Environmental Variables Influencing Drug Self-Administration

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Behavioral effects of drugs depend not only on their direct pharmacologic actions, but on the contingencies maintaining behavior as well (Sidman, 1956). This notion of drug-environment interaction applies equally to the analysis of factors influencing drug self-administration (Thompson and Schuster, 1968). Whether a drug will be self-administered depends not only on the type of drug, but also on the environmental conditions under which the drug is made available. Among the classes of environmental variables determining whether a drug will be self-administered are (a) past history of the subjects, (b) motivational factors, (c) current environmental conditions, and (d) reinforcement variables (Schuster and Thompson, 1969).

PRIOR HISTORY

The prior history of subjects subsequently provided with the opportunity to self-administer drugs can be of two types: (1) the behavioral history and (2) prior experience with drugs (Thompson and Pickens, 1969).

Behavioral history. Weeks and Collins (1967) investigated the effect of behavioral history on subsequent tendency to self-administer morphine. One group of rats were conditioned to self-administer morphine by emitting a

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lever-pressing response, while a control group received the same number and frequency of injections, but no response was required. After a period of detoxification, both groups were given the opportunity to self-administer morphine. Animals with previous experience emitting a response for morphine infusion learned the self-administration response significantly more rapidly than controls having learned no specific response for the drug.

**Drug experience.** Meisch and Pickens (1967) and Meisch (1969) illustrated the effect of prior drug experience on subsequent ethanol self-administration. The rate and volume of ethanol self-administered were compared during extinction of a previously food-reinforced response for subjects having a prior history of ethanol self-administration with those receiving only water. Rats were induced to orally self-administer ethanol and water using the schedule-induced polydipsia technique originally reported by Falk

![Graph](image)

*Fig. 1. The effects of ethanol experience on oral ethanol self-administration by a rat. I. The number of liquid reinforcements at 2 to 32 grams percent concentration and the volume of fluid ingested during extinction of a previously food-reinforced response. During food reinforcement, tap water had been available and copious drinking occurred adjunctively. II. After a history of ethanol consumption via schedule-induced polydipsia, there is a significant increase in the number of ethanol reinforcements (top graph) and the volume of ethanol consumed (bottom graph) (Meisch, unpublished).*