



# Decreasing excessive functional communication responses while treating destructive behavior using response restriction



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## ABSTRACT

Functional communication training (FCT) is an established treatment for destructive behavior that misucceeds in about 37% of cases when the reinforcement schedule for the functional communication response (FCR) is thinned using multiples schedules (mult FCT; Hagopian, Boelter, & Jarmolowicz, 2011). In this investigation, we evaluated the use of response restriction FCT (RR FCT) in a cohort of patients with poorly differentiated responding of the FCR during mult FCT. Results showed that (a) RR FCT maintained high rates of correct FCRs during the reinforcement component of RR FCT without increasing destructive behavior; (b) children displayed highly discriminated FCRs when an FCR card and a control card were simultaneously available during the reinforcement component of RR FCT; and (c) near-zero rates of destructive behavior were observed during the last five sessions of the terminal reinforcement schedule. Results are discussed relative to differences between mult FCT and RR FCT and successive and simultaneous discriminations.

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## 1. Introduction

Approximately 4 million people in the U.S. have an intellectual disability, and 12.5% (½ million) display destructive behavior, such as aggression and self-injurious behavior (SIB; Emerson et al., 2001). The risk for destructive behavior increases with intellectual-disability severity, communication deficits, and co-occurring autism spectrum disorder (Holden & Gitlesen, 2006). Severe destructive behavior is a primary reason for institutionalization. In 1994, the annual costs of destructive behavior exceeded \$3.5 billion in the U.S., and the costs are undoubtedly much higher today (Thompson & Gray, 1994). SIB produces health complications, including soft tissue damage, blindness, self-amputation of body parts, fractures, brain trauma, and even death (Hyman, Fisher, Mercugliano, & Cataldo, 1990). Individuals with aggressive behavior are at increased risk for institutionalization, social isolation, physical restraint, over-use of medication, denial of services, and physical abuse (Antonacci, Manuel, & Davis, 2008).

One of the most important advancements in the treatment of severe destructive behavior has been the development of functional-analysis methods (Beavers, Iwata, & Lerman, 2013), which collectively represent a systematic approach to identifying the reinforcer for destructive behavior and a variety of other problem behaviors (e.g., Chapman, Fisher, Piazza, & Kurtz, 1993; Piazza et al., 2003). The identification of the consequence that reinforces destructive behavior facilitates the

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development of effective behavioral intervention because it allows the behavior analyst to discontinue the contingency between destructive behavior and its reinforcer (i.e., extinction [EXT]) and to deliver that reinforcer contingent on one or more appropriate responses (Fisher & Bouxsein, 2011; Vollmer & Athens, 2011).

The function-based intervention for severe destructive behavior with the most research studies (and treated cases) supporting its effectiveness is called functional communication training (FCT; Tiger, Hanley, & Bruzek, 2008). FCT typically involves (a) training the individual to request the reinforcer for destructive behavior (identified by a functional analysis) using an appropriate communication response (i.e., a mand) and (b) discontinuing reinforcement for destructive behavior (i.e., EXT). Research results indicate that function-based interventions, like FCT, typically reduce destructive behavior by at least 90% and are more effective than similar behavioral treatments that are not informed by a functional analysis (Didden, Duker, & Korzilius, 1997; Didden, Korzilius, van Oorsouw, & Sturmey, 2006; Iwata, Pace, et al., 1994; Rooker, Jessel, Kurtz, & Hagopian, 2013).

Although the effectiveness of FCT is well established when implemented in controlled environments by highly trained therapists using dense schedules of reinforcement (e.g., FR 1), treatment relapse often occurs when a caregiver is unable to accurately carry out the procedures in the natural environment. In the home, parents have multiple competing activities (e.g., meal preparation, cleaning, laundry, paying bills, phone calls, texts, emails), which make it highly impractical to carry out a treatment that requires them to deliver the requested reinforcer as often as once every thirty seconds (e.g., Betz, Fisher, Roane, Mintz, & Owen, 2013). As a result, a number of investigators have developed strategies for leaning the schedule of reinforcement for the functional communication response (FCR) in order to make the treatment more practical for use in the home, school, and other community settings (e.g., Fisher, Thompson, Bowman, Hagopian, & Krug, 2000). The goals of these schedule-thinning procedures are typically to (a) lower the rate of the FCR at times when reinforcement is unavailable, (b) have the FCR occur almost exclusively at times when it is reasonable for the parent to deliver the requested reinforcer, (c) maintain the FCR's strength, and (d) mitigate or prevent resurgence of destructive behavior on those occasions when the FCR is emitted but not reinforced (Betz et al., 2013; Fisher, Kuhn, & Thompson, 1998; Fisher et al., 2000; Hagopian, Contrucci, Kuhn, Long, & Rush, 2005; Hagopian et al., 2011; Hagopian, Toole, Long, Bowman, & Lieving, 2004; Hagopian, Fisher, Sullivan, Acquisto, & LeBlanc, 1998; Hanley, Iwata, & Thompson, 2001; Roane, Fisher, Sgro, Falcomata, & Pabico, 2004; Rooker et al., 2013; Tiger & Hanley, 2004; Tiger et al., 2008).

One early approach to schedule thinning with FCT involved inserting and then progressively lengthening delays between the FCR and its reinforcer (e.g., a therapist telling the child that they have to wait immediately after emission of an FCR, followed a few seconds later by delivery of the reinforcer, and then progressively lengthening subsequent delays between the response and reinforcer; Fisher et al., 1993; Hagopian et al., 1998). A similar approach used with escape-reinforced destructive behavior (called “demand fading”; Fisher et al., 1993; or “response chaining”; Lalli, Casey, & Kates, 1995) consisted of (a) requiring the child to complete one or two demands prior to allowing escape for the FCR and then (b) gradually increasing the number of demands that had to be completed prior to reinforcing the FCR. Another early approach was to bring the FCR under discriminative control using multiple schedules (mult FCT) with quasi-randomly alternating components in which the FCR was reinforced (FR 1) or on EXT (Fisher et al., 1998; Hanley et al., 2001). A third approach involved providing the child with an alternative activity or reinforcer during periods when the FCR was not reinforced (Fisher et al., 2000; Hagopian et al., 2005), which was in part based on prior research with time-based (or noncontingent) reinforcement schedules (Hanley, Piazza, & Fisher, 1997) and basic research on self-control (e.g., Grosch and Neuringer, 1981). A fourth approach, called response restriction (RR FCT), involved removing the communication card or device for progressively longer durations (Fyffe, Kahng, Fittro, & Russel, 2004; Hagopian et al., 2004; Roane et al., 2004).

Only a small number of investigations have directly compared different schedule-thinning procedures using within-subject research methods (e.g., Hanley et al., 2001). Hanley et al. (2001) compared schedule thinning using mult FCT with several alternative schedules (progressively lengthened reinforcer delays, progressively lengthened fixed-interval schedules, and mixed schedules). They found that the discriminative stimuli used in mult FCT facilitated schedule thinning and low rates of destructive behavior by the end of treatment. Subsequent investigations have consistently replicated the finding that contingency-correlated stimuli facilitate (a) discriminative responding for the FCR and (b) schedule thinning (Betz et al., 2013; Tiger & Hanley, 2004).

Hagopian et al. (2011) reviewed the extant literature on schedule thinning and found that mult FCT was successful in reaching the target terminal schedule for the FCR while maintaining low rates of destructive behavior in five of eight applications (62.5%). They concluded that mult FCT was the preferred method of schedule thinning when the goal was to have the individual tolerate periods of non-reinforcement for the FCR lasting longer than one min. Rooker et al. (2013) presented data on 14 applications of schedule thinning with mult FCT (without supplemental procedures) and similarly found that a 90% or greater reduction was observed with six applications (43%) and an 80% or greater reduction was observed with nine applications (64%).

One reason that using mult FCT may not always achieve the goals of schedule thinning mentioned above is that some individuals have difficulty learning to fully discriminate between the reinforcement and EXT components of the multiple schedule (i.e., individuals may not display high and stable rates of the FCR in the presence of the  $S^d$ , low rates of the FCR in the presence of the  $S^A$ , and low rates of destructive behavior throughout). In particular, individuals may have difficulty learning to not display the FCR in the presence of the  $S^A$  (i.e., resistance to EXT). For example, in the Hanley et al. (2001) article, the subject named Karen displayed stable rates of the FCR in the presence of the  $S^d$ , but initially displayed 26.7 FCRs per min during the EXT component of the multiple schedule. In addition, even after 27 sessions of mult FCT (each lasting 10 to

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