

The Discriminative Stimulus for Punishment or S^D

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A discriminative stimulus, or S^D , is commonly known as a condition in the presence of which reinforcement is contingent upon a response. In the absence of the stimulus, reinforcement is not in effect for that response. As a result, the probability of the response is higher in the presence of the S^D than in its absence (Michael, 1980). As counterparts to the S^D , there are terms designating stimuli correlated with lower response probability by virtue of their participation in extinction conditions. Several sources define a stimulus correlated with extinction conditions as an S^A (Baldwin & Baldwin, 2001; Catania, 1998; Malott, Malott, & Trojan, 2000; Pierce & Epling, 1999) or as an S^- (this term is used in conjunction with S^+ , a term for a stimulus correlated with reinforcement conditions; Domjan, 1998). Missing from our conceptualization of stimulus control is a widely accepted term and symbol for a stimulus in the presence of which responding decreases via punishment. The purpose of the present paper is to propose such a term and accompanying symbol.

In describing a recent study of stimulus control in response-cost punishment with humans (O'Donnell, Crosbie, Williams, & Saunders, 2000), we found it difficult to write clearly and succinctly about a stimulus correlated with punishment conditions without using such a term. A term and symbol unique to a stimulus correlated with

punishment would facilitate communication of experimental procedures involving punishment. There are two important features of such procedures: First, the punishment contingency is in effect, and second, reinforcement contingencies are not discontinued with the introduction of punishment. Reinforcement and punishment are arranged for the punished response (a conjoint schedule; Baron, 1991) to prevent confounding extinction effects and punishment effects. Thus, the discriminative stimulus is correlated with both reinforcement and punishment, and an appropriate abbreviation should reflect this.

Existing terms and symbols for a discriminative stimulus for punishment are problematic. Miller (1997) uses SP , but that symbol may be confused with a common abbreviation for the punishing stimulus itself (S^P ; e.g., Michael, 1980). In addition, omitting S^D from the abbreviation may lead readers to assume that reinforcement contingencies have been discontinued. Sulzer-Azaroff and Mayer (1991) use S^D- , which may lead to confusion because the minus symbol has historically been used to indicate that reinforcement contingencies are either absent or withdrawn. Although many instances of punishment do involve withdrawing reinforcers or the opportunity to earn reinforcers, this symbol would not accurately represent situations in which reinforcement still is in effect for the punished response. Malott et al. (2000) use S^D and S^A for the presence and absence, respectively, of reinforcement or punishment contingencies, and differentiate the latter simply as a "punishment-based S^D/S^A " (p. 200). This use is congruent with our proposal in that

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it indicates that both punishment and reinforcement contingencies are in effect, but including the qualifier "punishment-based" may become cumbersome. Baldwin and Baldwin (2001) use S^A to refer to all "antecedent cues that inhibit behavior" (p. 80), and Chance (1999) defines S^A as a "discriminative stimulus in the presence of which responding either will not be reinforced or will be punished" (p. 316). These definitions effectively equate punishment and extinction, an undesirable and potentially confusing practice because the processes involved differ.

O'Donnell et al. (2000) introduced the symbol S_p^D , which is more easily reproduced as S^{Dp} to indicate that both reinforcement (S^D) and punishment (p) conditions are in effect for the same response in the presence of the stimulus. Furthermore, using S^{Dp} eliminates possible confusion with an extinction-based discriminative stimulus (e.g., S^A), and including p eliminates possible confusion with a reinforcement-based discriminative stimulus. Modifying Michael's (1980) definition of S^D , an S^{Dp} can be defined as a stimulus condition in the presence of which a response has a lower probability of occurrence than it does in its absence as a result of response-contingent punisher delivery in the presence of the stimulus.

Adoption of S^{Dp} as a discriminative stimulus for punishment would reserve S^D for reinforcement-only conditions, thus eliminating confusion as well as the need for additional descriptors (e.g., the corresponding S^{Dp}). Further-

more, use of S^{Dp} would obviate the need for a term designating a stimulus correlated with the absence of punishment conditions (e.g., S^{D0}). In the absence of punishment conditions, the antecedent stimulus would simply be abbreviated S^D if reinforcement conditions are present and S^A if reinforcement conditions are absent.

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