of the women; for biological sex would now be of no consequence, and the kind of experiences that produce masculinity or femininity in either sex would presumably be crucial. To seek correlations among women of differing interests and attitudes thus might well serve to check, clarify, and perhaps overthrow Barthol's nativistic view of both perception and, presumably, personality.

PURPOSE

The purpose of this study was to check the correlation between two measures of perception which Barthol found among women; and to test the hypothesis that his correlations for both men and women, if valid, are due to correlations in the occurrence of learning experiences necessary to the production of the measured phenomena, and not to gross physical structure. To accomplish this, Barthol's experiment was essentially repeated, using as subjects women who rated at either extreme on a masculinity-femininity personality scale.

It was felt that, should the results of this study show a significant, negative correlation for the total group, this fact could be interpreted as support for Barthol's hypothesis. Should the results show a significant, positive correlation for the "masculine" women and a significant, negative correlation for the "feminine" women, they would support Barthol's claim of a definite correlation between the two measures, but would suggest that the correlation is probably due to learning rather than to brain structure. And, finally, if the results should show the correlations obtained for the total group and for the subgroups to be insignificant, this fact could be interpreted as support for a learning theory of perception and as evidence against a theory in which the conductivity of the cerebral cortex plays so great a part in perception that there should be a consistency within the individual as between the different forms of perception.

SUBJECTS

In order to select the subjects for the experiment, the Guilford-Martin Inventory of Factors G A M I N was administered to fifteen introductory psychology classes, which included a total of about four hundred students. In six of the sections the tests were administered by the experimenter; in the other nine, they were administered by the regular instructors. The tests were graded and spot-checked by a student assistant.

Only the M-scale, the masculinity-femininity scale, of the Inventory was employed as the criterion for selection of the subjects. The M-scale measures the degree of masculinity of attitude and interests. A low score on the scale appears to indicate squeamishness, emotionality, lack of objectivity, concern with appearance, and interest in artistic rather than manual activities; a high score seems to indicate less sympathy, more objectivity, and an interest in more active pursuits. According to the authors, the scale discriminates between the sexes 92 per cent of the time; that is, only eight out of one hundred women make scores above the median and only eight out of one hundred men make scores below the median.

The thirty-seven students with C-scores of six to nine ("masculine") and the seventy-two students with C-scores of zero to two ("feminine") were asked to serve as subjects; of those asked, twenty-six of the first group and twenty from the second consented. The difference in proportion of acceptances indicates a selective factor which, if anything, would decrease the amount of difference between the correlation coefficients of the two groups, if such a difference exists. It should not, however, change the correlation between the two measures for the total group if Barthol's hypothesis of sex differences in brain structure is true and if the correlation which he found is a stable one.

APPARATUS

Phi-Phenomenon

The phi-phenomenon observations were conducted in a soundproof, windowless, air-conditioned room. In one corner, diagonally opposite the subject's chair, at a distance of fourteen feet, and at eye level, were mounted two Westinghouse one-watt neon lights. Each light had been painted black, except for a round unpainted aperture a quarter of an inch in diameter through which the filament shone; the apertures were three inches apart horizonally, on centers. Each of the lights was connected electrically to one of a pair of styli which were in contact with a revolving commutator wheel; this arrangement permitted the flashing of each light alternately for a quarter revolution of the wheel, with a quarter-revolution dark interval between flashes. The speed of the wheel could be regulated between 600 and 3600 revolutions per minute by the use of a General Radio Variac. This gave a dark interval which varied from 200 milliseconds to 33 milliseconds. The speed of the revolving wheel was measured by a General Radio Strobotac (stroboscopic tachometer); the revolutions per minute of the wheel, as measured by the Strobotac, were converted into seconds per quarter revolution to compute the length of the dark interval.

Kinesthetic Figural After-Effect

In another corner of the room, a chair was placed between two tables of such proximity as to permit the subject's placing her arms on the tables while seated in the chair. The equipment to be used for the measurement of the kinesthetic figural after-effect was kept out of sight until the subject had been blindfolded. It consisted of three pine blocks, sanded, but unfinished. The "test" block was 18 inches long and 2 inches thick with 12 inches of the length cut to a width of 1½ inches; the other 6 inches was 4 inches wide and was intended solely to provide a steadying weight. The "satiation" block was cut similarly, except that the 12 inch strip measured 3 inches in width. The "comparison scale" was 36 inches in total length. It, too, had the 6 x 4 x 2 inch steadying weight. The remaining 30 inches was graduated in width from ½ inch at one end to 4 inches at the other end and was calibrated (in terms of width) to 1/32 of an inch.

PROCEDURE

The subject was seated in the viewing chair approximately fourteen feet from the pair of lights. After the apparatus had been turned on for a moment to permit the subject to see the lights, she was instructed to report each time the lights changed from the apparent movement of one light to the alternate, sometimes almost simultaneous, blinking of two lights. The instructions, patterned after Barthol's were as follows:

> You are going to look at the lights in the corner and tell me what you see. I am going to change the rate at which the lights turn on and off, and you will probably see several things. First, when the lights are slow, you may see two lights turning on and off alternately. Some people at these slow speeds see what looks like a single light that turns on, turns off, then moves over and turns on again. You do not actually see the light move, but it appears to be the same light appearing in two different places. At faster speeds you may see a single light moving back and forth. It may flicker off and on while moving, but that is acceptable. At high speed you will see two lights blinking on and off quite rapidly. It may be hard, but I want you to try to distinguish between a single light that moves back and forth and two lights blinking off and on very rapidly.
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> So, I want you to report when you see a single light moving, or two lights blinking rapidly. You may see other things, and I do not know what they might be; so report whatever you see. Remember, I am interested in the change point from movement of one light to two lights blinking very fast, so tell me as soon as the change occurs. If you are not sure what you see, report anyway; and I will stop adjusting the apparatus until you decide. Any questions?

After any questions or misunderstandings were cleared up, the room lights were turned off and the apparatus started at the slowest speed so that the lights were blinking with about a two-hundred millisecond dark interval. If the subject did not immediately report what she saw, she was asked, "What do you see now?" and was told to report when a change occurred. The time interval was then shortened until the subject reported a change. A reading was taken and the interval further shortened well past the threshold. The procedure was then repeated in reverse order, that is, the time interval was lengthened until the subject reported movement; a reading was taken and the interval increased again to well past the simultaneity-movement threshold. The serial explorations were repeated three times more, yielding eight measures in all; the initial two measures were regarded as practice trials, and only the remaining six were used in computation.

The room lights were turned on again. The subject was seated between the two tables and was blindfolded. On the table at her left hand was placed the comparison scale; on her right, the one-and-a-half-inch wide test block. She was instructed to grasp each block between the thumb and the forefinger of the hand nearest it. She was then asked to find the place on the tapered comparison block which corresponded in width to the test block. Three more measures were found by moving the subject's left hand back to the smaller end of the comparison scale and asking her to measure it again. After each judgment, the comparison block was moved to prevent the subject's being able to learn to place her hands a certain distance from her body. Her hand, although placed at the smaller end of the block at the beginning of each measurement, was not placed at exactly the same spot each time; this procedure was followed to prevent the learning of a certain distance from the starting point.

Following the four measurements, the subject was instructed to rub the sides of the three-inch wide satiation block for 135 seconds. This block was rubbed with the right hand, also between the thumb and the fore-finger. After the 135-second satiation period, the subject was again asked to measure the one-and-a-half-inch test block against the comparison scale. Again, four judgments were made.

Following the measurements for the kinesthetic after-effect, six more readings, three ascending and three descending, were taken of the phi-phenomenon simultaneity-movement threshold, making a total of twelve experimental readings for that threshold.

Three differences between Barthol's experiment and this one should be noted. (1) In Barthol's experiment, three-watt lights were used. In this study, one-watt lights were used; local conditions of supply dictated this modification. (2) Barthol's measurement of the phi-phenomenon was conducted in a completely dark room, with the room lights turned on for each reading. In this experiment, it was necessary to tolerate the very dim light emitted by the Strobotac during the entire time. The dim light actually had the advantage of avoiding most of the distracting "shutter effect" which Barthol found occurred in total darkness.[16] (3) Barthol obtained the threshold for the change from alternation to movement as well as the simultaneity-movement threshold, even though he used only the latter, the more stable one, in his statistics. In this study, the first threshold was not measured at all, due to the limitations of the equipment; the apparatus could be slowed to well below the simultaneity-movement threshold of all subjects, but could not be slowed enough to reach the alternation-movement threshold of most subjects.

The above differences in procedure seem to be minor. The first two could possibly affect the location of the mean threshold, but should have no effect on the correlations obtained. The third difference probably would not affect the measurement of the simultaneity-movement threshold.

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16. R. P. Barthol, "The Movement of Ground over Figure." The Journal of Psychology, XLV (January, 1958), pp. 85-91.

RESULTS

Reliability

The correlation between the mean value of the six measurements at the first sitting for the phi-phenomenon and that of the six measurements at the second sitting was obtained; when corrected by the Spearman-Brown formula, r=.86, which is almost identical with Barthol's (.84). As in Barthol's study, no reliability coefficient was obtained for the kinesthetic after-effect measurements, which are generally regarded as quite stable.

Phi-Phenomenon Thresholds and Kinesthetic After-Effect Scores

Table I shows the means and standard deviations associated with the phi-phenomenon and the kinesthetic after-effect, for each group of women and for the total group.

TABLE I

PHI-PHENOMENON THRESHOLDS AND DEGREE OF KINESTHETIC AFTER-EFFECT

		Phi-Phenomenon msecs. of dark interval at simultaneity threshold	KAE inches apparent shrinkage
"Feminine" women (N=20)	M..	62.6	.154
	σ..	10	.103
"Masculine" women (N=26)	M..	60.6	.198
	σ..	13	.142
Total group (N=46)	M..	61.5	.179
	σ..	12	.129

Relation Between Phi-Phenomenon and Kinesthetic After-Effect

Product-moment correlations between the simultaneity-movement threshold and the kinesthetic after-effect (control scores minus satiation scores) were as follows:

"Feminine" women. . r= .05

"Masculine" women . r= .06

Total group . . . . r= .03

All of the correlations were insignificant, as were the differences between the means of the two groups on the two measures.

DISCUSSION AND CONCLUSIONS

The results obtained in this study fail to confirm the correlation coefficient which Barthol obtained for women. Neither the correlations for the separate subgroups nor the correlation for the total group approaches significance. What could account for the differences between the results of this study and the results of Barthol's study?

There is, first of all, a difference as to the kind of women subjects used: Presumably, Barthol's subjects were an unselected sample of female psychology students, while the subjects for this study were selected according to their scores on the masculinity scale of a personality test. If Barthol's hypothesis of sex differences in brain structure affecting perception were true, however, the composition of a group of women should not affect the correlation. Any group of women measured on these points should yield approximately the same correlation.

Secondly, there are the afore-mentioned differences in light wattage and in the darkness of the room. These two factors, while possibly affecting the threshold itself, would not be expected to change the relative positions of the subjects' scores. In fact, there was a significant difference between the mean threshold of eighty-two milliseconds in Barthol's study and the mean threshold of sixty-one milliseconds in this study.

There is a third factor which may or may not have affected the results. This is the sex of the respective experimenters. As perception is modified by emotion and as an experimenter of the opposite sex could have an emotional effect on the subject, it is not inconceivable that the fact that the experimenters in both of Barthol's studies were men could have affected the results. Whether or not this factor could have created the difference which occurred is, of course, unknown.

A fourth factor which should be mentioned is the part played by suggestion. An experimenter could unconsciously communicate to the subject that a particular speed is the one at which she should see a change. Because of the random shuffling of data on a pilot study in which he found insignificant, but opposite, correlations,[17] Barthol was seeking just such a correlation as he found; and it is possible that he could have unconsciously imparted this expectation to his subjects. The present experimenter made an effort to control this factor by sitting with her back to the subject and by avoiding, as much as possible, communication with the subject during the actual measurement. Also, while testing the first thirty-two of the forty-six subjects, the experimenter did not know to which group each subject belonged. At that point, however, upon checking

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17. Barthol, "Individual and Sex Differences in Cortical Conductivity." op. cit., p. 366.

the subjects already tested, it was found that only ten feminine subjects had consented to be tested while twenty-two masculine subjects had been tested. It became necessary then to test only feminine subjects, and the experimenter, from that point on, knew whom she was testing.

The empiricistic theory of perception, as was stated before, would not necessarily call for a correlation between kinds of perception; yet it could explain such a correlation, if found, as depending upon a correlation in the learning experiences which affect the perceptions measured. The purpose of this study, then, was to check on the correlation, which Barthol found, by repeating his experiment on women; and also to see if such a correlation, if present, would not vary with experience rather than with sex exclusively. The results show a total lack of correlation between the two experimental measures for both the two subgroups and for the total group, a result which is compatible with the empiricistic theory, but which is somewhat incompatible with the Gestalt theories of cortical conductivity and satiation, which tend to imply intra-individual consistency. Perhaps the most important datum in favor of an empiricistic position, and against a nativistic, is the very discrepancy between the present results and those of Barthol. A perceptual correlation found in one situation has evaporated in another, closely similar situation; and this evanescence is much more suggestive of the importance of learned "sets" and attitudes in perception than it is of the primacy of innate cortical conductivity.

SUMMARY

Two major theories have been advanced to explain perception. The empiricistic theory postulates that man learns to perceive as he does; nativistic Gestalt theory postulates that perception is innate and is dependent upon the electrical conductivity of the cerebral cortex. There is evidence for and evidence against both theories which leaves the problem still very much undecided.

Barthol, accepting the theory of cortical conductivity which would imply that there are inter-individual differences and intra-individual consistency in cortical conductivity, has done an experiment to find the correlation between two kinds of perception, the phi-phenomenon and the kinesthetic figural after-effect. He found significant correlations, which were different in direction for each of the two sexes, a result which seems to support his hypothesis and to point to sex differences in cortical conductivity.

The present experimenter, questioning the theory of cortical conductivity, has repeated Barthol's experiment with an eye to demonstrating that a correlation such as Barthol found, if valid, may actually vary with learning experience rather than with sex. The results showed no correlation between the two measures. This outcome is

compatible with the empiricistic theory, but is somewhat incompatible with a theory which calls for intra-individual consistency; furthermore, the very discrepancy between the present results and those of Barthol tends to call into question a simple, biological explanation of perception.

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