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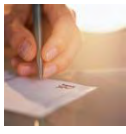


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SPECIAL ISSUE

Behavioral Momentum in the Treatment of Noncompliance

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Abstract:

Behavioral momentum refers to the tendency for behavior to persist following a change in environmental conditions. The greater the rate of reinforcement, the greater the behavioral momentum. The intervention for noncompliance consisted of issuing a sequence of commands with which the subject was very likely to comply (i.e., high-probability commands) immediately prior to issuing a low-probability command. In each of five experiments, the high-probability command sequence resulted in a "momentum" of compliant responding that persisted when a low-probability request was issued. Results showed the antecedent high-probability command sequence increased compliance and decreased compliance latency and task duration. "Momentum-like" effects were

shown to be distinct from experimenter attention and to depend on the contiguity between the high-probability command sequence and the low-probability command.

Introduction:

Noncompliance is one of the most commonly reported behavior problems in developmentally disabled populations (Schoen, 1983). In addition to its prevalence, treatment of noncompliance is important because of its covariation with other aberrant and adaptive behaviors. For example, several studies have demonstrated that increased compliance often results in collateral reductions in aggression, disruption, self-injury, and tantrums (e.g., Cataldo, Ward, Russo, Riordan, & Bennett, 1986; Parrish, Cataldo, Kolko, Neef, & Egel, 1986; Russo Cataldo, &

Cushing, 1981). Conversely, reduced noncompliance has been associated with increased appropriate behavior (Baer, Rowbury, & Baer, 1973). Thus, intervention to increase compliance appears to be an efficient means of improving a range of socially important behaviors.

A variation of noncompliance is slowness to respond to instructions or complete assigned tasks. Individuals who are excessively slow at completing tasks may receive less reinforcement (e.g., income from vocational tasks) and may incur punitive social responses from peers or staff. Considerable research has evaluated procedures for increasing compliance and, to some extent, for reducing excessive compliance latency and task duration. However, much of this research has been conducted with

Stereotypy I: A review of behavioral assessment and treatment

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Research in Developmental Disabilities
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Abstract

In this paper, we review definitional issues related to stereotypy, behavioral interpretations of stereotypy, procedures for determining operant function(s) of stereotypy, and behavioral interventions for stereotypy. In general, a preponderance of the assessment literature suggests that most forms of stereotypy are maintained by automatic reinforcement. Review of the treatment literature suggests that antecedent (e.g., environmental enrichment) and consequent (e.g., differential reinforcement of alternative behavior) interventions produce at least short-term reductions in stereotypy. Suggestions for further assessment and treatment of stereotypy are provided.

Introduction

Although the literature suggests that specific forms of stereotypy may be more common (e.g., body-rocking), there have been dozens if not hundreds of response forms called stereotypy. As a result, the question of what constitutes "stereotypy" has been subject to considerable debate and empirical evaluation. There is no clear answer. Based strictly on response form, Berkson (1967) identified two broad categories of stereotyped behavior; repetitive movements, such as body-rocking, and non-repetitive movements, such as limb or body posturing. Subsequent researchers have stipulated that stereotypy is non-functional and is not marked by a clear antecedent

stimulus (e.g., Lewis & Baumeister, 1982). Berkson (1983) later proposed a categorization of stereotypy according to the following criteria: (a) the behavior is voluntary (implying that the behavior is operant as opposed to respondent and ruling-out "tics"), (b) the behavior lacks variability, (c) the behavior persists over time (e.g., for at least several months), (d) the behavior is immutable when faced with environmental changes, and (e) the behavior is out of synchrony with the individual's expected age-related development.

Researchers have generally agreed that stereotyped behavior lacks variability; however, the results of a recent study suggests that body-rocking exhibited by individuals with

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children (Breiner & Beck, 1984; Fjellstedt & Sulzer-Azaroff, 1973; Forehand & McMahon, 1981). Procedures commonly used to increase compliance include time-out (e.g., Parrish et al., 1986) and guided compliance (e.g., Neef, Shafer, Egel, Cataldo, & Parrish, 1983). However, a potential liability of these procedures is that they often require physical contact with a client to achieve treatment integrity, which for large, uncooperative, or aggressive clients may be ill-advised. Alternatively, the effectiveness of differential reinforcement of compliant behavior depends on reinforcement for compliant responses being rich relative to reinforcement produced by noncompliant or dawdling behavior (cf. Ayllon, Garber, & Pisor, 1976; Cuvo, 1976; Holt, 1971). Unless a more powerful reinforcer or richer schedule can be applied to compliant behavior compared to the reinforcer and schedule maintaining noncompliance,

differential reinforcement may not have the desired effect and punishment-based alternatives may need to be considered (Myerson & Hale, 1984).

Alternative approaches to increasing compliance with developmentally disabled adults may be derived from consideration of advances in basic operant research (e.g., Deitz, 1978; Hayes, Rincover, & Solnick, 1980; Michael, 1980; Pierce & Epling, 1980). For example, Nevin has discussed the relationship between response strength and rate of reinforcement (see Nevin, 1974, 1979, for reviews). Behavior maintained at steady states by interval or ratio schedules of reinforcement has been shown to persist over time following a change in reinforcement conditions (de Villiers, 1977; Nevin, 1979; Zeiler, 1977). This resistance to change in the face of altered contingencies has been referred to as "response strength" (Herrnstein, 1970; Nevin, 1979). Response strength may be relatively low when



Did you know?

A queen bee lays 1500 eggs per day.



In the US, Americans eat about 18 acres of pizza day.



The human brain is 80% water.



response patterns change readily or relatively high when response rates are slow to change under modified conditions. In general, behavior controlled by a multiple schedule will be more resistant to change during the schedule component that has a comparatively higher rate of reinforcement. That is, a relatively higher rate of reinforcement will result in relatively greater resistance to change or greater response strength.

Nevin, Mandell, and Atak (1983) suggested a parallel between a behavior's resistance to change and the momentum of objects in motion as described by Newton's first law of motion. They argued that it may be worthwhile to consider behavior at possessing the property of momentum. Accordingly, behavioral momentum can be analyzed in terms analogous to the product of mass and velocity in classical physics (Nevin et al., 1983, p. 49). Behavioral mass was considered formally analogous to response strength and behavioral velocity as corresponding to response rate. Nevin et al. demonstrated that behavior controlled by a two component multiple schedule procedure was more resistant to change in the component with a relatively higher rate of reinforcement when reinforcement was provided noncontingently, or when all reinforcement was discontinued. Thus, factors that influence rate of reinforcement may be expected to affect a behavior's resistance to change.

Consideration of Nevin et al.'s (1983) work on behavioral momentum prompted us to develop a novel intervention for noncompliance and excessive compliance latency and task duration. This procedure, referred to as the high-probability command sequence, indirectly manipulates rate of reinforcement to establish what appears to be a "momentum" of compliant behavior that may persist when subjects are asked to perform a task with a low probability of compliance. Our objectives in the following series of experiments were (a) to evaluate the effectiveness of the high-probability command sequence in increasing compliance to "do" and "don't" commands (Neef et al., 1983) (Experiment 1), (b) to conduct preliminary investigations regarding the

appropriateness of the behavioral momentum analogy (Experiments 2 and 3), and (c) to evaluate the generality of the procedure to reduce excessive compliance latency and task duration (Experiments 4 and 5).

Experiment 1

Method

Subject and Setting

Bart, a 36-year-old man with severe mental retardation (IQ = 42), served as the subject in this experiment. Bart had resided in large, state-operated institutions for most of his life and had a long history of noncompliance and aggression. Bart's large physical stature (height 6'1", weight 200 lb) contributed to the severity of his noncompliance and aggression. In his first community placement, these behaviors eventually resulted in his recommitment to a private institution.

At the time of the present experiment, Bart had lived in a university-affiliated group home for approximately 18 months. The program was behavior-analytic in nature and was operated by university graduate students and faculty. Typical staffing patterns consisted of two graduate students working with six adults with moderate to severe mental retardation. After 6 months in this program, Bart became increasingly noncompliant and aggressive. A structured self-management program consisting of positive reinforcement for completion of house jobs and personal hygiene, without aggressive incidents, was effective only for periods of 2 to 3 months.

Sessions were conducted in the living room (5 m by 4 m), family room (3.5 m by 3 m), and kitchen (5 m by 4 m) of the home. An experimenter, one or two data collectors, and zero to two other clients were present during these sessions. Interactions between staff and other clients were minimal; client-client interactions were unrestricted. Because of the applied nature of the research, the subject was allowed free movement in these rooms to assess experimental effects under natural conditions.

Response Definitions, Measurement, and Interobserver Agreement

The principal dependent measure was the percentage of compliance to low-probability (low-p) "do" and "don't"

commands. In Experiment 1, low-p commands were instructions or requests issued by the experimenter to the subject with which, in the experimenter's experience, the subject was unlikely to comply. (In the remaining four experiments, the probability value of both low-p and high-p commands was empirically determined.) Examples of low-p "do" and "don't" commands are "Bart, please put your lunch box away" and "Bart, please don't leave your lunch box on the table." Commands called for performance of simple tasks that could be completed within 30 to 60 s (i.e., "do" commands) or discontinuation of an undesirable behavior or condition (i.e., "don't" commands). Command compliance was defined as the subject initiating the response called for by the command within 10 s of the stated command and eventually completing the requested response(s).

The independent variable in this experiment was a sequence of high-probability (high-p) commands that was issued prior to a low-p command. High-p commands were instructions or requests with which the subject had a history of complying. These commands were always stated as a "do" request and are exemplified by the following: "Give me five, Bart," "Come here and give me a hug," and "Show me your pipe (or wallet, notebook, etc.), Bart." The mean percentage compliance to high-p commands during the entire experiment was 98%.

Two trained observers recorded (a) experimenter commands or requests directed to the subject for low-p and high-p behaviors, (b) compliance to "do" and "don't" low-p commands, and (c) compliance to high-p commands. A count of all responses was made during continuous 10-s intervals. A percentage compliance measure was derived for each session by dividing the number of compliant responses (of a given class) by the number of experimenter requests for responses (of the same class) and multiplying by 100. Observers stood within 2 to 5 m of the experimenter and subject but did not speak or make eye contact with the subject.

The second observer independently collected interobserver agreement data from a position no closer than 2.5 m from the primary observer during an average of 66% of

the sessions across all phases and conditions of the experiment. For the first three experiments, total, occurrence, and nonoccurrence agreement were calculated on a point-by-point basis within all intervals per session (Page & Iwata, 1986). Table 1 presents the mean and range of interobserver agreement values for the dependent and independent variables for all experiments.

Procedures
Baseline.

During each baseline session, the experimenter stood or sat within 1 to 2 m of the subject. The primary data collector prompted the experimenter to issue a command to the subject on a fixed-time (FI) 1-min schedule. The experimenter made eye contact with the subject and issued a low-p command or request to Bart in a pleasant tone of voice. Low-p commands were selected at random from a pool of 20 low-p commands or, in the case of many low-p "don't" commands, were chosen on the basis of the subject's behavior (e.g., "Bart, don't put your feet on the coffee table"). If the subject satisfied the definition of command compliance, the experimenter provided immediate descriptive praise (e.g., "That's good Bart, thanks for putting your lunch box away"). Descriptive praise was used as a consequence for compliance for subjects in all five experiments because, in the experimenters' experience, praise appeared to be an effective reinforcer for these individuals. "Do" and "don't" command sessions differed only in the class of commands issued to the subject

(i.e., either all "do" or all "don't" low-p commands).

Psychotropic intervention-Haldol. On Day 7 of the experiment, Bart's psychiatrist prescribed 10 mg of Haldol b.i.d. to control his aggressive behavior. This represented a return-to-Haldol intervention, which Bart had experienced during the past 7 years, after a 6-week period of medication withdrawal. Baseline procedures remained in effect. Psychotropic intervention continued during all subsequent phases of the experiment.

High-probability command sequence. This condition was identical to the baseline procedures except that each low-p command was preceded by a sequence of high-probability (high-p) commands. The high-p command sequence consisted of the experimenter issuing a series of three or four high-p commands or requests to the subject immediately preceding presentation of the low-p command. High-p commands were issued at 10-s intervals (i.e., the interval between completion of a high-p task and the next high-p command).

Experimental Design

The experimental conditions described above were presented to the subject during two 15-min sessions daily that were separated by a 15- to 30-min free time period. Because "do" and "don't" commands have been shown to be members of different stimulus classes (Neef et al., 1983), sessions with either all "do" commands or all "don't" commands were alternated in a multielement design (Sidman, 1960). The order in which "do" and "don't"

command sessions were conducted was determined randomly each day. In addition, the independent variable was alternately applied and withdrawn during "do" and "don't" command sessions in the context of a reversal design (Sidman, 1960).

Results

Figure one represents Bart's percentage of compliance to low-p commands during "do" and "don't" command sessions across all phases of the experiment. During baseline, Bart's compliance to low-p requests during "do" sessions averaged 47% and during "don't" sessions 53.5%. With the addition of psychotropic medication, mean compliance to "do" commands was 68% versus 53.5% for "don't" commands.

During Phase 3, application of the high-p command sequence prior to each "don't" command resulted in an increase in mean compliance to 87.5%. Compliance to "do" commands, which remained under baseline conditions, averaged only 61%. In Phase 4, the pattern of compliance reversed with "do" command sessions increasing to a mean of 90.5% following application of the high-p command sequence. "Don't" command compliance returned to low levels during this period (M = 44%). In the fifth phase, compliance to "don't" commands returned to high levels when low-p commands were preceded by a series of compliant responses (M = 91%). Compliance to "do" commands, which were not preceded by the high-p command sequence, averaged only 56%. In the final experimental phase, use of the high-p command sequence resulted in high levels of compliance to both "do" and

Table 1
Interobserver Agreement: Mean and Range Percentages for Total Agreement (TA), Occurrence Agreement (OA), Nonoccurrence Agreement (NOA), and Agreement (A) within ± 1 s across the Dependent and Independent Variables of Experiments 1 through 5

	Experiment 1			Experiment 2	Experiment 2			Experiment 3			Experiment 4	Experiment 5	
	TA	OA	NOA	TA	OA	NOA	TA	OA	NOA	TA	A ± 1 s	TA	A ± 1 s
Dependent variables													
Compliance with "do" commands	99 (93-100)	99 (93-100)	94 (63-100)	99.5 (95-100)	96.7 (69-100)	99.6 (96-100)	99 (92-100)	98.7 (92-100)	97 (80-100)	—	—	—	—
Compliance with "don't" commands	97 (92-100)	79 (53-100)	96 (91-100)	—	—	—	99 (93-100)	97 (88-100)	97 (82-100)	—	—	—	—
Compliance with "do" commands (during attention control)	—	—	—	99.1 (97-100)	90.9 (71-100)	99.4 (97-100)	—	—	—	100	—	—	—
Latency to initiate task	—	—	—	—	—	—	—	—	—	100	—	—	—
Minutes to complete task	—	—	—	—	—	—	—	—	—	—	—	—	100
Independent variables													
Compliance with high-p commands	93 (83-98)	85 (71-94)	89 (77-97)	94.7 (75-100)	95 (77-100)	97.1 (86-100)	95 (90-100)	95 (88-100)	93 (79-100)	100	—	100	—
Occurrence of high-p	93 (83-98)	85 (71-94)	89 (77-97)	96.4 (87-100)	95.4 (82-100)	97.1 (92-100)	96 (91-100)	96 (92-100)	94 (87-100)	100	—	100	—
Occurrence of attention	—	—	—	98.4 (97-100)	94 (88-100)	98.6 (95-100)	—	—	—	100	—	—	—
Occurrence of 5-s IPT	—	—	—	—	—	—	99 (98-100)	96 (88-100)	99 (96-100)	—	—	—	—
Occurrence of 20-s IPT	—	—	—	—	—	—	99 (98-100)	95 (82-100)	99 (97-100)	—	—	—	—
Occurrence of prompts	—	—	—	—	—	—	—	—	—	—	—	100	—
Occurrence of contingency statement	—	—	—	—	—	—	—	—	—	—	—	100	—
Delivery of reinforcement	—	—	—	—	—	—	—	—	—	—	—	100	—

"don't" commands. Mean compliance ranged from 87% to 97% for "do" command sessions (M = 93%) and 85% to 97% for "don't" command sessions (M = 90%).

Discussion

This experiment demonstrated the effectiveness of preceding a low-probability command with a sequence of high-probability commands in the treatment of noncompliance. Establishing a pattern of compliant responding by the subject immediately prior to the issuance of a low-p request resulted in increases in the subject's compliance. Our objective in the second experiment was to assess the subject generality of the high-p procedure and to examine possible effects of positive attention alone on compliance.

Experiment 2

Method

Subject and Setting

The subject of the second experiment was Ned, a 44-year-old severely retarded (IQ = 21) male with Down Syndrome. Ned had lived in institutions for most of his life. When asked to perform a task, Ned typically shook his head "no" and looked away. Occasionally, he would throw items, curse, spit, hit others, or lie on the floor when such commands were issued.

The setting for the study was the same house as in Experiment 1. During the first four phases of the experiment, baseline and treatment high-p command sessions were conducted in the kitchen. Attention control sessions were held in

the subject's second floor bedroom (4 m by 3.5 m). Persons present and their interactions during the sessions were similar to those in the first study.

Response Definitions, Measurement, and Interobserver Agreement

Ned primarily did not comply with "do" requests. The procedure for identifying commands to which the subject had a low probability of complying consisted of the experimenter approaching Ned and asking him to perform each of 25 tasks on separate occasions. Ten separate trials were conducted for each of the 25 tasks; those commands that were complied with four or fewer times in 10 trials were designated as low-p commands. This procedure resulted in a pool of 15 low-p "do" commands that were used in the experiment. A similar procedure used with high-probability commands (i.e., at least 80% compliance) resulted in the following high-p command sequence: (a) "Ned, give me five," (b) "Give me a bump" (i.e., the experimenter and subject bumped hips in a dancing motion), and (c) "Ned, show me your radio."

The definition of command compliance and the data collection procedures for the primary and secondary observers were identical to those in Experiment 1 (see Table 1 for interobserver agreement values).

Procedures

Baseline. The actions of the experimenter and data collectors during this condition were virtually identical to

those described for the baseline condition for Experiment 1.

High-probability command sequence. The presentation of the high-p command sequence and the experimenter's response to compliance were identical to the procedures used during this condition in the first experiment.

Attention control. This condition was designed to provide experimenter attention prior to issuance of a low-p command without providing specific discriminative stimuli for behaviors presumably maintained by high rates of reinforcement. On an FT 1-min schedule, the experimenter sat or stood within 1 to 2 m of the subject and directed a sequence of three or four neutral or positive comments to the subject. Comments were randomly selected from a pool of 25 statements. The interval between comments ranged from 10 to 15 s. Examples of these comments included "Ned, that's a nice shirt you're wearing," "We're going bowling this afternoon," and "I'm going to visit my parents this weekend." Within 10 s of the last comment, the experimenter issued a randomly selected low-p command to the subject. Compliance to low-p commands resulted in descriptive praise on a continuous reinforcement (CRF) schedule.

Experimental Design

The experimental procedures were presented daily during two 15-min sessions separated by a 15- to 30-min free time period. An ongoing attention control condition was alternated with

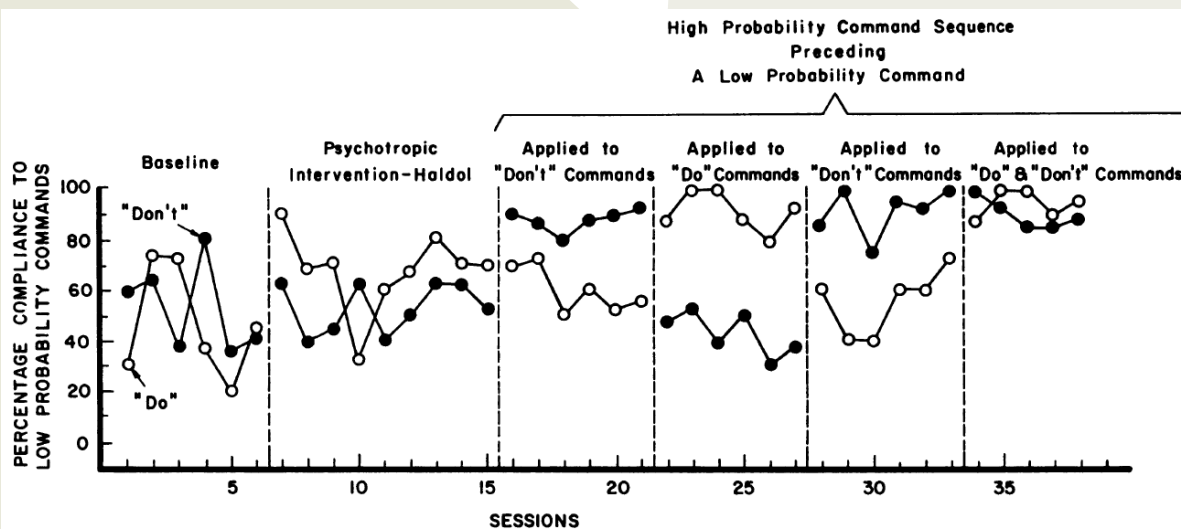


Figure 1. Bart's percentage compliance to low-probability "do" and "don't" commands under baseline and psychotropic intervention conditions, and alternate application and withdrawal of the high-probability command sequence.

either the baseline or the high-p command sequence condition in a multielement design. The order in which conditions were conducted was determined randomly each day. The effects of the high-p command sequence were evaluated with an A-B-A-B reversal design. In the final phase of the experiment, the settings in which the high-p command sequence condition and the attention control condition were conducted were reversed to control for possible effects of setting-specific commands.

Results

Figure 2 depicts Ned's compliance to low-p commands during all baseline, high-p command sequence, and attention control conditions. In the initial baseline phase, issuing low-p commands without a preceding high-p command sequence resulted in a mean compliance of 26%. When experimenter attention preceded each low-p command, compliant behavior was similar to baseline ($M = 35\%$). During Phase 2, application of the high-p command sequence effected an increase in mean compliant responses to 73%. Compliance during the attention control sessions remained essentially unchanged from the previous phase ($M = 38\%$).

A return to baseline condition in the third phase produced an immediate decrease in the subject's percentage compliance ($M = 39\%$). Comparable levels of compliance ($M = 43\%$) continued during the subsequent attention control condition. In the fourth phase, high levels of compliance occurred when the high-p command sequence was reinstated ($M = 84\%$). Average percentage compliance increased slightly during the ongoing attention control condition ($M = 51\%$). Finally, the setting reversal had little effect on the subject's pattern of compliance during the high-p command sequence ($M = 79\%$) and attention control conditions ($M = 47\%$).

Discussion

Results of the second experiment support the subject generality of the effects produced by the high-p command sequence inasmuch as the effects for Ned and Bart were similar. A second important finding was that experimenter attention was not itself

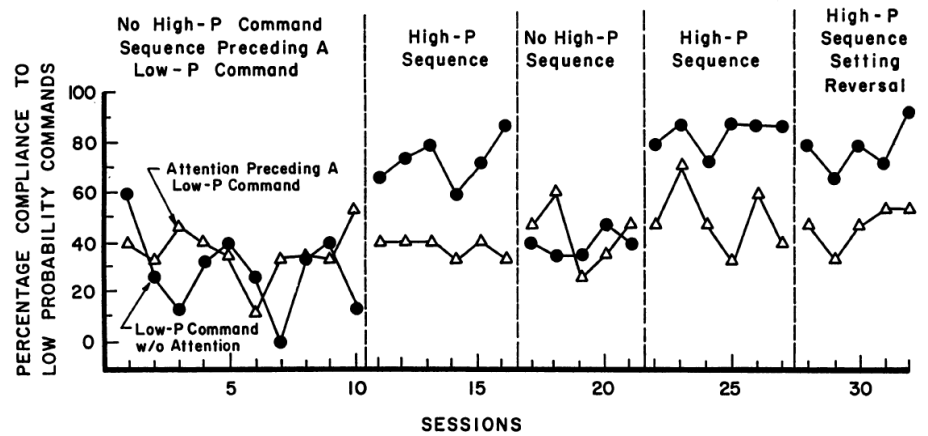


Figure 2. Ned's percentage compliance to low-probability commands during the attention control condition and alternate application and withdrawal of the high-probability command sequence. In the final experimental phase, the settings in which the attention control and high-p sequence were conducted were reversed.

sufficient to occasion compliance to low-p requests. That is, experimenter comments presented in the same manner as high-p commands failed to influence the probability of subject compliance. This finding suggests that presentation of discriminative stimuli for high-probability behaviors is critical to the momentum-like effects observed.

In the third experiment, we investigated another parameter of the high-p command procedure that may determine its effectiveness as an applied procedure and further examines the value of the behavioral momentum analogy. Nevin et al. (1983) found that resistance to change or behavioral momentum was directly related to rate of reinforcement. The higher the relative rate of reinforcement, the greater the resistance to change. Therefore, it may be logical to predict that momentum-like effects will decrease with an increase in the interval between the last high-p command in the sequence (or between any high-p commands in the sequence) and the statement of the low-p command. Increasing this interval presumably has the effect of decreasing rate of reinforcement which, in turn, should decrease behavioral momentum.

Experiment 3

Method

Subject and Setting

The subject and setting in which experimental sessions were conducted were identical to those described in Experiment 1. Bart continued to take 10 mg of Haldol b.i.d. for the duration of the study. This experiment was conducted 1 month after completion of the first study.

Response Definitions, Measurement, and Interobserver Agreement

As in Experiment 1, the principal dependent measure in the third experiment was the percentage compliance to low-p "do" and "don't" commands. The procedure described in Experiment 2 to identify low- and high-probability commands was used to define a pool of 15 low-p "do" commands, 10 low-p "don't" commands, and seven high-p "do" commands. Additional low-p "don't" commands were extemporaneously selected during "don't" command sessions corresponding to the subject's aberrant behavior.

Definitions and procedures used to measure command compliance for "do" and "don't" low-p commands and high-p commands were identical to Experiment 1. The independent variable manipulated in this study was interprompt time (IPT). IPT was defined as the time interval beginning with the cessation of the last high-p command in the high-p command sequence and ending with the onset of the low-p command. Independent observers measured this interval using a stopwatch. Time measurements within ± 2 s were considered in agreement. Interobserver agreement measures were taken for the dependent and independent variables on an average of 53% of the sessions during all phases and conditions of the study (see Table 1).

Procedures

High-probability command sequence-20-s IPT. All procedures in this condition were identical to those described for the high-p command sequence in Experiment 1 with one exception. After the last high-p

command in the high-p command sequence was issued, the experimenter paused 20 s without speaking to the subject, and then stated a randomly selected low-p "do" command or a low-p "don't" command that corresponded to the subject's inappropriate behavior. The primary data collector timed the IPT interval and nonvocally cued the experimenter to deliver the low-p command.

High-probability command sequence-5-s IPT. This condition consisted of the same procedures described for the high-p command sequence in the first study except that the 5-s IPT interval was timed by the primary data collector.

Experimental Design

The high-p command sequence preceded each low-p command in all sessions of the experiment.

"Do" command sessions and "don't" command sessions were alternated in a random order daily according to a multielement design. The effects of 5-s and 20-s IPTs were compared by alternately applying each IPT condition to "do" and "don't" command sessions across successive phases of the study in the context of a reversal design.

Results

Bart's compliance to low-p "do" and "don't" commands under 5-s and 20-s IPT conditions is presented in Figure 3. During Phase 1, application of the high-p command sequence with a 5-s IPT to "don't" commands resulted in consistently higher compliance ($M = 83\%$) than the high-p sequence with a 20-s IPT applied to "do" commands ($M = 53\%$). When IPT conditions were reversed in the second phase, mean compliance to "do" commands using a 5-s IPT increased to 89%, whereas compliance to "don't" requests dropped with the use of a 20-s IPT to an average of 27%. The reversal pattern continued during Phases 3 through 5. Mean percentage compliance with the 5-s IPT was 80%, 86%, and 78% for Phases 3, 4, and 5, respectively. By contrast, the high-p command sequence with a 20-s IPT resulted in low levels of compliance. Percentage compliance averaged 22%, 29%, and 37% during the third through fifth phases of the experiment, respectively. In the final phase,

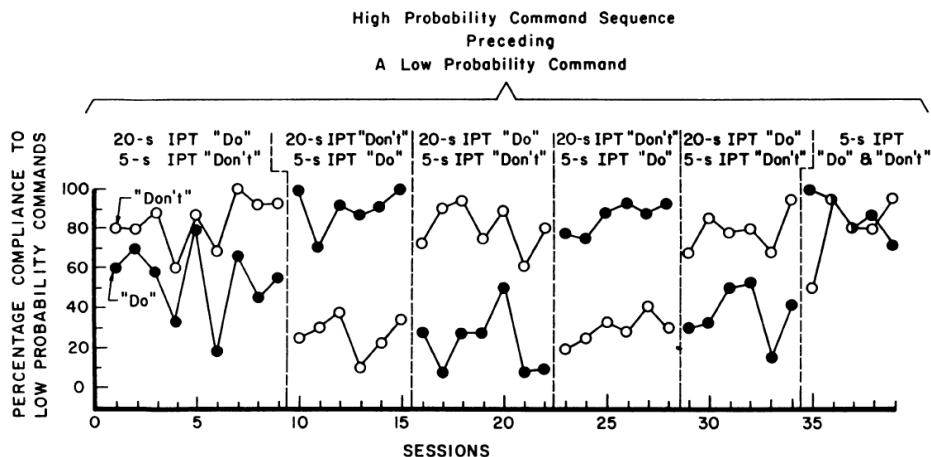


Figure 3. Bart's percentage compliance to low-probability "do" and "don't" commands during 5-s and 20-s IPT applications of the high-probability command sequence.

compliance averaged 91% for "do" commands and 78% for "don't" commands when the high-p procedure was used with the 5-s IPT for both stimulus classes.

Discussion

Two important findings may be gleaned from the third experiment. First, the momentum-like effects produced by the high-p command sequence appear to depend on the temporal contiguity between the high-p command sequence and the low-p command. The relatively longer IPT interval failed to elevate compliance levels above those achieved by this subject during the baseline phase of Experiment 1. Thus, on the basis of this subject's data, it appears that practitioners must ensure that low-p commands are issued immediately after the high-p sequence. Extensions of the IPT interval appear to negate the controlling effect that high-p commands have on compliant behavior. Second, these findings may have been due to differences in the rate of reinforcement between the 5-s and 20-s IPT condition. Issuing three high-p commands at 10-s intervals followed by a low-p command at an IPT of 20 s results in a reinforcement rate that is approximately half the rate using a 5-s IPT. Thus, the results of Experiment 3 are predicted by the behavioral momentum analogy, if rate of reinforcement is analogous to behavioral mass as Nevin et al. (1983) have argued.

The fourth and fifth experiments examined the application of the high-p command procedure to a problem related to noncompliance, excessive response latencies. These studies investigated whether the high-p

command procedure could reduce subjects' latency to respond to experimenter commands or requests to perform tasks.

Experiment 4

Method

Subjects and Setting

Two adult men with moderate mental retardation served as subjects. Tim was a 34-year-old male with Down Syndrome ($IQ = 53$) who lived with his parents until age 33. He performed most self-care skills and household tasks independently. However, the speed with which he responded to Staff requests was extremely slow. During the period following staff instructions, Tim would typically engage in various forms of stereotypy or stare into space and move very slowly toward initiation of the task.

The second subject, Mitch, was 45 years old ($IQ = 47$) and had lived most of his life in state operated institutions. He had grand mal seizures that were controlled by 500 mg of Tegretol and 250 mg of Mysoline per day. His psychiatrist also prescribed 100 mg of Mellaril per day to control his "psychotic" behavior, which consisted of talking to himself or talking out of context. Mitch was skilled at most self-care and household tasks; however, he was sometimes very slow to respond to staff requests or spent excessive periods of time performing tasks such as showering, making his bed, or preparing his lunch. When off-task, Mitch would typically stare into space or talk to himself. Both subjects lived in the community group home described in Experiment 1. All sessions were conducted in the kitchen.

Response Definitions, Measurement, and Interobserver Agreement

The dependent measure for both subjects was compliance latency defined as the interval beginning with the completion of an experimenter's instruction and ending with initiation of the specified task. Task initiation for Tim was defined as lifting his plate or glass from the dining table. For Mitch, task initiation entailed performing one of the following depending on the task selected: (a) lifting the kitchen trash container, (b) lifting a broom, or (c) touching the mirror-cleaning materials. Compliance latency was measured in seconds by the experimenter using a stopwatch. A trained independent observer collected interobserver agreement measures for the dependent and independent variables on an average of 52% and 40% of the sessions across conditions of the study for Tim and Mitch, respectively. All interobserver latency measures agreed to within ± 1 s (see Table 1).

Measures of the integrity of the independent variables were obtained for all sessions. Event records were collected for the following variables during their respective experimental sessions: (a) occurrence of high-p commands, (b) compliance with high-p commands, and (c) occurrence of attention statements. The integrity measures indicated that the experimenter issued high-p or attention statements according to the procedures on 100% of the compliance trials. Compliance to high-p commands was 100% for both subjects. Interobserver agreement calculated on a trial-by-trial basis was 100% for all independent variables (see Table 1) (Page & Ivata, 1986).

Procedures

Baseline: No high-probability command sequence. For Tim this condition was conducted immediately after he finished eating his breakfast, lunch, or dinner. Tim was seated along one side of an oblong dining table and the experimenter was seated across from him. Within 5 s of the subject placing his napkin on his plate indicating the end of the meal, the experimenter made eye contact with Tim and issued the following instruction: "Tim, please clear your place at the table." The

experimenter remained seated and directed no other comments to Tim until he complied with the task request (i.e., rinsed his plate and glass and placed them in the dishwasher). Descriptive praise was provided immediately after Tim performed the task.

During baseline for Mitch, the experimenter took Mitch into the kitchen where all task materials were located and issued one of the following five randomly selected task commands: (a) "Mitch, please empty the trash," (b) "... sweep the downstairs (or upstairs) bathroom floor," or (c) "... clean the downstairs (or upstairs) bathroom mirror." Procedures for descriptive praise were identical to those described for Tim.

High-probability command sequence. Procedures in this condition were identical to baseline, except preceding the statement of each task request, the experimenter delivered the following sequence of high-p commands in a manner identical to that described in Experiments 1 through 3: "Tim (or Mitch), shake my hand," "Tim (or Mitch), give me five," and "Tim (or Mitch), give me a hug." Within 10 s of the subject's compliance to the last high-p command in the sequence, the experimenter issued the task request described for each subject during baseline.

The probability value of each high-p command was determined empirically prior to the experiment. Ten separate trials for each of the high-p requests were conducted for both subjects. Trials were separated by at least 15 min. Both subjects complied with all high-p requests 100% of the time during this preliminary assessment.

Attention control. Procedures in this condition were the same as those described in Experiment 2.

Experimental Design

Experimental conditions were presented in the context of a multielement design. During the first 9 days of Tim's study, the baseline, high-p command sequence, and attention control conditions were administered one per day in a random order across days without balancing the number of times each condition was conducted. On Days 10 through 27 these conditions were administered in a

random and balanced order.

Six sessions were conducted for Mitch each day, with two of each of the three types of tasks represented (i.e., empty trash, sweep floor, clean mirror). Each day of the experiment a baseline and high-p command sequence condition were conducted for each of three task pairs. The order in which these six sessions were conducted was determined randomly on a daily basis.

Results

Figure 4 represents the subjects' latency to initiate each task following a staff instruction during the different experimental conditions. During the baseline or no high-p command sequence condition, Tim's compliance latency varied greatly from 12 s to 848 s ($M = 156$ s). Experimenter comments prior to the task command during the attention control condition produced results similar to baseline. Mean compliance latency was 117 s with a range of 16 s to 416 s. By contrast, Tim consistently responded quickly to experimenter instructions that were preceded by the high-p command sequence. His average latency to compliance was 17 s, with a narrow range of 11 to 25 s. Similar results were obtained for Mitch. Without the preceding high-p command sequence, compliance latency was quite variable and often lengthy. During baseline, the average latency to compliance across all three task types was 151 s (range, 5 s to 377 s). Use of the high-p command sequence sharply reduced the subject's latency to comply. Mean compliance latency with the high-p procedure was 10 s across all task types. Momentum-like effects were also usually consistent across the three types of tasks used in the experiment. With the high-p command sequence, average latencies to initiate emptying trash, sweeping floors, and cleaning mirrors were 5 s, 17 s, and 8 s, respectively. Without the high-p procedure, compliance latencies averaged 98 s, 160 s, and 194 s for the three tasks, respectively.

The fifth experiment extended the application of the high-p command sequence to reduce the time a subject spent performing an entire task. When applied to reduce task duration, the high-p command procedure was presented when off-task behavior or

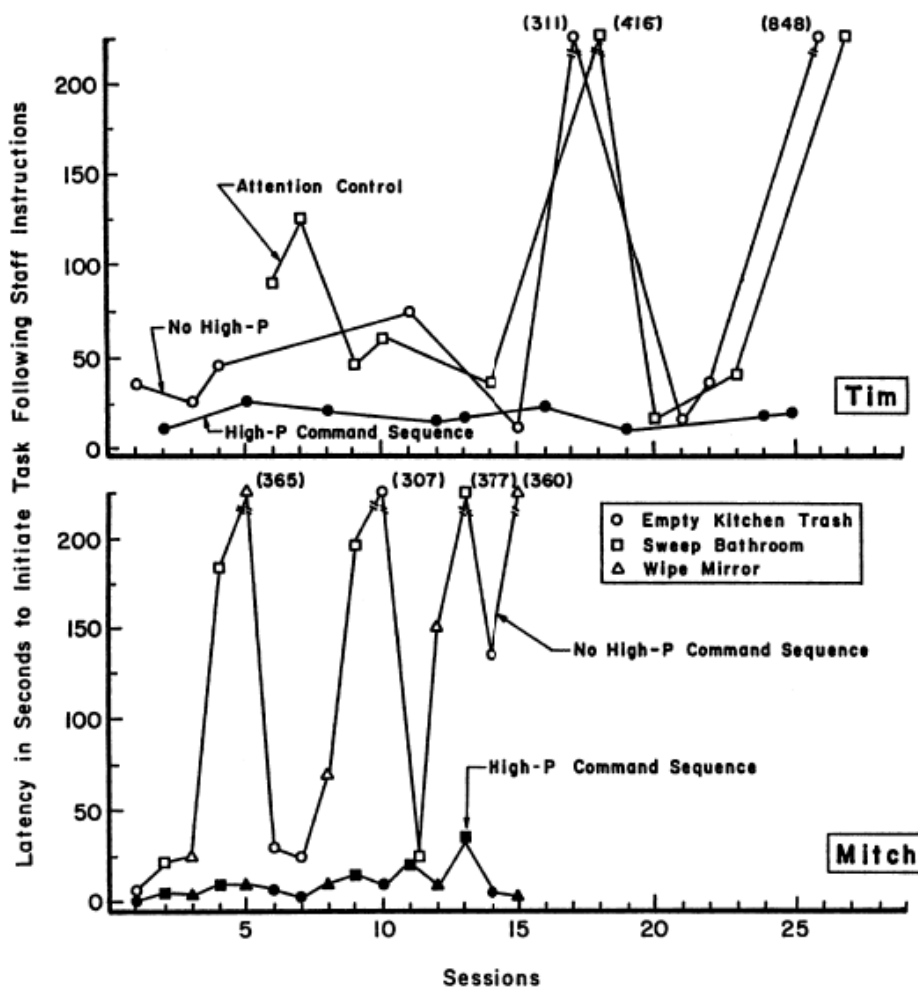


Figure 4. Latency in seconds to initiate task following staff instruction during baseline (no high-p) and high-p command sequence condition (Tim and Mitch), and attention control condition (Tim). Different data symbols represent different tasks for Mitch.

dawdling occurred in the course of performing the task. Because the high-p command sequence requires continual supervision of the task and is more complex to administer than simple prompts to resume task-related behavior, the applied value of the high-p procedure for reducing excessive task duration depends on it being highly effective. For this reason, the fifth study compared the effectiveness of the high-p command sequence with simple prompts and a contingency management procedure.

Experiment 5

Method

Subject and Setting

Mitch (of Experiment 4) served as the subject in this study. The target behavior of interest was the excessive amount of time Mitch spent taking a shower.

The study was conducted in the group home's second floor bathroom (2.5 m by 3.5 m) and Mitch's bedroom (5 m by 5 m). The bathroom was

equipped with a tub, shower head, and plastic shower curtain, and was located 6 m down the hallway from Mitch's bedroom. In general, only the experimenter and secondary observer were present during experimental sessions.

Response Definitions, Measurement, and Interobserver Agreement

Showering sessions were divided into three task segments which Mitch, on average, spent comparable amounts of time performing. The dependent measure was the time elapsed to complete each of the three task segments. Task Segment 1 was shower preparation and was defined as the period beginning with the experimenter's instruction "Mitch, it's time to take your shower" and ending with the subject entering the bathroom wearing his bathrobe and slippers and carrying a towel and washcloth. During this segment the subject undressed in his room, put his clothes away, dressed in his bathrobe and slippers, and obtained

a towel and wash cloth from his drawer. The second task segment was showering, which began with the end of Task Segment 1 and ended when the subject turned off the shower water. During this period, Mitch undressed, washed most body parts, and shampooed his hair. Task Segment 3 began with the end of Task Segment 2 and ended when the subject was dressed in his pajamas and slippers. This task had become very routine for Mitch, and no steps were omitted during any session of the experiment.

Task segment durations were measured by the experimenter using a stopwatch. During baseline, the experimenter assumed a position in the hallway that would permit observation of Mitch's bedroom and the bathroom. During intervention phases, timing took place in the room in which the subject was located. Interobserver agreement measures for the dependent and independent variables were collected in no less than 29% of the sessions across all conditions and phases of the study. All interobserver duration measures were within ± 1 s (see Table 1).

Event recording was used to measure the integrity of the independent variables during all sessions. The following variables were measured during the conditions in which they occurred: (a) occurrence of vocal prompts, (b) occurrence of contingency statement, (c) occurrence of high-p commands, (d) compliance with high-p commands, and (e) delivery of contingent reinforcement. The integrity measures indicated that (a), (b), (c), and (e) were administered the number of times described in the procedure section on 100% of the sessions. Percentage compliance to high-p commands (d) was 96% for Mitch. Interobserver agreement computed on a trial-by-trial basis was 100% for all independent variables (see Table 1).

Procedures

Baseline. Sessions were begun at approximately 8:00 p.m. each evening. The experimenter approached Mitch, made eye contact, and provided the instruction to take a shower. No other instructions or contingencies were announced. The experimenter followed the subject upstairs and continued timing task duration from the hallway

position. When Task Segment 3 was completed and the subject exited his bedroom, the experimenter said "Mitch, I'm glad to see you finished your shower."

Contingency management.

Procedures in this condition were identical to baseline with the following exceptions. The experimenter (and secondary observer) stood approximately 1 to 3 m from the subject. Contingent on the first occurrence of off-task behavior the experimenter showed Mitch two cupcakes, two quarters, and one of his favorite books and said "Mitch, if you finish (last step in the task segment) by the time the buzzer sounds you can have your choice when you're done with your shower." "Off-task" was defined as 15 continuous seconds of any behavior that was unrelated to completion of the task. Examples included (a) repetitive motor movements such as removing or replacing his watch, wallet, comb, etc., (b) rearranging items on his dresser, (c) talking to himself or out of context without working on the task, and (d) staring into space. After stating the contingency, the experimenter set a kitchen timer for 16 min, positioned the timer within Mitch's view, and left the room. The 16-min criterion was 2 min lower than the subject's lowest baseline data point. When the timer sounded, the experimenter entered the room, told the subject whether or not the reinforcer had been earned, and praised successful task completion. On 85% of the sessions, the experimenter stated the contingency within 60 s of the onset of

the task segment and between 60 s and 120 s during the remaining sessions.

Prompts. These procedures paralleled baseline except that the experimenter stood within 1 to 3 m of the subject and provided a combination vocal and gestural prompt to resume the task contingent on each occurrence of off-task behavior. The prompt was repeated every 15 s until the subject resumed on-task behavior. Descriptive praise was delivered for compliance with the prompts. An average of 4.7 prompts per session were required to sustain Mitch's involvement in the task (range, 1 to 13).

High-p command sequence. The procedures in this condition were the same as the prompt condition except that the high-p command sequence was applied instead of a prompt, contingent on each instance of off-task behavior. The high-p commands, timing of high-p commands, and descriptive praise were identical to Experiment 4. Durations of each high-p command sequence were included in the measures of task duration. The mean number of high-p command sequences administered per session was 1.8 and 1.5 during Phases 2 and 4, respectively.

Experimental Design

Experimental conditions were administered in the context of a four-phase multielement design. Baseline conditions were in effect during all task segments for the first and third phases of the experiment. Phase 2 randomly assigned the contingency management, vocal prompts, and the high-p

command sequence conditions to Task Segments 1 through 3 for each day of the experiment. In the fourth phase, the high-p command sequence was applied during all three task segments per session.

Results

Durations for each of the three task segments during all experimental conditions are presented in Figure 5. In the first baseline phase, durations were similar although quite variable across the three task segments. The average time spent performing Task Segment 1 was 35 min. Mean durations for the second and third task segments were 31.8 min and 33.9 min, respectively.

All three interventions resulted in faster performance of task segments compared to baseline. The most effective procedure was the high-p command sequence, which reduced task durations to a mean duration of 10.3 min per task segment (range, 4.3 min to 15.2 min). Prompts were the next most effective, reducing task duration to approximately one half of baseline. With prompts, task segment durations averaged 16.7 min. Least effective of the three interventions was the contingency management procedure. Reinforcement of short task durations resulted in an average of 18.4 min per task segment. Mitch met the criteria for reinforcement on 57% of the sessions during this condition.

The return to baseline condition in the third phase of the study again resulted in longer task durations. However, unlike the first baseline phase,

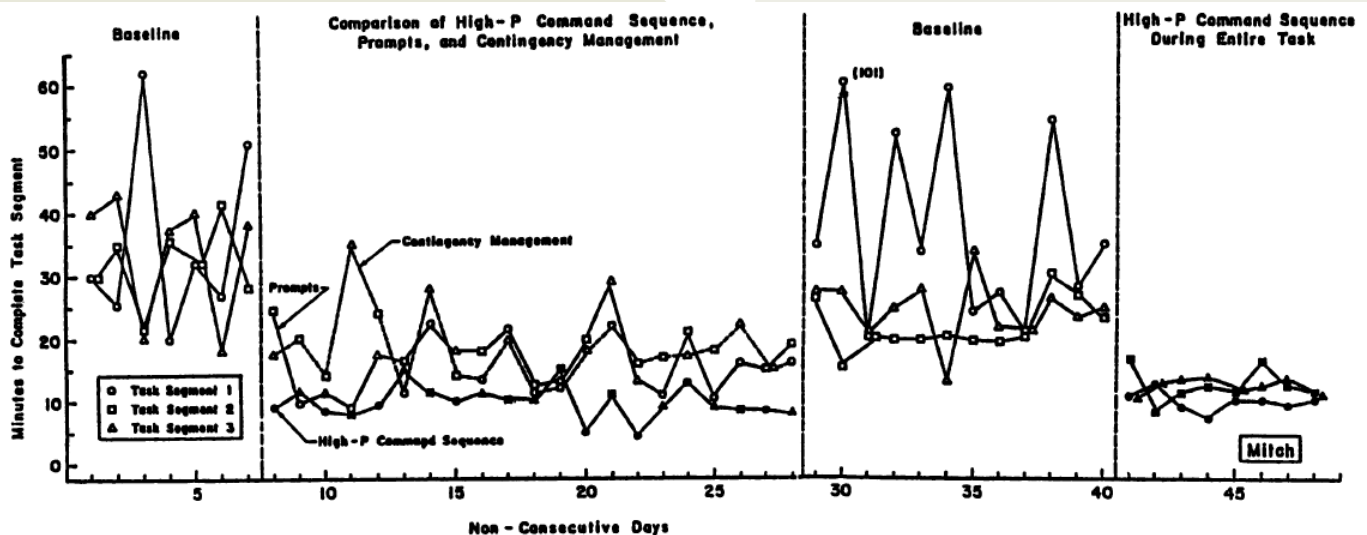


Figure 5. Minutes to complete each of three showering task segments during baseline, alternating treatments, and application of the most effective treatment during the entire task. Different data symbols correspond to different task segments.

Mitch spent considerably more time performing Task Segment 1 than Segments 2 and 3. Average duration for the first task segment was 40.7 min compared to 21.6 min and 28.7 min to complete Task Segments 2 and 3, respectively. Although performance in the second baseline was differentiated on the basis of task segment, the overall time required to complete the three task segments was similar for both baseline phases. Mean overall task duration was 100.7 min for Baseline 1 and 91 min for Baseline 2.

In the final phase of the study, the most effective intervention was applied during all task segments. Administration of the high-p command sequence during the entire task resulted in uniformly short task segment durations. The mean durations for Task Segments 1 through 3 were 9.7 min, 12.2 min, and 12.1 min, respectively. This resulted in an overall task duration mean of 33.9 min, which again was approximately one third of the baseline level.

General Discussion

Concepts and findings from the basic behavior analysis literature stimulated the development of an innovative intervention for adult noncompliance. A nonhuman model of behavioral momentum (Nevin et al., 1983) was useful to predict how persons with severe developmental disabilities would respond to low-probability commands under different antecedent conditions. Presentation of a sequence of high-probability commands immediately prior to issuance of a task request increased the probability of compliance for some subjects and reduced compliance latency and task duration for other subjects. The precision of our analogy with Nevin's behavioral momentum, as well as the fit between behavioral and physical momentum, may at some point prove to be less than perfect. However, there may be applied and theoretical value in viewing behavioral momentum as a distinct phenomenon.

The applied value of the analogy lies in its inspiration of innovative intervention procedures. The high-probability command sequence used in the present research seemed to establish a series of responses with high behavioral mass. Commands that have a high probability of occasioning compliant responses are,

we assume, discriminative stimuli for behavior that has produced reinforcement in the past. Although the exact reinforcers and their schedules were not analyzed in this research, the subjects quickly and reliably responded to the high-p requests and, anecdotally, seemed to enjoy doing so. Thus, it appears that by manipulating the type of command issued it is possible to reliably evoke behavior that effects reinforcement and, accordingly, establish a pattern of responding that has a relatively high behavioral mass. Interpreted from a behavioral momentum framework, increased compliance to low-p commands following the high-p sequence may illustrate resistance to change in the face of altered environmental conditions (i.e., when a low-p command is presented).

The results of Experiments 2, 3, and 4 offer some preliminary support for the appropriateness of the behavioral momentum analogy. First, Experiment 3 illustrated that when reinforcement rate was reduced by increasing the interval between the high-p sequence and low-p command, compliance to low-p commands decreased. This effect is predicted by the behavioral momentum analogy because decreases in reinforcement rate should produce corresponding decreases in resistance to change or behavioral momentum. Second, in the attention control conditions of Experiments 2 and 4, pleasant, neutral statements delivered to subjects on the same schedule as the high-p commands failed to alter compliance to low-p requests. This suggests the important role of the high-p command, which presumably serves as a discriminative stimulus for behavior maintained by high rates of reinforcement. We should emphasize, however, that these analyses are preliminary. Further research should directly manipulate reinforcement rates and intervals between high-p commands and compare reinforcement associated with neutral statements versus high-p commands.

Several dimensions of the present experiments differed from the basic work of Nevin et al. (1983). First, Nevin et al. directly manipulated subjects' access and rate of reinforcement. By contrast, we manipulated discriminative stimuli assumed to be correlated with reinforcement (i.e., high-p commands).

Thus, without direct manipulation of reinforcement rates we must be cautious in our conclusion that the high-p procedure produced a relatively high behavioral mass. Second, if we can assume that reinforcement rates were manipulated indirectly with the high-p commands, the reinforcement schedule for compliance to high-p commands approximated a CRF schedule. This differed from Nevin et al.'s work in which resistance to change was examined under different, and highly intermittent, variable-interval (VI) schedules of reinforcement. Finally, Nevin et al. used a two-component, multiple-schedule procedure in which each component (i.e., reinforcement schedule) was correlated with a different discriminative stimulus (i.e., a red or green response key). Subjects' rate of responding was controlled by the discriminative stimuli only via their associated reinforcement schedule. In the present experiments, the rate of compliant responding was controlled directly by the number of high-p and low-p commands issued.

Given the differences between Nevin et al.'s (1983) basic research and the present attempt to apply these concepts in the high-p command procedure, alternative explanations for the results of the present research merit discussion. One plausible account may be stimulus generalization, which refers to the spread of the effects of reinforcement to stimulus conditions that have not been associated with reinforcement (Catania, 1984). Thus, stimulus generalization indicates a lack of stimulus control. When the subjects in the present experiments complied with low-p commands following the high-p command sequence, it could be said that compliance to high-p commands generalized to low-p commands and that the stimulus control of high-p commands was weak. However, as Nevin (1974) noted, stimulus generalization appears to be an instance of resistance to change rather than an alternative to it. During extinction, resistance to change is greatest at the training stimulus and decreases as the test stimulus departs from the training stimulus (Nevin, 1974, p. 406). Thus, the antecedent presentation of high-p commands may weaken the distinction between high- and low probability commands, thereby increasing resistance to change and inducing stimulus

generalization.

Our results also bear some resemblance to the effects reported in the generalized imitation literature. Several studies have shown that, following imitation training, subjects made imitative responses to unreinforced models (e.g., Baer & Sherman, 1964; Brigham & Sherman, 1968). Further, the probability of imitation to unreinforced models increased when unreinforced models were interspersed among models that were reinforced (Peterson, 1968) and decreased when discrimination between reinforced and unreinforced models was facilitated (Burgess, Burgess, & Esveldt, 1970). It may be possible to view the present findings in this context. The dose temporal contiguity (5 s) between the high-p commands and the low-p command (i.e., interspersal) may have facilitated compliance to low-p commands whose historical association was presumably with relatively weak reinforcement. In Experiment 3, extending the IPT interval to 20 s may have induced discrimination between high-p and low-p commands, resulting in lower percentages of compliance to low-p commands. These speculations could be tested by randomly interjecting a low-p command in the high-p sequence and introducing stimuli antecedent to the low-p command that may enhance its discrimination (e.g., verbal statements or different experimenters correlated with different command types).

Future investigations of the high-p command sequence and/or applications of behavioral momentum could improve on some aspects of the methodology used in these experiments. First, all sessions were conducted by an experimenter who was aware of the experimental hypotheses. Where possible, staff who are uninformed of the experimental hypotheses should conduct sessions to avoid possible expectation effects and to assess the practical value of the procedures for applied settings. Second, as a novel intervention, the acceptability of the high-p command procedure should be assessed by those who use it and observe its use. The topography of high-p requests may need to be altered to be consistent with the subject's age and functioning level to gain widespread acceptance of the procedure. Finally,

general conclusions regarding the comparative efficacy of the high-p procedure and the contingency management intervention (Experiment 5) should be made with caution. The degree of effectiveness of the contingency management procedure may have been influenced by the level at which the criterion was set. Perhaps a lower criterion would have resulted in shorter task durations and represented an optimally effective representation of contingency management (Van Houten, 1987).

Finally, we hope that the present findings will stimulate additional research on the use of high-p command sequences as well as investigations of behavioral momentum in applied settings. Conceivably, modifications could be made to the high-p command procedure that would make it applicable to a range of target behaviors and populations. In addition to studies with an applied focus, more research is needed to establish the appropriateness of the behavioral momentum analogy. Specifically, more experiments are needed that directly manipulate variables affecting behavioral mass and examine their relationship to the degree of persistent responding in applied settings. Enthusiasm for the applied value of the behavioral momentum analogy must await the outcome of these studies. However, at the very least, we must credit the heuristic value of Nevin et al.'s (1983) basic research in stimulating the development of an innovative treatment for noncompliance.

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DD is actually more variant on an episode-to-episode basis than is the body-rocking of matched individuals with typical development (Newell, Incedon, Bodfish, & Sprague, 1999). Thus, the degree of variability may differ across response forms. Some researchers also contend that stereotypy contains an element of rhythmicity or "periodicity" (e.g., Lewis & Baumeister, 1982; Ross, Yu, & Kropla, 1998), though this characteristic too has recently been challenged. According to Ross et al., periodicity, as opposed to rhythmicity, connotes that behavior occurs at fixed points or intervals in time and is therefore indicative of temporal regularity. Based on a refined criterion, demonstrations of periodicity appear to be limited to a single topography of stereotypy, body-rocking (Ross et al.). Still other researchers suggest that time allocation to repetitive behavior should be considered for classification (e.g., Sackett, 1978; Tierney, McGuire, & Walton, 1978). This proposal is based on the notion that stereotypy is problematic because it absorbs too much of an individual's time.

The conflicting views and findings provide a rather equivocal picture of what constitutes "stereotypy." Even where there is general agreement, empirical evidence is lacking. For example, researchers generally agree that stereotypy lacks a clear social function. Nevertheless, no systematic method for ruling-out social functions has been utilized in studies of prevalence. In addition, there is some consensus that repetition and invariance are necessary dimensions; however, there is some ambiguity about how many bouts of behavior, the duration of each bout (occurrence), and how similar successive responses must be to constitute "invariance." To some extent, time allocation (on a daily basis) to repetitive behavior and immutability appear to be important dimensions, but

neither has been quantified. Furthermore, some researchers have extended the use of the term "stereotypy" to behavior that appears to be invariant, but that lack dimensions of repetition (e.g., hand mouthing).

As it pertains to invariance, the context in which repetitive behavior is exhibited and the salience of the behavior are contributing factors in determining whether behavior should be deemed problematic. Researchers have noted that forms of stereotypy are displayed both by individuals with DD and individuals with typical development (e.g., Schwartz, Gallagher, & Berkson, 1986; Smith & Van Houten, 1996; Woods & Miltenberger, 1996). However, individuals with DD often display stereotypy across a variety of stimulus contexts, in conjunction with multiple repetitive response forms, and in a manner that is highly salient to others in the environment (Berkson & Andriacchi, 2000; Berkson, Rafaeli-Mor, & Tarnovsky, 1999; Smith & Van Houten, 1996). The apparent insensitivity of some behavior to potentially competing social variables seems to be an important feature for distinguishing between response forms that are merely repetitive in nature and those that are "stereotypy."

Although behavioral researchers have made little if any reference to the etiology of repetitive behavior, other researchers have implicated neurobiological mechanisms as the originating and maintaining source(s) of stereotyped behavior. Hypotheses concerning neurobiological systems that influence stereotypy and pharmacological interventions for stereotypy will be discussed in a later review (Rapp & Vollmer, in press). The emphasis of the present review will be on operant interpretations of and behavioral interventions for stereotypy. It is hoped that an emphasis on functional properties of behavior may circumvent many of the problems that have been

encountered historically in pinpointing what is meant by "stereotypy" and in subsequently developing interventions. For example, it may be the case that two forms of stereotypy may serve similar operant functions. Alternatively, one form of stereotypy may serve different functions within and across individuals.

1. Interpretations and explanations

From a behavioral perspective, stereotypy is operant behavior that is maintained or reinforced by consequences that follow the behavior. Operant interpretations of stereotypy are at least in part derived from data obtained from functional analysis methodologies (e.g., Iwata, Dorsey, Slifer, Bauman, & Richman, 1982/1994). Procedures that are used to evaluate the operant function of stereotypy involve systematic manipulations of both environmental antecedents (e.g., presence of a task) and consequences (e.g., attention from a parent). In short, functional analyses examine the extent to which stereotypy can be maintained by: (a) social positive reinforcement (e.g., attention, edibles); (b) social negative reinforcement (e.g., escape from a task); (c) automatic positive (e.g., sensory stimulation) or negative reinforcement (e.g., removal of an unpleasant physical stimulus); or (d) some combination of social and non-social reinforcement (e.g., social positive and automatic reinforcement).

For the remainder of this review, we have adopted the descriptors of movement invariance and movement repetition to categorize behavior of humans, which generally persists in the absence of social consequences, as stereotyped or stereotypic. However, the potential role of social variables in the maintenance of stereotypy will also be considered. Likewise, studies involving "nervous habits" (e.g., hair pulling) were included as long as the behavior in question conformed to the descriptors of movement invariance,

movement repetition, and persistence in the absence of social reinforcement. Operant research on automatic reinforcement and social reinforcement is reviewed in the ensuing sections. In addition, mechanisms indirectly related to reinforcement, such as schedule induction, are discussed. Given the breadth of the literature, we critically reviewed representative studies that were published subsequent to the review by LaGrow and Repp (1984) and included the terms “stereotypy,” “stereotypic behavior,” or “stereotyped behavior.”

1.1. Automatic reinforcement

When behavior produces its own sources of reinforcement, independent of social mediation, the behavior is said to be “automatically reinforced” (e.g., Lovaas, Newsom, & Hickman, 1987; Vaughn & Michael, 1982; Vollmer, 1994). For example, a child with autism might look at his hand while engaged in hand-flapping because the repetitive movement of his fingers produces visual stimulation. In this example, hand-flapping is described as automatically reinforced because the reinforcing consequence (i.e., visual stimulation) is produced directly by stereotypy and is not dependent on social mediation.

1.1.1. Automatic positive reinforcement

There are at least five sources of evidence to support the notion that stereotypy is maintained by automatic positive reinforcement. Any one of the sources, in isolation, is probably not sufficient to draw conclusions about reinforcement. Collectively, however, these sources of evidence provide strong support for this hypothesis. The automatic positive reinforcement hypothesis is supported by studies showing that (a) stereotypy persists in the absence of social consequences, (b) environmental enrichment is correlated with reductions in stereotypy (competing or substitutable sources of automatic reinforcement), (c) attenuation the putative sensory product(s) of stereotypy reduces stereotypy, (d) contingent access to stereotypy functions as reinforcement for other behavior, and (e) restricting access to or providing prior access to stereotypy results in subsequent increases or decreases in stereotypy (i.e., stereotypy is sensitive to establishing operations).

The implications of these procedures as treatment will be discussed later. For now it is important to note that, collectively, results from these studies provide five sources of evidence suggesting that many forms of stereotypy are maintained by automatic positive reinforcement.

A first step in evaluating automatic reinforcement in the maintenance of stereotypy is to demonstrate the persistence of the referent behavior in the absence of social consequences (i.e., during an alone condition of a functional analysis), across a variety of stimulus contexts (i.e., stereotypy persists when other reinforcement is available [control condition of a functional analysis]), or both. Although the persistence of behavior in the absence of social consequences can be evaluated via the alone condition of the functional analysis (e.g., Iwata et al., 1982/1994), this method does not necessarily permit researchers to directly manipulate and assess the putative (possibly interoceptive) reinforcement generated by stereotypy (because the reinforcer may be inextricably linked to the behavior itself). As such, stimulation generated by stereotypy cannot be provided on a response independent basis (as is done with attention during the control condition of the functional analysis) or contingent on another behavior (e.g., raising a hand). Nonetheless, numerous studies have demonstrated the persistence of stereotyped behavior in the absence of social consequences (e.g., Piazza, Adelinis, Hanley, Goh, & Delia, 2000; Rapp, Miltenberger, Galensky, Ellingson, & Long, 1999; Vollmer, Marcus, & LeBlanc, 1994).

Environmental enrichment involves provisions of alternative sources of reinforcement. Treatment of stereotypy with environmental enrichment can be arbitrarily divided into two approaches; general and matched. In an example of general enrichment, Vollmer et al. (1994) used several items, mostly toys, which were empirically identified as preferred (via stimulus preference assessment), to decrease stereotypy. When the preferred items were made available, levels of stereotypy decreased markedly. However, no attempt was made to match the type of stimulation produced by stereotypy. By contrast, Piazza et al. (2000) decreased stereotypy by

providing individuals with access to alternative items that generated stimulation that was similar (i.e., “matched”) to the putative products of the referent behavior (e.g., shaving cream was provided to an individual who manipulated his own saliva). Piazza et al. showed that alternative sources of automatic reinforcement (i.e., sensory products of object manipulation) competed with or substituted for the sensory products of repetitive behavior. That is, when the alternative sources of stimulation were available, the individual chose to interact with the items rather than engage in repetitive behavior.

Sensory extinction involves the disruption of the contingency between the stereotyped response and the putative sensory products (Rincover, 1978; Rincover et al., 1979). In a series of studies, Rapp and colleagues extended the literature on sensory extinction to repetitive behavior typically categorized as “nervous habits.” Rapp et al. (1999) first showed that the hair pulling and hair manipulation displayed by an individual with DD were maintained by automatic positive reinforcement (in the form of tactile stimulation). Rapp et al. then demonstrated that both response forms decreased when the individual wore a rubber glove, which presumably attenuated the sensory products of both responses. In a subsequent investigation, Rapp, Dozier, Carr, Patel, and Enloe (2000) showed that a young boy’s hair manipulation decreased when he wore a glove. Prior to response cessation, within-session patterns of hair manipulation showed possible “response bursts,” which are consistent with patterns that may be observed when behavior is placed on extinction (see Ferster & Skinner, 1957). Other studies have used “sensory extinction” procedures to attenuate the sensory consequence(s) of repetitive self-injurious behavior such as head hitting (Iwata, Pace, Cowdery, & Miltenberger, 1994) and body picking (Roscoe, Iwata, & Goh, 1998). As a whole, studies that used sensory extinction demonstrate that stereotypy is eliminated, at least temporarily, when the putative stimulus product is blocked or otherwise attenuated; this outcome indirectly supports the position that some stereotyped response forms are directly reinforced by the stimulation generated

from the repetitive behavior.

Although studies involving environmental enrichment and sensory extinction lend support to an operant explanation, these studies are limited insofar as they do not directly show that the stimulus products of stereotypy function as reinforcement. A fourth approach illustrated by two studies may address this issue. Haag and Anderson (2004) differentially punished stereotypy in the presence (or absence) of an external stimulus and permitted stereotypy (no social consequences were provided) in the presence of a different external stimulus (e.g., wristbands). Thereafter, participants were taught to request the stimulus that was correlated with access to stereotypy. Thus, stereotypy was used to reinforce appropriate requests (for access to stereotypy). Using a slightly different approach, Hanley et al. (2000) used a component analysis, which controlled for the effects of response restriction, to show how contingent access to stereotypy could be used to reinforce alternative behavior. Specifically, Hanley et al. showed that the contingency between the alternative behavior and access to stereotypy, rather than response reallocation due to restriction of stereotypy, increased the alternative behavior. Thus, both studies showed that contingent access to stereotypy functioned as reinforcement for other behavior.

The relative reinforcing efficacy of stereotypy can be further evaluated from the perspective of the response deprivation hypothesis. The response deprivation hypothesis predicts that restricting any behavior below free operant levels (for extended periods of time) will increase the efficacy of the behavioral event as reinforcement (Timberlake & Allison, 1974). If stereotypy produces automatic positive reinforcement in the form of sensory stimulation, withholding access to stereotypy (i.e., restricting it below baseline levels) should create relative deprivation from the sensory product, thereby increasing the future reinforcing value of stimulation generated by stereotypy. Results from at least four studies show that restricting access to stereotypy subsequently increased time allocation to the restricted response (Forehand & Baumeister, 1971, 1973;

Rapp, Vollmer, Dozier, St. Peter, & Cotnoir, 2004; Rollings & Baumeister, 1981). In addition, results from a recent study show that prior access to stereotypy decreased subsequent exhibition of stereotypy (i.e., prior access may have served as an abolishing operation: Rapp, 2004). Note that the results obtain by Rapp for automatically reinforced behavior were consistent those obtained with socially reinforced behavior (McComas, Thompson, & Johnson, 2003; Vollmer & Iwata, 1991; Zhou, Iwata, & Shore, 2002). Collectively, the results of these studies are consistent with the response deprivation hypothesis insofar as withholding access to stereotypy increased the relative reinforcing value of stereotypy (as indicated by increased response allocation) and providing prior access decreased the reinforcing value (as indicated by decreased response allocation). To generate additional support, researchers should evaluate satiation for sensory (automatic) reinforcers by permitting extended access to stereotypy and, thereafter, observing the point in time when the individual displays different behavior (i.e., switch points).

To summarize, an operant explanation involving automatic positive reinforcement is empirically supported by studies showing that (a) stereotypy persists in an alone condition of a functional analysis, (b) access to manipulable objects is correlated with a reduction in stereotypy (competing or substitutable sources of automatic reinforcement), (c) sensory extinction reduces stereotypy, (d) contingent access to stereotypy functions as reinforcement for other behavior, and (e) restricting access to or providing prior access to stereotypy results in subsequent increases or decreases, respectively, in the referent behavior.

1.1.2. Automatic negative reinforcement

Some researchers and clinicians contend that repetitive behavior exhibited by individuals in the absence of social consequences may at times attenuate or otherwise reduce an aversive interoceptive stimulus. For example, an individual may display repetitive ear-hitting to reduce pain from an ear infection (see Cataldo & Harris, 1982). Although researchers have been

challenged to design studies to adequately evaluate this phenomenon, some preliminary data may lend a degree of empirical support to an automatic negative reinforcement account.

Tang, Kennedy, Koppekin, and Caruso (2002) found that an individual's stereotypic ear covering was most probable when noise was present. Tang et al. concluded that ear covering produced automatic negative reinforcement in the form of attenuation of or escape from ambient noise. However, the results of the analysis may be limited because the assessment condition actually involved social escape (i.e., noise was terminated by a therapist contingent on ear covering) rather than a non-social consequence (e.g., attenuation produced by ear covering only). To provide support for an automatic negative reinforcement explanation, it would have been necessary to show (in some combination) that (a) ear covering did not occur when noise was absent, (b) ear covering persisted at high levels when continuous noise was present (i.e., socially mediated escape is not provided), and (c) communicative requests for alternative sound-attenuating stimuli (e.g., ear plugs) occurred only in the presence of noise.

In summary, although automatic negative reinforcement has been used to account for some self-injurious behavior, no studies to date have unequivocally demonstrated the maintenance of stereotypy by automatic negative reinforcement. Further research is needed to support this position.

1.2. Social reinforcement

Although social reinforcement is very nearly an exclusionary characteristic in defining stereotypy, there is some limited evidence that response forms commonly called "stereotypy" can enter into social reinforcement contingencies.

1.2.1. Social positive reinforcement

Kennedy, Meyer, Knowles, and Shukla (2000) found via functional analysis that the stereotypic behavior of two individuals diagnosed with autism was maintained by multiple sources of reinforcement (for one participant, stereotypy was reinforced by social positive, social negative, and automatic

reinforcement). A specific intervention involving functional communication training (FCT) was evaluated for each putative function using a multiple baseline (across contexts) design. Results indicated that a distinct FCT response was acquired (to address each function) and was exhibited only in the pertinent stimulus context (e.g., the FCT response for attention was exhibited only when attention was low). Nonetheless, two potential methodological problems make it difficult to conclude that stereotypy was socially reinforced. First, visual inspection of the data paths within the multiple baseline design indicates that simultaneous stability in any two data paths was not achieved. Thus, the assumption of functional independence (of the responses) across contexts, which is necessary to demonstrate functional control of the intervention, was not clearly established. Second, as specific FCT responses were trained for each function, one might have expected participants to exhibit the “wrong” FCT response in a given context. For example, hand-raising, which was trained to produce attention in the attention condition, may also be evoked in the “no attention” condition, where the trained request was for toys (attention was low in both conditions). To control for this confound, it would have been necessary to report occurrences of FCT responses in untargeted contexts (see Roane, Lerman, Kelley, & Van Camp, 1999). Based on these limitations, it is possible that stereotypy was automatically reinforced and that social reinforcement (e.g., attention) competed with reinforcement generated by stereotypy.

Thus, although it seems reasonable to conclude that some stereotypy enters into contingencies of social positive reinforcement, the evidence to date is limited. Perhaps the strongest case for a social positive reinforcement hypothesis is that other forms of aberrant behavior, such as self-injurious and aggressive behavior, are commonly reinforced by social consequences. However, it is possible that the difference in level of intensity between self-injurious or aggressive behavior and stereotypy make it less likely that stereotypy will produce a social consequence. That is, people may not feel that it is necessary to attend to stereotypy.

1.2.2. Social negative reinforcement

In a representative study from this category, Durand and Carr (1987) conducted a multiphase evaluation of stereotyped behavior displayed by four individuals with DD. Results of the first phase indicated that higher levels of stereotypy were correlated with increased task difficulty. In the next phase, the authors found that stereotypy increased when a 10 s break from the task was imposed contingent on stereotypy. This increase suggested that stereotypy was sensitive to escape from demands as reinforcement; however, at least two methodological problems prevent a clear interpretation of the results from this study. First, the extent to which the behavior persisted in the absence of social consequences is unknown because stereotyped behavior was never evaluated in the absence of a task. Second, because a 10 s partial-interval recording method (a common method of data collection) was employed, only the occurrence or non-occurrence of stereotypy was scored during 10 s escape periods (during the demand context). Thus, the extent to which stereotypy abated when demands were withdrawn could not be determined. In summary, a consistent limitation of studies reporting the maintenance of stereotypy by social variables is the failure to demonstrate that the removal of the motivational event (e.g., the escape period of the demand condition) or the absence of social reinforcement (i.e., an alone context) decreases stereotypy.

Nonetheless, as with the social positive reinforcement hypothesis, there is ample evidence that other forms of aberrant behavior are maintained by social negative reinforcement (Iwata, 1987). As such, social negative reinforcement remains a possibility to be explored in future research.

1.3. Schedule induction

Behavior that increases during inter-reinforcement intervals of intermittent or response independent reinforcement schedules is said to be schedule induced. Response independent schedules (often referred to as non-contingent reinforcement) involve the delivery of a known reinforcer based on the passage of time rather than the occurrence of a specified behavior.

Several studies have shown that intermittent reinforcement schedules (e.g., variable interval [VI] and response-independent schedules (i.e., fixed or variable time schedules) with consumable reinforcers increase untargeted behavior in non-humans (Staddon, 1977). For example, Falk (1966) found increased water consumption in rats when lever pressing was reinforced with food on VI schedules. Likewise, Roper (1978) found increased chewing, grooming, running, and drinking in rats when lever pressing was reinforced with food on fixed interval (FI) schedules. Only a handful of studies have evaluated this phenomenon in humans with DD (Emerson & Howard, 1992; Emerson, Thompson, Robertson, & Henderson, 1996; Lerman, Iwata, Zarcone, & Ringdahl, 1994; Wiesler, Hanson, Chamerlain, & Thompson, 1988).

Emerson and Howard (1992) evaluated the stereotypy of eight individuals using massed reinforcement and extinction (no reinforcement for task completion) conditions and compared these results to those obtained using various intermittent reinforcement schedules (e.g., FI 45 s). Emerson and Howard concluded that each participant exhibited schedule-induced stereotypy. In a subsequent investigation, Emerson et al. (1996) evaluated schedule-induced stereotypy in three individuals with DD using FI 30 s and FI 60 s schedules of reinforcement for completion of designated tasks. According to Emerson et al., the stereotypy of two individuals occurred with the greatest frequency during intermittent reinforcement conditions (for the instrumental task completion response). Lerman et al. (1994) also found increased levels of stereotypy during time-based schedules; however, no specific response form increased during the conditions.

Unfortunately, several potential methodological and design limitations in the Emerson and Howard (1992) and Emerson et al. (1996) studies preclude an unambiguous interpretation of intermittent reinforcement and response-independent schedule effects on stereotypy. First, there appeared to be no specific criterion for changing phases in either study. Phases were generally brief (e.g., 2–5 sessions) and many schedule changes occurred during increasing or decreasing trends

(potential transition states). Second, the putative differences in stereotypy were often 2–5% between massed reinforcement/extinction and intermittent reinforcement conditions (see Emerson & Howard, 1992). It is unlikely that behavior of this duration would warrant classification as “repetitive” or “stereotypic.” Third, the authors did not conduct alone or no-interaction conditions to demonstrate the occurrence or non-occurrence of stereotyped responses in the absence of other schedules of reinforcement.

Despite potential methodological limitations in the Emerson and Howard (1992) and

Emerson et al. (1996) studies, stereotypy as a form of schedule-induced behavior represents an intriguing line of inquiry that could prove useful with a number of procedural modifications. Interpretation of data presented by Emerson and Howard (1992) could have been aided with a design that contained within-subject replications (e.g., ABAB reversal). This design should include relevant control conditions from which to evaluate induction under one or two, as opposed to numerous, intermittent schedules (see Roper, 1981). Of central importance, an alone or no-interaction condition is necessary to demonstrate the persistence (or lack thereof) of the behavior in the absence of social variables and to determine whether the level of behavior (i.e., duration of time allocation) is high enough to warrant classification as “stereotypy.”

The possibility remains that some stereotypy may be induced or enhanced by intermittent schedules of reinforcement. What is unclear is whether stereotypy exhibited under such stimulus conditions is indeed operant. Conceptual and empirical analysis of “induced” stereotypy might require a unique methodology. Aside from its inherent relevance as a complex behavioral phenomenon, the further study of schedule-induced stereotypy is especially pertinent in cases when alternative (intended to be competing) sources of stimulation (particularly edibles) are presented on intermittent schedules.

1.4. Summary and conclusions: operant interpretations

A preponderance of the literature

strongly supports an automatic positive reinforcement account of stereotypy (e.g., Lovass et al., 1987). Substantially fewer studies provide support for automatic negative reinforcement, social positive reinforcement, or social negative reinforcement as explanations for stereotypy; fewer still provide clear support that stereotypy may be schedule-induced. The goal of the present review was not to argue against the possibility of diverse operant functions, but rather to suggest the development of methods to directly identify various sources of reinforcement for stereotypy.

2. Behavioral interventions

2.1. Antecedent manipulations

A broad range of behavioral studies involving antecedent manipulations have involved attempts to treat stereotypy using continuous access to varied sources of antecedent stimulation (e.g., Cuvo, May, & Post, 2001; Kern, Koegel, & Dunlap, 1984; Piazza et al., 2000; Vollmer et al., 1994). In general, antecedent interventions involve altering the environment before the individual displays the problem behavior. The alteration sets the occasion for the individual to engage in a different, non-problematic behavior.

Kern et al. (1984) evaluated stereotypy during periods that followed one of two parameters of physical exercise (vigorous [jogging] and mild [playing ball]). The results showed that stereotyped behavior was reduced during periods that followed vigorous exercise when compared to baseline (i.e., vigorous exercise served as an abolishing operation for stereotypy), but was unchanged during periods that followed mild physical exertion. However, some potential limitations of this study should be noted. First, each intervention was implemented only three times and data for two of the three participants showed increasing trends in stereotypy across the vigorous exercise condition (the effects of the intervention were diminishing). Second, data showing change or no change in other behavior following the intervention were not provided to rule-out fatigue as an alternative explanation for changes in stereotypy.

Studies involving environmental enrichment as treatment for stereotypy

have provided stimuli that are intended to indirectly reduce stereotypy with competing sources of reinforcement. This topic was discussed earlier in review of evidence for an operant interpretation of stereotypy. Research on the use of environmental enrichment to treat stereotypy raises several issues regarding the extent to which: (a) stimuli selected for environmental enrichment were empirically derived; (b) stimuli identified as preferred were selected from a sufficiently broad class of sensory modalities (e.g., visual, tactile, auditory); (c) stereotypy decreased and appropriate behavior increased due to the mere availability of alternative stimuli (i.e., reinforcer competition); (d) prompts to engage with alternative stimuli or restriction of stereotypy was or were required to facilitate appropriate behavior; and (e) whether additional reinforcement was required to increase alternative behavior. Some studies have shown that the simple availability (i.e., no prompts are needed) of alternative sources of stimulation increased object manipulation and decreased stereotypy (e.g., Piazza et al., 2000; Vollmer et al., 1994). Other investigations have reported the need for therapist-guided prompts to facilitate interaction with items (e.g., Britton, Carr, Landaburu, & Romick, 2002; Singh & Millichamp, 1987). Still other studies have shown that environmental enrichment alone does not increase alternative behavior unless access to stereotypy is restricted (e.g., Hanley et al., 2000; Lindberg, Iwata, & Kahng, 1999). The effects of environmental enrichment alone, and in conjunction with other antecedent approaches (e.g., prompts), are reviewed in this section.

Vollmer et al. (1994) evaluated the effects of environmental enrichment (containing either preferred or non-preferred stimuli) on the stereotypic SIB and hand mouthing of three individuals. In general, results showed that stereotypic behavior was always lower in conditions containing preferred stimuli. Nonetheless, these results are potentially limited because observation sessions were only 10 min in duration; it is possible that stereotypy may have returned to previous levels during more extended observations. In addition, for two participants, social reinforcement was needed to further increase toy play

(i.e., stimulation produced by object manipulation did not consistently or completely compete with stereotypy without social reinforcement).

Other studies involving environmental enrichment have empirically identified and then provided specific sources of stimulation that are intended to compete with stimulation derived from automatically reinforced behavior. Piazza et al. (2000) evaluated the repetitive behavior of three individuals during several antecedent conditions wherein stimuli that were “matched” or “unmatched” to the putative sensory products of each participant’s behavior were presented. Even though some unmatched stimuli were more preferred, the results showed that the matched stimuli produced the greatest reductions in repetitive behavior. Despite the uniqueness and clinical effectiveness of this approach, some limitations should be noted. First, multiple stimuli were typically used during the matched condition. Thus, the extent to which a single item produced stimulation that was substitutable for the product(s) of repetitive behavior is unknown. Second, given the uniqueness of the response forms treated in this study, results may have only limited generality to other, more typical, stereotyped behavior (e.g., body-rocking, hand-flapping).

Lindberg et al. (1999) found that response blocking was required to decrease “stereotypic” SIB and increase object manipulation for one participant, while application of arm restraints (i.e., restriction of stereotypic behavior) was needed to facilitate these same changes for another participant. However, as indicated by the authors, it is not known whether “matched” stimuli would have reduced stereotypy without blocking.

In contrast to the stimulation provided during enrichment with matched objects, “Snoezelen” rooms involve a broad range of highly accessible stimulation (auditory, visual, and tactile) with which participants are encouraged to interact (for a review, see Hogg, Cavet, Lambe, & Smeddle, 2001). A study by Cuvo et al. (2001), represents one of the most comprehensive and systematic approaches to evaluating Snoezelen as a treatment for stereotypy. Cuvo et al. concluded that Snoezelen intervention increased stimulus engagement and

decreased stereotypy for each of three participants. However, results also showed that the participants’ stereotypy was actually lower during an outdoor activity (e.g., walking) than during the Snoezelen intervention. Cuvo et al. suggested that walking might have been physically incompatible with some forms of stereotypy (e.g., body-rocking, body-swaying).

Despite substantial methodological and conceptual improvements offered in the Cuvo et al. (2001) study, some potential limitations preclude a definitive interpretation of the results. First, persistence of the participants’ behavior in the absence of social consequences was not experimentally demonstrated. Second, participants received verbal and physical prompts to engage with stimuli during both the Snoezelen intervention and the outdoor activity conditions, but comparable prompts were not provided during baseline sessions. Prior studies have shown that prompting alone can increase object engagement in individuals who display stereotypy (e.g., Britton et al., 2002; Singh & Millichamp, 1987). Third, a control condition or extended baseline was not used to evaluate changes in each participant’s stereotypy during different times of day without programmed intervention.

As a whole, environmental enrichment appears to be a promising antecedent approach to the treatment of stereotypy, yet the relative contributions of specific components (e.g., prompting) warrant further examination. Future research on the effects of environmental enrichment could focus on: (a) transfer of stimulus control of object manipulation from therapist prompts to the relevant stimulus; (b) systematic identification of stimuli (“matched” or “unmatched”) that function as reinforcers when stereotypy is and is not available; (c) determining the extent to which stimulus preference should be periodically re-assessed to avoid stimulus satiation or habituation; and (d) contingencies of additional reinforcement (e.g., contingent praise) for object manipulation in the event that stimulation produced from the object itself does not support alternative behavior.

2.2. Consequent manipulations

2.2.1. Sensory extinction

In addition to supporting the position that stereotypy generates its own reinforcement (as discussed earlier), sensory extinction has been used as a direct intervention for stereotypy. As treatment, sensory extinction involves the blocking or attenuation of putative response products of stereotypy to the extent that the behavior is ultimately eliminated. In a series of studies, Rapp and colleagues applied sensory extinction to the evaluation and treatment of stereotypic hair pulling and hair manipulation (Rapp, Dozier, et al., 2000; Rapp, Miltenberger, Galensky, Ellingson, & Long, 1999; Rapp, Miltenberger, et al., 2000). Following a functional analysis that ruled-out social reinforcement, Rapp et al. (1999) showed that stereotypic hair pulling and hair manipulation decreased when the participant wore a rubber glove on her hand. This outcome suggested that both stereotypic responses were maintained by automatic reinforcement in the form of tactile stimulation.

Based on the assessment from the Rapp et al. (1999) study, Rapp, Miltenberger, et al. (2000) evaluated treatment (for the same participant) involving a golf glove (to attenuate tactile stimulation). The results showed that the approach was ineffective for producing long-term stereotypy reductions. Ultimately, a multi-component procedure involving contingent restraint for hair pulling and differential reinforcement in the form of parental attention (for the absence of stereotypy) eliminated the stereotypic behavior. In a subsequent study, Rapp, Dozier, et al. (2000) evaluated the stereotypic hair manipulation of a boy with autism and showed that this behavior was reduced when he wore a glove and had simultaneous access to alternative objects. Thus, the results from Rapp, Dozier, et al. (2000) and Rapp, Miltenberger, et al. (2000) are limited in that application of sensory extinction procedures in isolation did not permanently reduce stereotypic behavior. This problem may be related to the use of brief sessions (e.g., 5–10 min in duration: Rapp, Dozier, et al., 2000) during the initial assessments wherein it was possible that the glove did not actually attenuate the product of stereotypy but only disrupted responding temporarily (the glove may have evoked behavior that was

incompatible with hair pulling; e.g., see Holz & Azrin, 1963). This might explain why it was necessary to provide competing sources of reinforcement (e.g., tangible objects, attention) in order to produce long-term reductions in stereotypy.

In summary, despite the apparent utility of sensory extinction as an approach to isolate and alter the response-reinforcer contingency of stereotypy, current research does not support its use as an independent treatment for stereotypy for individuals with DD (but see Ellingson et al., 2000, for treatment of thumb sucking in typically developing children). In addition, it may be both cumbersome and socially undesirable to for individuals to wear “equipment” (such as gloves) throughout the day. Nonetheless, sensory extinction may represent an initial step in a multifaceted approach to the analysis and treatment of stereotypy. Further research is needed to determine whether matching alternative stimuli to response products identified with sensory extinction techniques will increase alternative response repertoires (e.g., manipulation of toys or other objects).

2.2.2. Displacement of reinforcement

In a seemingly paradoxical approach to reducing problem behavior, a few studies have evaluated the effects of providing contingent “external” reinforcement for stereotypy (Foxx & McMorrow, 1983; Neisworth, Hunt, Gallop, & Madle, 1985; Schmid, 1986). Researchers speculated that stereotypy was maintained on intermittent schedules of automatic reinforcement and the addition of continuous reinforcement might bring stereotypy under control of the CRF schedule using a different type of reinforcer, thereby making stereotypy more sensitive to extinction when the new reinforcer is withheld. Neisworth et al. (1985) evaluated the effects of providing CRF (with edibles) for stereotypic hand movements that were exhibited by two individuals. Following CRF, stereotypic behavior was placed on extinction (i.e., edibles were no longer provided for hand movements). Results for one participant showed that stereotypy gradually decreased during extinction and these reductions were maintained

for several months. For the other participant, extinction produced an immediate reduction in stereotypy, but the behavior ultimately returned to baseline levels. For four participants, Schmid (1986) showed that stereotypy increased during CRF and then decreased below initial baseline levels during extinction. Results for the other two participants indicated that stereotypy returned to baseline levels during extinction. Foxx and McMorrow (1983) found that this intervention produced only temporary decreases in stereotypy for two individuals.

Results from the Neisworth et al. (1985) and Schmid (1986) studies are intriguing because stereotypy decreased when arbitrary reinforcement was added and then subsequently removed from the response-reinforcer contingency. Conceptually, it is possible that stereotypy became an instrumental response for edible reinforcement and withholding edibles produced extinction. In light of the behavior change produced with this approach, some limitations should be noted. First, functional analyses of the participants’ behavior were not conducted in either study to rule-out social sources of reinforcement. Second, baseline reversals were generally brief and may have been of insufficient duration to evaluate the long-term changes in stereotypy. Third, the authors’ conclusion that stereotypy reductions were produced by a shift from intermittent reinforcement to CRF prior to extinction is conceptually tenuous. It is possible that CRF increased the reinforcing value of stereotypy (sensory stimulation plus an edible item) and subsequently withholding additional reinforcement devalued the response product of stereotypy (sensory stimulation without an edible item). It is also possible that CRF edibles may have produced satiation for the products of stereotypy due to extended exposure to the stimulation generated by stereotypy (see Klatt & Morris, 2001). As a result, the stimulation generated by high-rate stereotypy may have become aversive. This possibility could have been evaluated with lengthier extinction sessions and phases (see Foxx & McMorrow, 1983). Future research involving reinforcement displacement could evaluate these possibilities.

2.2.3. Differential reinforcement

Differentiated consequences in the form of differential reinforcement of other behavior (DRO), differential reinforcement of alternative behavior (DRA), and differential reinforcement of low rate behavior (DRL) have been used to treat stereotypy. The general logic of these approaches is that stereotypy can be reduced if other behavior can be reinforced and increased to occupy the time previously consumed by stereotypy. In a study involving DRO and DRA, Wacker et al. (1990) first conducted a brief functional analysis of stereotypic body-rocking, which showed that body-rocking persisted in the absence of social reinforcement. Using access to a rocking chair or an exercise bike as reinforcers (identified by stimulus preference assessments), Wacker et al. evaluated the suppressive effects of FCT and DRO on stereotypy. During treatment with FCT, which is a form of DRA, appropriate requests produced access to preferred stimuli. With DRO, the preferred stimuli were provided contingent on the absence of stereotypy for a pre-determined interval. The results showed that both procedures decreased stereotypy; however, reductions obtained with FCT were more pronounced than with DRO. However, because DRO was evaluated following a condition involving FCT with prompts, it is not clear whether DRO would have decreased stereotypy without a prior history of treatment with FCT.

In cases where low levels of stereotypy may be tolerable, the product of stereotypy may be used to reinforce more appropriate behavior. Several studies have used contingent access to stereotypy as reinforcement for appropriate behavior. These studies can be conceptualized as a variant of DRA because the reinforcement generated by stereotypy was provided contingent on alternative behavior (e.g., Charlop et al., 1990; Haag & Anderson, 2004; Hanley et al., 2000; Wolery, Kirk, & Gast, 1985). Hanley et al. provided what is perhaps the clearest demonstration of this phenomenon. Hanley et al. found that contingent access to stereotypy, which necessarily included response blocking to restrict stereotypy, was required to increase appropriate

behavior for one participant. The approach described by Hanley et al. may be particularly useful when other forms of stimulation (e.g., edibles) do not reinforce alternative behavior.

Singh et al. (1981) examined the effects of DRL with attention as reinforcement for instances of stereotypy with interresponse times (IRTs) that were greater than the mean baseline IRT (gradually increased to 180 s or greater). Singh et al. showed that DRL decreased stereotypy and increased unprogrammed appropriate behavior (e.g., object manipulation, social interaction). Although this effect was desirable, a potential limitation to this study should be considered. Specifically, because a functional analysis was not conducted to rule-out social reinforcement (models on the application of functional analysis were just being developed at this time), it is possible that attention was the reinforcer for stereotypy (i.e., stereotypy was socially reinforced). Thus, stereotypy reductions could have been the result of providing attention contingent on appropriate behavior (this intervention would be equivalent to DRA plus extinction). An equally plausible alternative is that the reinforcement previously generated by stereotypy was overridden by attention (as reinforcement) and stereotypy became an instrumental response (operant) for attention.

As a whole, research involving differential reinforcement shares some commonalities with studies involving environmental enrichment insofar as both approaches reduced stereotypy using preferred, but functionally arbitrary stimuli (i.e., the stimuli were not originally reinforcing stereotypy) to establish a concurrent schedule of reinforcement. Investigations from these respective literatures suggest useful interventions for facilitating response reallocation from stereotypy toward appropriate alternatives.

2.2.4. Punishment and inhibitory stimulus control

Punishment involves the presentation of aversive stimulation that inhibits stereotypy and its product(s), alters the stimulation generated by stereotypy, or a combination of both processes. These interventions have included contingent auditory stimulation

(e.g., Rapp, Miltenberger, & Long, 1998), response blocking or interruption (e.g., Haag & Anderson, 2004), and variations of overcorrection (e.g., Rollings & Baumeister, 1981; Rollings, Baumeister, & Baumeister, 1977). Following treatment with punishment, the effects of inhibitory stimulus control were also evaluated (Haag & Anderson, 2004; Rapp et al., 1998; Rollings & Baumeister, 1981; Rollings et al., 1977).

Rapp et al. (1998) used contingent auditory stimulation to suppress automatically reinforced hair pulling and hair manipulation. Although inhibitory stimulus control was shown to exert a suppressive effect in a novel environment, the results are limited in that simplified habit reversal was implemented prior to punishment. Following the use of an overcorrection procedure that involved manual guidance, Rollings and Baumeister (1981) evaluated the effects of inhibitory stimulus control on stereotypy. For three participants, one light (in a series of five that were equally spaced) was always illuminated when overcorrection was provided contingent on stereotypy. Further assessment showed that stereotypy was inhibited when the stimulus position correlated with punishment was illuminated, but increased as successive positions (moving from left to right) were illuminated. As previously noted, Haag and Anderson (2004) provided what is perhaps the most convincing demonstration of the effects of inhibitory stimulus control on stereotypy. However, because participants could request access to stereotypy (the stimulation generated by stereotypy was still available), it is not clear whether stereotypy suppression would have continued in the presence of the inhibitory stimulus if such access were not provided.

In a general sense, several explanations for the effects of punishment (e.g., response blocking and overcorrection) on stereotypy are plausible. First, if contingent physical guidance functioned as an aversive event, individuals may have engaged in alternative behavior (e.g., toy play) to escape or avoid physical guidance (see Dunham, 1971, 1972). Second, it is possible that imposition of additional "effort" of any kind is sufficient to suppress stereotypy. A recent study by

Cole, Montgomery, Wilson, and Milan (2000) showed that overcorrection with brief (30 s) or extended (8 min) application yielded similar response suppression. Third, it is possible that stereotypy suppression following response blocking or overcorrection is a direct effect of the aversive stimulation produced by physical contact. That is, stereotypy decreases because attempts to engage in stereotypy no longer produced sensory consequences but are instead followed by an aversive event. Finally, when punishment is used in conjunction with differential reinforcement, the availability of edible reinforcement contingent on alternative operants (e.g., panel pressing; see Johnson, Baumeister, Penland, & Inwald, 1982) potentially increases the value of alternative behavior and simultaneously devalues stereotypy. The mechanism responsible for response reallocation during overcorrection and other punishment procedures remains subject to further experimental inquiry.

The use of punishment to treat problem behavior in individuals with DD has received considerable attention and been subjected to extensive and critical review (e.g., Coe & Matson, 1990; Lerman & Vorndan, 2002; Matson & Taras, 1989). In general, literature on the use of punishment to treat stereotypy suggests that several factors are in need of evaluation to enhance the clinical utility of punishment. Given that several studies have shown that consequent- and antecedent-based interventions produce at least short-term reductions in stereotypy, the long-term effects of multi-component interventions warrant evaluation (e.g., use of inhibitory stimulus control procedure within the context of an enriched environment with matched stimulation). When used in conjunction with EE, it is possible that an inhibitory stimulus provides a window of opportunity for lower probability behavior to contact reinforcement (social or non-social). The extent to which such behavior contacts stimulation that is similar to or more potent than that generated by stereotypy will likely determine subsequent response allocation. This need for evaluations of multi-component intervention is further predicated on the fact that the mechanism responsible for behavior change when punishment is used for automatically reinforced behavior has

not been clearly established.

2.3. Summary and conclusions: behavioral interventions

Research from the past two decades supports the use of several antecedent (e.g., general and specific EE) and consequent interventions (e.g., DRA and punishment) to reduce stereotypy. Interestingly, LaGrow and Repp (1984) previously concluded that antecedent based interventions were less effective for reducing stereotypy than consequent-based intervention. The different outcomes in more recent studies is likely attributable, at least in part, to the expanded technology of stimulus preference assessment (e.g., DeLeon & Iwata, 1996; Roane, Vollmer, Ringdahl, & Marcus, 1998). To some extent, studies have shown that both antecedent and consequent interventions affected untargeted (desirable) behavior. Treatment studies conducted by Johnson et al. (1982) and Rollings and Baumeister (1981) were among the first to provide preliminary evidence for response reallocation during response restriction (i.e., punishment of stereotypy). Rapp et al. (2004) recently showed that decreases in one response might be accompanied by increases in a different response or produce covarying reductions in yet another response. Despite growing ethical concern for the application of punishment (see Lerman & Vorndam, 2002, for a review), emphasis could be placed on the rapid reduction of stereotypy produced by punishment and the possible positive side effect of increasing motivation for alternative behavior. In keeping with this paradigm, researchers should systematically examine the benefits of integrating techniques (e.g., environmental enrichment, prompting) to strengthen alternative response repertoires during conditions of inhibitory stimulus control (in the presence of stimuli that predict that punishment will be provided for stereotypy), and evaluate the extent to which expansion of those repertoires exerts long-term suppression of stereotypy. In other words, combining antecedent and consequent procedures into treatment packages may have sound clinical utility. In addition, systematic programming designed to develop a broad range of alternative skills may ultimately lead to reductions in

stereotypy.

As a whole, a preponderance of the assessment literature suggests that many forms of stereotypy are maintained by sources of automatic positive reinforcement to the near exclusion of other operant functions (e.g., social positive reinforcement). Support for the automatic positive reinforcement interpretation is garnered from studies that have demonstrated: (a) the persistence of stereotypy in the absence of social consequences; (b) reductions in stereotypy in the presence of alternative sources of automatic reinforcement (e.g., during environmental enrichment); (c) decreases in stereotypy when the products of the respective behavior are blocked or otherwise attenuated; (d) increases in alternative behavior when access to stereotypy is provided contingently on the alternative behavior; and (e) orderly changes in levels of stereotypy as a function of prior restriction or access to stereotypy (i.e., changes in establishing operations). Likewise, studies have shown that antecedent interventions, such as environmental enrichment, and consequent interventions, such as DRA and punishment, have been effective for decreasing stereotypy. It is interesting to note that only about half of the treatment studies cited in this review explicitly attempted to assess the operant function of stereotypy and even fewer included analyses of both social and non-social sources of reinforcement (for a notable exception, see Kennedy et al., 2000). The fact that many studies used procedures that decreased stereotypy without conducting pre-intervention assessment suggests that the field still relies on procedures that somehow override the reinforcers maintaining stereotypy (e.g., punishment, differential reinforcement) to treat automatically reinforced behavior. Although the literature suggests that many forms of stereotypy are maintained by automatic positive reinforcement, assuming behavioral function based on topographical features (e.g., repetition and invariance) is unlikely to lead to effective intervention.

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COMMUNITY RESOURCES



Creative Perspectives: Insights & Espressos with Mike Foster, M.S.

Creative Perspectives: Family Counseling with Mike Foster, M.S.

Creative Perspectives: Super Group Social Skills Training: Justin Male, M.S.

Therapalooza: Community Based Intervention for Adolescents through Creative Perspectives, Inc.

Autism Society of Colorado: <http://www.autismcolorado.org/>

Autism Society of Boulder County: <http://www.autismboulder.org/>





Center for Disease Control and Prevention Autism Resource:
<http://www.cdc.gov/ncbddd/autism/index.html>

Autism Action: <http://www.autismaction.org/>

Autism Speaks: <http://www.autismspeaks.org/>




Autistic Self Advocacy Network: <http://www.autisticadvocacy.org/>

April 2010: Upcoming Events!

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
				1 Lafayette EC Grand Rounds	2 Debbie Exley Birthday 	3
4	5	6 Englewood EC Grand Rounds	7 COCAP Clinical Standards Meeting 8.30 – 10.30 am Adolescent Clinical Rounds	8 Lafayette EC Clinical Rounds	9	10 Project Freedom 5.00-9.00 pm
11 ASC: Environ Health Impacts 1.15-4.30 pm	12 Dawn Barnett Birthday COCAP Meeting 6.00 – 8.00 pm 	13 Englewood EC Clinical Rounds	14 Autism ABC's 6.30 – 8.00 pm Adolescent Grand Rounds	15 Lafayette EC Clinical Rounds	16	17 Justin Male Birthday 
18	19	20 Seth Perelman Birthday Englewood EC Clinical Rounds 	21 Imagine! Living Arts Seminar 6.30-8.00 pm Adolescent Clinical Rounds	22 Lafayette EC Clinical Rounds	23	24 Walk Now for Autism Speaks Dick's Sporting Goods Park
25	26	27 Englewood EC Clinical Rounds	28 Adolescent Clinical Rounds	29	30	MAY-1

May 2010: Upcoming Events!

COCAP Meeting
6.00 – 8.00 pm

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
2	3	4 Englewood EC Grand Rounds	5 Adolescent Clinical Rounds	6 Lafayette EC Grand Rounds	7	8
9	10	11 Englewood EC Clinical Rounds	12 Adolescent Grand Rounds	13 Lafayette EC Clinical Rounds	14	15
16	17 COCAP Meeting 6.00 – 8.00 pm	18 Imagine! Living Arts Seminar 6.30-8.00 pm Englewood EC Clinical Rounds	19 Adolescent Clinical Rounds	20 David Cox Birthday 	21	22
23	24	25 Englewood EC Clinical Rounds	26 Adolescent Clinical Rounds	27 Amy Gearhard Birthday 	28	29
30 Denise Nicholas Birthday 	31					

The Four Characteristics of an Effective Reinforcer

David Cox



One of the most important aspects in behavioral modification is the ability of the individual attempting to modify an organism's behavior to select and deliver an effective reinforcer. Without proper reinforcement, the behavior plan will not be as effective nor have the lasting impact needed for significant and sustained behavioral change.

The effectiveness of reinforcers is dependent on four main factors. But before we get into those four factors, a quick note about the difference between reinforcers and rewards is in order. By definition, a reinforcer is any event that follows a behavior and causes an increase in the rate of that behavior. A reinforcer, although presented by an outside party, is not chosen by the outside party to serve as a reinforcer. The individual whose behavior is being changed is the only one that can decide whether or not the activity, tangible, praise, etc. will serve as a reinforcer and lead to an increase in the desired behavior.

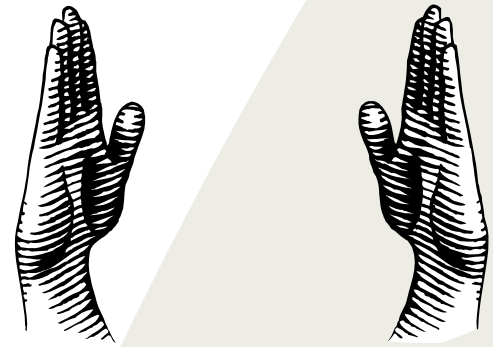
This differs from a reward which is any tangible, activity, praise, etc. that is chosen by an outsider party and given following a behavior because the outside party thinks it will reinforce the behavior. For example, I personally love chocolate chip cookies and, depending on the behavior being asked, would

engage in a fair amount of various actions to receive a chocolate chip cookie fresh from the oven. But, just because I love chocolate chip cookies and would increase the rate at which I perform behavior to receive chocolate chip cookies does not mean that you or anyone else would necessarily do so. I cannot assume as an outside party that chocolate chip cookies will necessarily cause an individual to increase the rate of a given behavior, and without properly determining whether or not it is a reinforcer, my addition of the chocolate chip cookie following a behavior would only be a reward. Again, to be a reinforcer, it has to be **an event that follows a behavior** that causes an **increase in the rate of the behavior**.

Once one has determined that a given event is a reinforcer, there are four specific characteristics of using the reinforcer that increases its effectiveness. These four characteristics can be remembered by the acronym **D I S C**. The first characteristic, the 'D' in DISC, stands for **deprivation**. Deprivation refers to the state of being without something or denied something. In relation to reinforcers, this simply means that the individual must have been without the reinforcer or denied the reinforcer for a significant amount of time so that they desire the reinforcer, i.e. they are not satiated with the reinforcer when you are attempting to use it.

The second letter, the "I", stands for **immediacy**. This means that one ought to deliver the reinforcement immediately (or as soon after) the desired behavior occurs. The longer the lag time between the behavior and delivery of reinforcement, the more the effectiveness of the reinforcer decreases.

The third letter in the DISC acronym stands for **size**. This refers to the size or the amount of the reinforcer you are giving. An entire chocolate chip cookie the size of a dinner plate is much more



reinforcing than a nibble of the cookie without any chocolate chip in it. As such, one needs to be conscious that the size of the reinforcer being given is large enough that the individual will want to engage in the desired behavior in future similar situations.

The fourth and final characteristic of effective reinforcers is represented by the 'C' in the DISC acronym. The 'C' stands for **contingency** and is argued to be the most important aspect of all. Contingency means that the reinforcer is only given after the individual has performed the desired behavior. Giving the reinforcer for anything less or anything else only serves to weaken the effectiveness that the reinforcer has on the desired behavior. This also requires consistency across all members who are involved in attempting to modify an individual's behavior as they all can only present the reinforcer contingent upon the individual engaging in the desired behavior.

In summary, once one has found a reinforcer (not a reward) for use with someone, ensuring that one follows the DISC acronym (deprivation, immediacy, size, and contingency) will lead to that reinforcer have the greatest effect on reinforcing the desired behavior.





STAFF BIO: Bob Killam

Hello! My name is Bob Killam. I am a program coordinator in Lafayette. I graduated from college in Kentucky with a B.A. in English Literature. I couldn't believe at the time that I could major in reading and writing! I loved everything about my major and still do. Reading remains a large part of my life to this day. I don't write as much anymore. After I graduated, I moved home to Maine and began working with a state agency that provided ABA therapy to autistic pre-school children. This is where it all began for me – about nine years ago. When I moved to Colorado, I quickly fell into the public school system as a Paraprofessional as well as working as an in-home therapist for JFK until I started with CPI. In my free time, I enjoy hiking, reading, and training my dog to behave himself in public. I'm a real interesting guy.



STAFF BIO: MEREDITH JONES

After spending a glorious eighteen years in Birmingham, Alabama, I opted to go away to attend college at Florida State University. I received my degree in Communications and English, working toward becoming a news anchorwoman, though secretly planning to be Miss America (that didn't happen, by the way). Conveniently, around my graduation in 2005, I realized I actually had very little interest in becoming an anchorwoman. Over the years and through my work experiences during college, I had begun to develop a real interest in working with children with disabilities. My first experience with children with Autism came the summer after college graduation, when I worked at an early childhood summer camp in Tallahassee. At the end of the summer I moved back to Birmingham and began working as a Special Education Paraeducator in an elementary school. Though I loved that job, I was not ready to be settled in any city. At the end of the school year I packed my bags and headed out to work at a dude ranch in Buena Vista, CO. I immediately fell in love with Colorado and have not yet been able to leave. I've been with CP in some capacity for almost two years, and I also currently work to research and assist in writing a book regarding the brain and adult learning in the business sector.

I try to get outside as much as possible; summer is definitely my preferred season – though I'm finally learning to appreciate snow. I have a passion for working with kiddos, but also for really enjoying life. Even when I'm not with the kids, you may find me at Chuck E. Cheese saving my tickets to win a gumball machine or watching the latest Disney movie. I'm a big dancer and take improv classes at a small theater downtown. At this point I'm not exactly sure what my future holds (a Master's degree, world travel, the Peace Corps...?), but I'm certainly looking forward to whatever it is!

Who Can Diagnose Autism

David Cox

Without a standard medical test for diagnosing autism spectrum disorders, the current standard of practice involves observing behavior, educational testing, and psychological testing. In the route to receiving a diagnosis, the first point of contact for families is generally the child's pediatrician. Many groups have been working hard to educate both expected parents and physicians as to the symptoms of autism, and how to check for developmental milestones from birth to 36 months. If concerns regarding the development of the child are present, the standard of care currently is for the pediatrician to refer the parents and the child to an autism specialist. Pediatricians can ethically diagnose an individual if they have received training in utilizing the standardized assessments and diagnostic tools for detecting autism. However, simply being familiar with the symptoms of autism doesn't necessarily indicate an ability to appropriately diagnose an individual with autism or any given disorder for that matter. This is especially important when one considers the weight that a diagnosis carries in one's permanent medical record.

The next clarification in relation to diagnosing autism would be who exactly constitutes an autism specialist. Autism specialists can wear a number of professional hats including, but not limited to: Speech and

Language Pathologists, Occupational Therapists, Licensed Psychologists, Board Certified Behavior Analysts, Audiologists, Developmental Pediatricians, Neurologists, Psychiatrists, Physical Therapists, Social Workers, etc. (Autism Speaks website, 2010 and Autism Society of America website, 2010). Generally, a diagnostic assessment involves a multi-disciplinary team that utilizes a variety of the aforementioned professionals. The important thing is not necessarily what educational training and theoretical background the professional is coming from, although that is definitely something to consider. But rather more importantly is that the individual has the appropriate training and clinical experience with autism as well as familiarity and training with the necessary diagnostic assessments. The permanent label that comes along with a diagnosis of autism is too important to not check for the experience and training ethically

needed to properly diagnose an individual with autism. When concerns regarding development are present, it is highly recommended that one either research the individuals they are going to consult with for a potential diagnosis, or contact one's local autism agency to see who they recommend.

References:

- Autism Society of America, (2010). "Diagnosis and Consultation". *About Autism*. Obtained on April 7, 2010 from the Autism Society of America website: http://www.autism-society.org/site/PageServer?pagename=about_diag.
- Autism Speaks, (2010). "Diagnosis of Autism". *Be Informed*. Obtained on April 7, 2010 from the Autism Speaks website: <http://www.autismspeaks.org/diagnosis/index.php>.



SportsCAMP

NATIONAL SPORTS CENTER FOR THE DISABLED

You're Invited!

(please disregard this message if you have already registered)

This free, interactive soccer camp allows kids with disabilities, ages 6 - 18 to experience first hand the sport of soccer. This fun filled day will include instruction and skill development, use of equipment, games, prizes and ends with a snack. Appearances will also include Colorado Rapids players, coaches or mascot.

2010 Colorado Rapids

Soccer Sports Camp

DATE: Thursday, May 20th
TIME: 5:45 PM - 8:00 PM
LOCATION: Dick's Sporting Goods Park

Camp Schedule

5:45 PM - 6:00 PM Registration & Check-In
6:00 PM - 7:30 PM Soccer Skills Clinic
7:30 PM - 8:00 PM Snacks/Giveaways/Autographs

TO REGISTER ONLINE:

http://www.nscd.org/programs/sportscamp_rapids.htm

There is no fee, but you must register

For more information, please contact:

Nicolette Thaden
National Programs Intern
nthaden@nscd.org
(303) 633 - 5808





PROJECT: FREEDOM

RESPITE PROGRAM

MAKE YOUR
RESERVATIONS
NOW!

2010 PROJECT: FREEDOM DATES:

PLEASE RSVP BY THE FIRST OF EACH MONTH

Saturday, January 9, 2010	5 – 9 p.m.
Saturday, February 13, 2010	5 – 9 p.m.
Saturday, March 13, 2010	5 – 9 p.m.
Saturday, April 10, 2010	5 – 9 p.m.
Saturday, May 8, 2010	5 – 9 p.m.

Please contact Missy Perkins for more information

Email: missy.perkins@creativeperspectives.org

Phone: 303.935.5200

INFORMATION

Project: Freedom is an opportunity for parents to have a night out while the kids have fun too!

This respite program is held at CPI's Englewood Center on the second Saturday of the month from 5pm - 9pm.

The evening is filled with fun activities, games, snacks, and a movie! Each night is themed, so come prepared to have fun!

Need a Night Out?



CPI is an approved respite care provider through CES and SLS. Check with your Resource Coordinator to have CPI added to your plan **PRIOR** to making reservations.



Creative
Perspectives Inc.
Autism Centers of Colorado

the **Super Series.**

Social and Life Skills for
Individuals with Asperger's & PDD-NOS



Program Overview & Focus

The **Super Series** has been designed to address a variety of deficits associated with Asperger's and PDD-NOS including challenges in social communication, self-regulation and behavior management, as well as increasing independence, confidence, success, and enjoyment in daily routines and activities.

Who?

Individuals with Asperger's and PDD-NOS from the ages of 6 to adult

Enrollment

Enrollment is ongoing, year-round.
Sessions run in quarters: Fall, Winter, Spring & Summer.

Session

Each session is Center-Based, with the exception of the last week of the month, which is typically utilized for a community outing. Participation in activities within the community provides individuals with the opportunity to socialize with a variety of peers and generalize learned skills across settings.

Ratio?

1:1 initially; with the potential for the formulation of pairs and small groups, based on similar interests, goals, and abilities (upon availability and parent request only).

Cost?

\$45 / per hour

Super Series

Mission:

Be a Friend.

Make a Friend.

SuperSeries Sessions

Commitment to Quality

Programming typically begins with our Super Staff on a 1:1 basis, allowing the individual to work on pre-identified skill sets until it can be determined that there is an appropriate pair, triad, or small group for the individual, based on relevant skill level and interest.

CPI recognizes the challenges that exist for individuals with ASD to establish friendships within their own environment. We work to build individual skill levels and find the best possible matches based on natural factors of friendship, rather than considering only age, *diagnosis, and session time*

Ages: Participants are considered on an individual basis; however, age ranges include: 6 – 8, 9 – 11, 12 – 14, and 15 – 18.

Times: Session times are determined per family; groups are subject to interest and availability.

Locations: Sessions are available at both Englewood and Lafayette locations.

*Insights &
Espresso*

Parent & Family Support Groups

What Can This Group Offer Me?

Honesty. The truth is that there are many challenges that come with having a loved one with ASD or Asperger's. There are also many victories that come with this as well. This group is designed to be a place where people impacted by having a loved one on the spectrum can come together and walk this journey together. Support is something everyone needs. Family members of individuals on the spectrum are some of the strongest, boldest, and honest people in our community. They are continually faced with challenges and decisions, which is when being surrounded by individuals who understand and can share a similar experience is encouraging and healing. Imagine what can be accomplished when we come together.

Date & Time:

First Wednesday of each month from 6:00 – 7:30 p.m.

Location:

CPI Lafayette Center: 1724 Majestic Drive, Suite 109, Lafayette, CO

Cost: \$10 per family, each session.



To Reserve Your Mug of Coffee:

Please contact:

Mike Foster, M.A., LPC

Licensed Family Counselor

Phone: 303.935.5200

mike.foster@creativeperspectives.org

HOPE