EFFECTIVENESS OF DIFFERENT COLORS IN THE ELICITATION AND DEVELOPMENT OF APPROACH BEHAVIOR IN CHICKS

by

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(With 4 Figures)

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Approach responses can be elicited by a variety of stimulation at or shortly after hatching in naive precocial birds without prior learning. This behavior is associated with a quick acquisition process (imprinting) that represents the first significant experiential influence in avian behavioral development. Thus, the study of the effectiveness of the different stimuli that elicit neonatal approach behavior, together with the study of the associated learning processes, provide an excellent opportunity for understanding the interaction of constitutional factors and experiential influences in the early development of behavior.

Most studies of avian color preferences and color related processes of early behavioral development deal with choice discrimination, in which the relative frequency of responses within simultaneously presented stimuli is examined. While choice performances and perceptual discrimination responses represent proper indices for the analysis of complex perceptual processes, the simultaneous presentation of a combination of different stimuli introduces the added dimension of stimulation complexity which in itself may influence the relative magnitude of performances (KOVACH, 197oa). Furthermore, possible response-reinforcing values inherent in complex stimulation may overshadow the smaller effects of the supposedly investigated relationships between stimulus qualities and responses. The present study deals with approach performance levels of naive subjects in relation to individually

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presented simple color stimuli, and investigates the effects of controlled early exposure to such stimuli on the development and modification of approach performances. A series of related experiments reported elsewhere (Kovach, 1970b; Kovach & Hickox, 1970), which were designed on the basis of findings of the present study, deal with the early development of choice performances and perceptual discrimination of simultaneously presented stimuli.

METHOD

The following general methodological steps were taken: (a) the subjects were obtained from a breeding population with known optimal age and stimulus conditions for eliciting early approach behavior by achromatic visual stimulation; (b) the perceptual experience of all subjects prior to approach behavior testing was strictly controlled and experimentally manipulated; (c) a new automated experimental procedure was used to insure sensitive measurement of approach responses in relation to simple strictly controlled color and intensity variables of visual stimulation.

The study is composed of three interrelated experiments. Their common treatment of subjects, perceptual exposure, and approach behavior testing procedure will be described in this section. Additional necessary details of experimental design will be given in respective brief sections on the specific procedures of each experiment.

a. Subjects.

A total of 768 Rhode Island Red chicks were used in three experiments. They were all incubated in two forced-draft incubators, in weekly hatches during a time span of 15 weeks, from eggs produced by a breeding colony of fifty birds at the Animal Behavior Laboratory of The Menninger Foundation. The hatching incubator was kept in a dark room. The only visual experience the subjects had received prior to approach preference testing, in addition to the visual experiences to be specified later as the experimental conditions of prolonged perceptual exposure, came from brief exposures to low intensity achromatic light during hatching inspections and during transfer, shortly after hatching, into individually isolating dark compartments.

The eggs were chilled at approximately 28°F prior to incubation to insure uniform hatching and uniform developmental age for each group. The age was calculated from the beginning of incubation in such a way that zero age corresponded to the end of the 21st day of incubation which was at, or close to (± 1 hour), 4:00 p.m. on the day of hatching for all hatches.