The Effect of Drugs on Stereotyped and Nonstereotyped Operant Behaviors in Retardates*

KAREN V. DAVIS

Institute for Juvenile Research, Department of Mental Health, Chicago, Illinois, U.S.A.

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Abstract. The present study assessed the degree of operant control that could be achieved over stereotyped and nonstereotyped behaviors and explored the effects of two drugs on these behaviors in reference to arousal and operant interpretations of drug action. The Ss were 5 severely and 5 moderately retarded institutionalized males from 15 to 21 years of age. Their task was to obtain candy on an FR15 schedule of reinforcement by rocking or bar pressing in the presence of an appropriate S$. Each $S$ received each drug (1.4 mg/kg of thioridazine and 0.5 mg/kg of methylphenidate) and a placebo twice in random order with no-drug sessions on the days preceding and following each drug session. Results in terms of pause time, response rate, and number of reinforcements obtained indicated that the two behaviors were comparable in their susceptibility to environmental control, but that the severely retarded Ss were more variable in their response than the moderately retarded Ss. The interpretation of drug results in terms of the arousal and operant viewpoints was complicated by two factors: (a) within each drug condition, there were Ss who increased and Ss who decreased from baseline on each measure, tending to produce insignificant results overall, and (b) the majority of Ss were consistent within themselves in terms of direction of change not only over behaviors but over drug conditions.

Key-Words: Thioridazine — Methylphenidate — Stereotypy — Operant Conditioning — Retardation.

Previous research on the stereotyped movements observed in the behavioral repertoires of institutionalized humans and environmentally restricted animals has been reviewed and discussed by Berkson (1967) and Hollis (1968a). Two major viewpoints concerning the origin and nature of these stereotyped movements emerge from these reviews.

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Berkson and his associates in a series of studies on stereotypy in human and infrahuman Ss presented a viewpoint that stereotyped movements are related to arousal. The arousal concept evoked by this viewpoint has been defined by Malmo (1959) as the level of consciousness described by a continuum from deep sleep to extremely agitated states which is the result of cortical bombardment by the ascending reticular activating system (ARAS). At some point on this continuum, there is a point of optimal arousal which is associated with maximal performance. However, Berlyne (1967) warned against viewing arousal as a phenomenon or process that goes on in a particular location in the central nervous system. He proposed that as any intervening variable, arousal is defined through its relations to antecedent and consequent variables. Arousal, thus defined, is reflected in the common variance of many response measures in a wide variety of stimulus situations. Whether stereotypy functions to increase arousal, however defined, to its optimal level for organisms in stimulus-deprived environments or whether it functions as a means of tension-reduction for organisms in highly aroused states (Mason, 1967), there is agreement that some organisms react to permanently or temporarily altered levels of arousal by engaging in stereotyped behavior.

A second viewpoint emerges from the research of Hollis (1968a) who produced evidence that stereotyped movements in humans can function as operants, i.e., they can be instituted and/or maintained by contingent positive reinforcement, extinguished (at least in some Ss), and brought under the control of different schedules of reinforcement much like simple operant behaviors studied in lower organisms.

Common to both viewpoints is the finding that a reciprocal relationship exists between stereotyped and nonstereotyped behaviors such as environmental manipulation, locomotion, and grooming in animals. Although observed in naturalistic situations (Berkson, 1964; Berkson and Mason, 1964a, 1964b), this inverse relationship is strengthened by the provision of alternative activities and greatly accentuated by making positive reinforcement contingent on either the stereotyped or the nonstereotyped behavior (Hollis, 1968a, 1968b; Lovaas, 1967).

The differences between an arousal and an operant view of stereotyped movements are often only a matter of interpretation. For example, increases and decreases in arousal can be interpreted as internal reinforcing consequences. However, empirical differences between the two viewpoints emerge when the results from studies involving the use of psychotropic drugs are examined.

There is an extensive literature which offers evidence to support the notion that arousal plays an important role in the mediation of drug response, particularly in terms of the level of stereotyped behaviors. In the majority of studies, two classes of drugs are used: (a) stimulants