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Noncontingent Reinforcement. An Introduction

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This article reviews basic features of a relatively new behavior analytic method: noncontingent reinforcement (NCR). The method is strikingly simple; just presenting reinforcers according to a (mostly fixed-) time schedule. The article also discusses more complicated considerations that must be made before applying NCR. Important considerations are how dense NCR schedules must be in order to reduce or eliminate problem behavior, whether schedules can be thinned while maintaining effects, the possibility of adventitious reinforcement, whether reinforcers demonstrated to maintain the problem behavior to be treated have to be delivered, the generality of NCR across behaviors and functions, and whether NCR eliminates alternative responses. NCR and the history of behavior analysis are also discussed, including why NCR was not applied at a large scale earlier.

The Historical Context of Noncontingent Reinforcement as a Behavioral Treatment

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Noncontingent Reinforcement (NCR) emerged as a behavioral treatment in the early 1990s. In this paper we describe the historical context leading to the development and use of NCR as treatment. There are at least three general historical factors. The main reason the procedure emerged when it did is that functional analysis assessment methods were beginning to influence publication practices for behavioral treatment studies. Treatment studies based on functional analysis outcomes were just beginning to emerge by the late 1980s, so the time was ripe. A second factor is that some other treatment procedures that were logically derived from a functional analysis (e.g., DRO and extinction) had obvious negative side effects, both in terms of practicality (e.g., re-setting a timer every time a target response occurred in DRO) and in terms of dangerous behavioral outcomes (e.g., extinction bursts). A third factor was that there was an empirical basis for the application. Basic behavioral research on time-based schedules and applied research on NCR as a control procedure had already been published. Results of these prior experiments had shown that NCR reduced response rates relative to a response-dependent baseline. In our conclusion, we will propose that NCR research has persisted because the procedure provides a relatively straightforward preparation from which to conduct a range of parametric and component analyses.

Key words: Noncontingent Reinforcement, Behavioral Treatment, Functional Analysis

On the Appropriateness of the Term “Noncontingent Reinforcement”

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The behavior-analytic procedure commonly referred to as noncontingent reinforcement has proven to be useful both as an experimental control procedure and as a reductive treatment for problem behavior. However, the term “noncontingent reinforcement” is a misnomer for several reasons. These reasons are discussed, along with possible alternatives to the term.

Tim, Tom, and Tim

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Basic and applied findings disagree on the effects of noncontingent reinforcement. Basic effects have usually been modest, and always reversible. Applied effects have often been strong, and sometimes irreversible. A partial explanation of the difference lies in the way response rates have been calculated. In basic work, but not in applied work, time spent during reinforcement has always been excluded from session time.

Noncontingent Reinforcement: From Basic Research to Therapeutic Application

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This article provides an historical overview of the use of noncontingent reinforcement (NCR). Originally designed as a contingency-control procedure for both basic and applied research, in recent years NCR has been used increasingly as a function-based treatment to reduce the frequency of a wide range of problem behaviors.

Descriptors: Noncontingent reinforcement, basic research, contingency-control

Noncontingent Reinforcement for the Standpoint of an Applied Behavior Analyst

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Noncontingent reinforcement (NCR) is an empirically validated procedure effective in the treatment of challenging behavior among individuals with developmental disabilities. In this paper, we review some of the practical issues that arise in using NCR in applied settings. We conclude that NCR should be used after a functional assessment has identified the consequence maintaining challenging behavior so that the reinforcer delivered in NCR matches the reinforcer that maintains challenging behavior. Initially, reinforcement may need to be given on an almost continuous basis, which may be logistically difficult in some applied settings. Over time, the schedule of reinforcement must be thinned to increase the feasibility of NCR for use in applied settings. NCR is viewed as a temporary and short-term solution that is relatively easy for parents and teachers to use. In addition, NCR can be combined with skills-building treatments to promote development of the individual's adaptive behaviors.

Processes involved in noncontingent reinforcement

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The term *noncontingent reinforcement* (NCR) refers to time-based schedules that have demonstrated to be effective to reduce undesired behavior. My opinion is that hypotheses based in *satiation* or *extinction* alone do not encompass all the processes involved in behavior reduction. Instead, the empirical data are coherent with the hypothesis that the stimuli presented reinforce alternative concurrent responses as described by the *matching law*.

Some Undesirable Effects of Noncontingent Reinforcement

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Noncontingent reinforcement (NCR) has been an effective treatment for a wide range of problem behaviors. Nevertheless, NCR may produce some undesirable effects when attempting to suppress responding initially, maintain treatment gains, or strengthen alternative behaviors. Specific sources of difficulty and potential solutions are discussed.

DESCRIPTORS: Noncontingent reinforcement, extinction, differential reinforcement

Noncontingent Reinforcement and the Acquisition of Appropriate Behavior

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Noncontingent reinforcement (NCR) continues to be a successful treatment option to reduce severe problem behavior exhibited by individuals with developmental disabilities. The approach has been demonstrated effective across behavioral function and there is a growing body of literature suggesting NCR can be effective in combination with response-dependent reinforcement schedules. The literature on NCR in combination with response-dependent reinforcement schedules suggests that NCR does not necessarily reduce the effectiveness of contingent reinforcers when acquisition of appropriate behavior is a clinical goal, depending on the density of the NCR schedule component.

Unexamined Potential Effects of the Noncontingent Delivery of Reinforcers

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Noncontingent reinforcement (NCR) is a therapeutic arrangement in which the reinforcer hypothesized to maintain a problem behavior, or another preferred stimulus, is delivered on a response-independent, time-based schedule. Several investigations have determined that this form of intervention is effective in decreasing problem behavior maintained by both positive and negative reinforcement. However, it seems possible that this sort of intervention may have unknown side effects under certain arrangements. Some of these (e.g., the potential for adventitious reinforcement) have been documented, but others have not been directly examined. This paper discusses some of these less considered or unconsidered possible effects, some of which may be detrimental. Specific effects include the relation between contingency and stimulus value, behavioral and hedonic contrast, behavioral momentum and the discriminative functions of reinforcers. We further discuss the conditions under which these effects may or may not occur, and address their implications for future research on NCR.

Noncontingent Reinforcement: Behavioral Mechanisms Involved in Response Suppression and Treatment Efficacy

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Noncontingent reinforcement (NCR) has been found to be an effective treatment for a variety of undesirable behaviors maintained by various types of reinforcement (e.g., social positive, social negative, and automatic). Throughout the last decade, over 100 research articles have been published on the topic of NCR as a treatment for maladaptive behavior. Research has involved questions ranging from treatment comparisons and efficacy to parametric analyses. Specifically, much of the research has questioned the specific behavioral mechanisms involved in the reduction of undesirable behavior. In addition, more

recent studies have started to evaluate the efficacy of NCR with respect to both short- and long-term outcomes. This paper reviews these two prominent areas; highlighting particular research that is indicative of current views in the field of behavior analysis. In addition, suggestions for future research on NCR

Basic research, application, ethics, and recommendations regarding non-contingent reinforcement procedures

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The article highlights some findings in basic and applied research regarding the use of non-contingent reinforcement procedures. An emphasis is placed on the role of adventitious reinforcement of desirable or undesirable behaviors. Skinner argued that to best help people in need would be to provide functional behaviors so that people can later help themselves. Non-contingent reinforcement procedures may not help people develop such behaviors. A recommendation is made for implementation of multiple desirable target behaviors in application venues that use differential reinforcement methods to suppress undesirable behaviors.

The nonmaintenance of behavior by noncontingent reinforcement

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The discontinuation of reinforcement in extinction has two components: the contingency between the response and its reinforcer is terminated, and reinforcers are no longer delivered. The latter is responsible for some side-effects of extinction. Noncontingent reinforcement terminates the contingency while reinforcers continue to be delivered. Some implications of this difference are considered in the context of introducing a companion experimental article by Katz & Catania that explores extinction, noncontingent reinforcement and delayed reinforcement procedures with and without the concurrent reinforcement of an alternative response. The effects of noncontingent reinforcement are typically transient and the long-term effectiveness of noncontingent reinforcement in maintaining behavior is typically nil and if it ever does occur it is at best weak. Because reinforcer deliveries are not discontinued, noncontingent reinforcement may have advantages over extinction in many applications aimed at reducing behavior that has been maintained by contingent reinforcement.

Key words: noncontingent reinforcement, extinction, response-reinforcer contingency, side effects, adventitious reinforcement, superstition

Concurrent performances: Extinction, noncontingent reinforcement and variably delayed reinforcement

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Transitions from variable-interval (VI) reinforcement of a pigeon's pecks on one key to extinction, noncontingent reinforcement or variably delayed reinforcement of those pecks were arranged with and without concurrent reinforcement of pecks on a second key. Within sessions, the two keys were sometimes available singly and sometimes concurrently. Response rates during extinction and during noncontingent reinforcement decreased comparably. Similar rate decrements occurred early after initial exposure to variably delayed reinforcement; thereafter, delayed reinforcers maintained relatively higher rates of responding that produced little if any loss of scheduled reinforcers. Extinction, noncontingent reinforcement and delayed reinforcement typically maintained lower rates of responding when operating concurrently with VI reinforcement than when operating alone. Responding was maintained by the contingent relation between responses and reinforcers whether that contingency involved immediate or variably delayed reinforcers. Responding was not maintained when that contingency was broken whether reinforcers were completely discontinued or were delivered independently of responses (noncontingently). These results add to the data supporting a distinction between the effects of initiating or terminating response-reinforcer contingencies and those of initiating or terminating reinforcer deliveries. When responding appears to be maintained by noncontingent reinforcement, in so-called superstition or adventitious reinforcement, it is likely either that the maintenance will be transient or that other variables are operating, as when reinforcer deliveries have eliciting or adjunctive effects.

Key words: Noncontingent reinforcement (NCR), contingency, extinction, variable delay, VI, VT, concurrent responding, superstition, key pecks, pigeons
