ment to the pupal stage but no adults emerged. Flies developing from larvae reared in media containing 0.0063, 0.0125, and 0.025 percent of 4-amino-1H-pyrazolo [3,4-d] pyrimidine sulfate were small, but they reproduced normally.

When consumed by newly emerged flies in sufficient quantities for 14 days, Chlorambucil almost completely prevented growth of testes and 4-amino-1H-pyrazolo [3,4-d] pyrimidine sulfate prevented the growth of ovaries (Fig. 1). The toxicity of these compounds to warm-blooded animals may preclude their use on field crops. However, further investigations may lead to the synthesis or discovery of other compounds that can be used safely on field crops.

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29 March 1962

Effects of Perceptual Training at Three Age Levels

Abstract. Children 6, 7, and 8 years old were first tested for their ability to reverse figure and ground and then given special training in this skill. Although all the children's ability improved greatly with practice, the initial differences between the age groups were still apparent both immediately and 1 month after training.

On the basis of numerous cross-sectional investigations with children, Piaget (*1*) and his colleagues have suggested that many complex perceptual phenomena—such as illusions, size constancy, and figure-ground reversal —are neither entirely innate nor entirely learned but rather derive from the interaction of maturation and experience. Our study was designed to test this developmental hypothesis by attempting to train children at different age levels to reverse figure and ground when both figure and ground were meaningful images. Figure-ground reversal involving the identification of meaningful images was chosen for study because, in the absence of special training, the reversal increases gradually during middle childhood (*2*). Two questions were asked: (i) Can children at different age levels profit from training in reversing figure and ground? and if so, (ii) Are the initial differences between the age groups affected by special training?

Subjects for the study were 69 children (23 at each age level from 6 to 8 years whose mean ages were 79 months, 91 months and 103 months, respectively) attending the University Elementary School at U.C.L.A. The materials consisted of two sets of 8- by 10-inch cards containing ambiguous black and white figures and a set of cardboard shields cut so that when they were placed over the drawings the hidden (reversed) figures were immediately apparent (Fig. 1). The average correlation between the two sets of drawings (based on a separate study of 150 children aged 6 to 12 years) was .56 ($p < .01$).

Each child was pre-tested on one set of cards (form A) immediately prior to training. The testing consisted of showing the child the cards one at a time and asking him, "What do you see? What does it look like?" Immediately after this test, the child was trained on the second set of cards (form B). Training involved providing the child with successively more direct and revealing clues to the perception of the hidden figure. The first clue was the statement, "Some children see more than one thing. Do you see anything else besides a ——?" (whatever the child had seen). If this clue did not prompt a reversal of figure and ground, a second clue was given, "Sometimes children see a —— (whatever figure the child had not seen) in the picture. Do you see a ——?" If the child replied that he did see the figure, he was asked to point out the parts to insure that he was not responding to suggestion. Those children who still did not see the figure were given a third clue. This time the cardboard shield was superimposed on the drawing and the previous question was repeated. The youngster was again asked to point out the parts to insure that he actually saw the reversed figure. Each child was trained to the point where he could

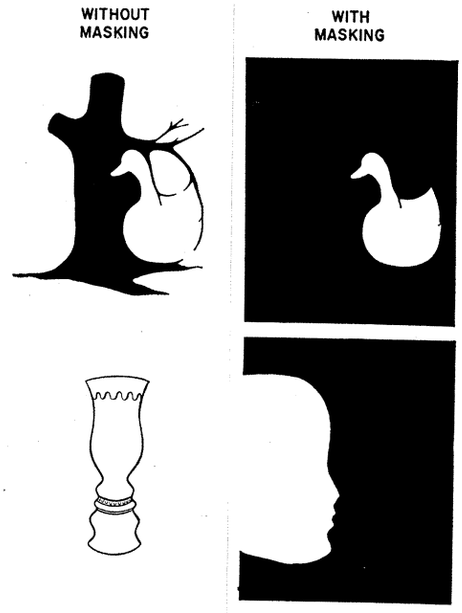

Fig. 1. Illustration of the training procedure showing two of the figures with and without masking.

indicate the parts of all the hidden figures in form B. Immediately after the training the child was again tested with form A, and then retested with the same form (A) a month later. The child's score was the number of figures he perceived of the 24 possible figures contained in the drawings of form A.

The results of the experiment were assessed by means of an analysis of variance for two variables (three age levels and three tests with form A). All three groups made significant ($p < .01$) improvement which was maintained over a month's time. There were also significant differences ($p < .01$) between the age groups both initially and on the subsequent testing.

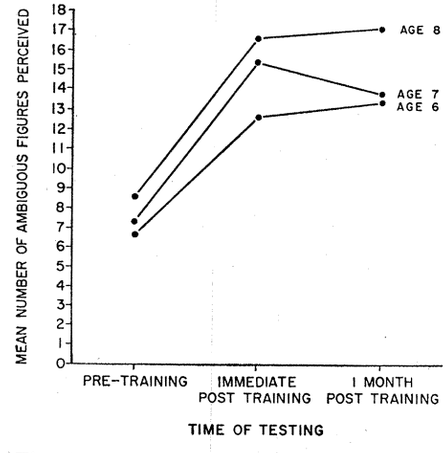

Fig. 2. Effects of perceptual training on ability to reverse figure and ground at three age levels.

Although there was a tendency for the 7-year-old group to lose and for the 6- and 8-year-old groups to increase some of their gains over a month, the rank order of the age groups with respect to their level of performance was the same on all tests. (Statistically this was shown by an Age × Testing interaction which was not significant.) Assessment of the number of clues given at each age level (also by means of analysis of variance) indicated that there were significant differences ($p < .01$) between the mean number of training clues required at each age level and that the mean number of clues required was inversely related to age. At each age level the mean number of clues required was: age 6, 13.5; age 7, 12.0; age 8, 8.7 (see Fig. 2). Sex differences were also checked by analysis of variance and were found to be not significant.

Some investigators (*3*) concerned with perceptual learning have argued that verbal mediation, rather than the maturation of perceptual structures, can account for age differences in the acquisition of perceptual skills. In our study verbal mediation was employed by all the children although its effects were not the same at different age levels. The majority of the 8-year-old youngsters were able to use the verbal clues to reverse figure and ground and to attain and maintain the highest level of performance. For many of the 6- and 7-year-old children, however, the verbal clues were not sufficient and they required the shield in order to reverse figure and ground. In addition, many of the younger children remembered (from their training on form B) that they had seen "faces" or "animals" in the cards and then claimed they saw them in form A. They were, however, unable to point them out. Thus, the younger children were unable to reverse figure and ground despite their appropriate use of verbal mediation. The ineffectiveness of correct verbal mediation in young children has been noted previously by other investigators (*4*) although they have not stressed its maturational implications.

In our study the influence of experience was suggested by the finding that all the children improved greatly with special training in reversing figure and ground, while the influence of maturation was suggested by the finding that 6- and 7-year-old children required more intense teaching and reached a lower level of performance than did the 8-year-old children. Although our findings do not prove Piaget's developmental hypothesis regarding perception, they are consistent with the cross-sectional observations he reported and upon which he based his hypothesis.

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References and Notes

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Nevada Test Fallout and Radioiodine in Milk

Abstract. The iodine-131 dosage to infant thyroids as a result of Nevada testing is evaluated. The case of heavy fallout in the Troy, N.Y., area on 26 April 1953 is cited. The possibility is discussed that a thyroid cancer survey would provide a critical test of linear response versus threshold theory for radiation injury to tissue.

The resumption of nuclear testing at the AEC's Nevada Test Site has resulted in the injection of fission products into the air mass over the U.S. continent. The purpose of this communication is to call attention to localized tropospheric fallout of radioiodine as a short-lived contaminant of the milk supply.

A search of the unclassified literature reveals that in past testing at the Nevada Proving Grounds there have been instances of tropospheric fallout involving iodine-131 contamination far in excess of the levels recorded in the United States as a result of Soviet and U.S. off-continent tests during 1961–62. Such fallouts occurred in the Salt Lake City, New York, Chicago, Rochester, and Troy areas (*1*). Data pertaining to the Troy, N.Y., fallout are detailed enough to permit an estimate of the radioiodine hazard. Emphasis will be placed upon the 8-day iodine-131 activity as a contaminant of the milk supply. The presence of shorter-lived radioiodine and radiation dosage due to inhalation and solid food ingestion is not considered here.

On Sunday, 26 April 1953 a rainout of radioactive debris occurred over Troy, N.Y. H. M. Clark of Rensselaer Polytechnic Institute reported a gamma radiation intensity of 0.4 mr/hr 1.1 days after arrival of the debris (*2*). In addition, a surface contamination of 1.6×10^7 disintegrations per minute per square foot was measured, corresponding to the activity 36 hours after detonation of the Simon test in Nevada. This explosion took place in the atmosphere (the bomb was mounted on a 300-foot metal tower) and produced a fission yield which has been reported as 43 kilotons (*3*) and also as 52 kilotons (*4*). The top of the bomb cloud reached an altitude of 45,000 feet, and its base was defined at 31,000 feet. The tropopause at the time was at 38,000 feet so that much of the cloud was trapped in the lower atmosphere.

The cloud trajectory took the radioactive debris eastward on an arc path over Pennsylvania, the Hudson Valley, southern Vermont, and Massachusetts (*5*). Severe rainstorms probably produced concentrations of fallout in these states, but the monitoring network was of too coarse a grid to define these fallouts. However, the Troy, N.Y., area was surveyed by an aircraft flying at 500 feet above the terrain on 1 May 1953. The reports of the Simon fallout were classified Secret (*6*). It seems quite probable that the extent of the contamination was considerable (*7*); it is also likely that contamination levels elsewhere exceeded those found in Troy.

I estimate that the level of iodine-131 contamination in Troy, N.Y., was in the range of 2 to 4 curies per square mile or, roughly, that 1/1,000,000 of the Simon test radioactivity fell on 1 square mile. This corresponds to approximately 1 $\mu c/m^2$. A single square inch of plant surface would be exposed to a fallout of 650 $\mu\mu c$ of iodine-131. Thus, leafy edibles marketed promptly after such a fallout could involve a substantial ingestion hazard. However, fresh milk is the most convenient food product to monitor, and it is also the main contributor to the diet of many infants. A pasture level of 1 $\mu c/m^2$ may be translated into a milk contamination of 100,000 $\mu\mu c$/liter. This is based