



Influence of motivating operations and discriminative stimuli on challenging behavior maintained by positive reinforcement

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ABSTRACT

We examined the effects of an establishing operation (EO) and abolishing operation (AO) on stimulus control of challenging behavior. Two participants with developmental disabilities and challenging behavior participated. In Phase I, a functional analysis was conducted to identify the consequences maintaining challenging behavior. In Phase II, a discrimination between S^D and S^A was trained. In Phase III, pre-session MOs (i.e., EO and AO conditions) were arranged to assess their effects on challenging behavior. Finally in Phase IV, in addition to manipulating pre-session MOs the challenging behavior was evaluated under extinction in both S^D and S^A conditions. Results indicated that in the context of extinction when pre-session EO and AO conditions were manipulated, responding not only became differentiated but was higher in both S^D and S^A conditions in the pre-session EO condition when compared to the pre-session AO condition.

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1. Introduction

In recent years, there has been an increased interest in the application of antecedent variables to enhance instructional strategies and behavior management approaches with individuals with developmental disabilities (Kennedy & O'Reilly, 2006). One class of antecedent variables that may have such an effect on challenging behavior includes motivating operations (Michael, 1982, 1983, 1993a, 1993b). Motivating operations are reported to influence operants by: (a) altering the effectiveness of a consequence as a reinforcer/punisher, (b) altering the probability of behavior previously associated with that consequence, and (c) modifying the evocative effects of discriminative stimuli (Laraway, Snyderski, Michael, & Poling, 2003).

A number of studies have examined the influence of motivating operations and how they may moderate the three-term contingency. Together these studies have shown that (a) it is possible to identify MOs via manipulation of antecedent variables (Carr, Smith, Giacini, Whelan, & Pancari, 2003; Gerwitz & Baer, 1958; Gottschalk, Libby, & Graff, 2000; Horner, Day, & Day, 1997; Kennedy & Meyer, 1996; McAdam et al., 2005; North & Iwata, 2005; O'Reilly, 1995, 1997; Vollmer & Iwata, 1991); (b) performance during training/teaching sessions may be enhanced by scheduling "deprivation" of the reinforcer

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(Wilder, Carr, & Gaunt, 2000); (c) constant access to the reinforcer may diminish its effectiveness, so that its true value to function as a reinforcer may not be optimized (Gottschalk et al., 2000; McAdam et al., 2005; North & Iwata, 2005); and (d) prior levels of reinforcement can influence positively reinforced challenging behavior (Berg et al., 2000; O'Reilly, 1999).

Most intervention research to date has focused on the reinforcer altering effects of antecedent operations. In other words, researchers have examined how antecedents influence the consequences maintaining responding. Antecedents may also influence operant responding when reinforcement is not available, and when the behavior is under extinction (Michael, 2000). However, an understanding of behavior under different antecedent conditions (that is motivating operations), and their momentary behavior-altering effects, requires a more complex examination of behavior (Michael, 1993a, 1993b). Such research may have important implications for the assessment and treatment of challenging behavior in people with developmental disabilities (McGill, 1999).

Skinner (1953) stated that when a S^D has an effect upon the probability of a response, that the present environment becomes relevant, but that in order to prove the “inevitability of the control” one needs to have an adequate history of reinforcement and deprivation in relation to the contingency. Therefore, in order to examine the relationship between the MO and the S^D , the S^D in question must be clearly identified and systematically manipulated under both reinforcement and deprivation. Michael (2000) offered a conceptual model to do so. In his model he states that a direct relation between deprivation levels and the initial rate of responding or the total number of responses emitted needs to be examined during extinction. Laraway et al. (2003) pointed out that once a S^D has been developed, the behavioral effects of that stimulus will be seen only when the relevant MO is in effect. Klatt and Morris (2001), further stated that the behavior altering effect should be demonstrated when other contingencies are not in effect during extinction.

O'Reilly and colleagues attempted to isolate the behavior altering effects of the MO under extinction in a series of studies for behavior maintained by positive reinforcement (O'Reilly, Edrisinha, Sigafos, Lancioni, & Andrews, 2006; O'Reilly, Sigafos, Edrisinha, Lancioni, Cannella, et al., 2006; O'Reilly, Edrisinha, Sigafos, Lancioni, Cannella, et al., 2007; O'Reilly, Edrisinha, Sigafos, Lancioni, Machalicek, et al., 2007). They employed a three-phase methodology. In Phase I, the operant function of challenging behavior was identified in a functional analysis (Iwata, Dorsey, Silfer, Bauman, & Richman, 1982/1994). In Phase II, putative MOs were isolated for the discriminated operant identified by systematically controlling the levels of pre-session access to reinforcement under two conditions, (a) pre-session access (Abolishing Operation), and (b) pre-session no access (Establishing Operation) (c.f. Vollmer & Iwata, 1991). Finally, in Phase III, the MO was systematically controlled as in Phase II while target behaviors were placed on extinction.

Although the authors in the above studies demonstrated differential control over challenging behavior by the antecedent/consequence arrangements in Phases I–III, no specific S^D was either identified or manipulated in a way that clearly demonstrated their effects. Rather, contingencies that maintained challenging behavior were identified and manipulated in pre-session conditions. Further, no manipulation was conducted that supported an account of the effects of pre-session access to the reinforcer on the S^D .

Another study by Horner et al. (1997) examined the use of neutralizing routines to reduce challenging behaviors maintained by negative reinforcement. They examined four conditions: (a) EO + S^D , (b) S^D only, (c) EO only, and (d) neither S^D nor EO conditions. However stimulus discrimination was not trained. Multiple stimuli were used both during the neutralizing routines, and the instructional settings. Furthermore, instructions differed from day to day. Therefore, it was not clear if the participants in their study discriminated the S^D due to the variations in their methodology. Regardless, their results supported the utility of MO manipulations when developing interventions.

Currently, no known research has demonstrated the relation between the MO and the S^D for behavior maintained by positive reinforcement. In order to evaluate the interaction between a MO and the S^D , it would be necessary to first demonstrate or establish a discriminative relationship. Then, compare response measures from conditions during which no reinforcement is presented contingent on the target response and in which, (a) the S^D is present and the Establishing Operation (EO) is present, (b) the S^D is present and the Abolishing Operation (AO) is present, (c) the S^A is present and the EO is present, and (d) the S^A is present and AO is present. These manipulations (a–d) need to be conducted in the context of extinction.

Results of such a manipulation would then examine any direct effect the MO has on the S^D . If the data were to indicate that responding did indeed occur, in the presence versus absence of the S^D under extinction, one may then be able to extrapolate that responding was a function of the presence of the MO (establishing operation). This would be evidenced by the differentiation in response measures in the presence (EO) versus absence (AO) of the MO when the S^D was held constant. In effect, the purpose of this study was to verify the influence of the MO on the S^D to exert stimulus control of challenging behavior maintained by positive reinforcement.

2. Methods

The study comprised of four phases. In Phase I, an FA was conducted to identify the contingency maintaining the target behavior. In Phase II, discrimination training was conducted under two conditions (1) S^D and (2) S^A for the contingency identified in Phase I. In Phase III, pre-session levels of satiation and deprivation were manipulated in the presence of the S^D in order to identify the MO, whilst within session target behavior was reinforced on a fixed ratio (FR) 1 schedule. In Phase IV, the MO identified in Phase III was manipulated in the presence of both S^D and S^A while the target behavior was placed on extinction. The response measurement and target behaviors for all phases were the same.

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