The Effectiveness of "Safe Extinction" of Escape-Motivated Severe Aggression

By Dr. Bruce Linder, Ph.D., C.Psych., BCBA-D
Deanna Minervini, B.Sc., M.ADS., BCBA
Pryor, Linder & Associates
Safe Management Group Inc.
December, 2019

"Severe behavioural disorder" (SBD) can be defined as severe daily aggressive behaviour that is learned as a result of a history of favorable consequences and which does not respond to medications or positive behavioural support (PBS) programming alone (Linder, 2013). It affects an estimated 5 to 7% of adults with developmental disabilities (DD) living in residential group home settings (Linder, 2008, 2013). It's costs to society are difficult to measure but informal estimates in Ontario can be made based on hospitalizations. At one time it was estimated that approximately 200 adults with DD were hospitalized in acute psychiatric units throughout the province in long-term stays (personal communication). If we assume that the per diem rate for hospital stay is about $1500, then the total cost is $300,000 per day. We do not have statistics on average length of stay, but if estimated at 3 months, we are talking about $27,000,000, a staggering figure when it is noted that in most of these cases the individuals are not assessed to be suffering a psychiatric disorder. Often, they are referred to as merely having "behavioural problems" for which behavioural treatment is deemed appropriate.

Applied Behaviour Analysis (ABA) is the field that has done the most in developing and researching the effectiveness of various treatments for severe behavioural disorder based on learning theory, the idea that many behavioural problems are learned from their history of consequences. Most treatment programs for behavioural problems focus on teaching new more appropriate behaviours through prompting and reinforcing such behaviour. For SBD, the bulk of evidence has demonstrated that "extinction" is also required (e.g, Hagopian et al, 1998; Rooker et al, 2011), that is, the withholding of reinforcement that used to occur for the behaviour in order to teach that aggression is not effective in controlling reinforcement. Extinction eventually results in the cessation of aggression. (cf., Cooper, Heron, & Heward, 2020, especially Chapter 24 "Extinction").

Despite the proven importance of providing extinction procedures for treating SBD in the outcome research literature, general clinical experience indicates that few treatment plans in the real world include them. One reason for this is that withholding a desired outcome reinforcer would likely trigger more severe and dangerous aggressive behaviour, thus, creating a temporary heightened risk to the program implementers until the behaviour stops. This risk would be particularly difficult to justify for adults and those whose physical size and intensity of behaviour is substantial, exactly the situation with those with SBD, by definition.

Safe Management Group, Inc. and Pryor, Linder & Associates have worked for over 30 years to develop safe techniques of intervention that make extinction procedures possible for those with SBD. This involves adding safe methods of physical and mechanical restraint interventions to the normal procedures of extinction. We have suggested calling this "Safe Extinction" (SE) (Linder & Minervini, 2019). As an example, consider the common situation with SBD of aggression that has been learned through the dropping of demands for activities and participation whenever severe aggression occurs – so-called 'escape-motivated' aggression. Extinction in this case is called 'escape extinction' (EE) and is completed by not dropping the demand, and often includes least-to-most restrictive prompting with hand-over-hand physical guidance, which predictably triggers increases in the frequency and intensity of aggression.

EE and SE interventions are not implemented for reasons other than risk. Insufficient staffing, hands-off program philosophies, and clinical concerns about the potential traumatizing or re-traumatizing effects of the physical restraints included in SE are other common reasons. Clearly, the clinical decision to proceed with SE is a complex one, that must consider the relative cost and benefits of risk, staffing monies, violating programming philosophies,

and psychological harm. Perhaps surprisingly, there is very limited research on the cost/benefits of SE in the treatment of SBD.

To address this need we have developed an assessment protocol that allows us to determine if such an approach will be effective and under what conditions before training staff to implement the protocol. This is a 4-to 6-hour assessment conducted in a single day in which escape extinction with hand-over-hand physical guidance and restraint is trialled. Additional procedures are also implemented including differential positive reinforcement, shaping task tolerance through backward chaining task sequences, and positive-practice overcorrection.

The purpose of this paper is to present the results of 26 roughly consecutive SE one-day program assessments with individuals with SBD and escape-motivated aggression in order to define the typical response, and, by doing so, contribute to the literature with information about the potential benefits that can accrue with SE. Ten long-term treatment cases will also be presented to address the question of long-term effectiveness of SE treatments. It is hoped that this additional information will help decision makers to conduct more comprehensive cost/benefit analyses with SBD treatment decisions.

METHOD

Subjects. Twenty-six approximately consecutive cases of SBD who were given assessment were the subjects. There mean age was 24 years (8 to 48 years old), 65% were adults, 27% adolescents, and 8% children. All had been referred to SMG-PLA for programming based on a long history of serious aggressive and/or self-abuse behaviour.

The vast majority had mild intellectual disabilities (73%). Seventy-seven percent were diagnosed with Autism Spectrum Disorder; 19% with Intellectual Disability only, and one (4%) with Borderline Personality Disorder without ID.

The overwhelming majority had physical aggression (77%) as their main target behaviour (TB) with 19% self-injurious behaviour (SIB), and 4% destructiveness. Indirect measures of the function of their TB through the Questions About Behaviour Function (QABF) questionnaire found that 81% were escape-motivated, 12% tangible-motivated, and 4% each attention- or denial-motivated.

SE Assessment. The SE assessment was conducted for one day, approximately 4 to 6 hours with a one-hour lunch break. Two rooms were used for the assessment: one room for the assessment, and a second room for observers. Observers watched via a video-link. Observers included in one or more combination of parents, staff, case managers, behaviour therapists and agency administrators. It was always the case that a parent or legal substitute decision maker was present to ensure continuous informed consent. Assessments were conducted in a variety of settings based on the referral source including hospitals, schools, residential group homes, and parent homes.

The assessment team included: registered psychologist and BCBA-D, behaviour therapist BCBA, one or more data collectors, two or more crisis intervention instructors from the Safe Management Group Inc. Occasionally, when required, non-instructors trained in SMG who had extensive experience in implementing SE interventions were included.

Procedures. The assessment procedure involved the presentation of tasks known to be already mastered by clients in tasks sequences that were backward chained over time. Task sequences started at one task and proceeded by adding additional tasks one at a time only when extinction had been achieved of any aggression occurring on the previous task. Extinction was defined as at least 5 minutes of task participation without aggression. Reinforcers were given at the end of the task sequence usually in the form of a 3-to-5-minute rest period from tasks with tangible or edible reinforcers offered when appropriate for the client. Task sequences usually were shaped to 6 to 8 tasks and were repeated throughout the day to assess task tolerance and extinction effects. Tasks trained early were done on a table-top (e.g. put clothes in a basket, fold face clothes, clean table) and later while standing (e.g., walking, bouncing ball, sweeping). Generalization across instructors was also

attempted by including staff and parents, when possible. And testing the limits of generalization was conducted by exposure to natural triggers, such as van rides, community walks, and independent schedule following.

All physical intervention procedures were designed as part of the Safe Management Group Inc. crisis intervention program, approved by the Ontario Ministry of Community and Social Services. Mechanical restraints were implemented with the SureGuard™ Correctional Chair (https://restraintchair.com/sureguard-correctional-chair.php) that includes 4 types of straps – shoulder, wrist, lap, and ankle. Physical restraints were implemented only until the individual was calm enough to be physically redirected to the current task, typically short in duration to reduce the magnitude of negative reinforcement. Mechanical restraints were used primarily early in the assessment to minimize escape from the table-top task situation; rarely were all straps needed, with order of use being lap belt, shoulder belt, and ankle restraints. Wrist restraints were least often used, and only for one wrist, because the client would not be free to perform the target task.

Data Collection. Frequency counts were made by one or more trained data collectors of negative target behaviours, tasks completed, level/type/duration of restrained used, activities introduced, and reinforcers earned in 5-minute intervals to enable mapping the extinction process. Inter-observer-agreement (IOA) was calculated when possible and was always above 90%.

RESULTS

SE Assessment. Of the 26 SE assessment, 2 (7%) of the clients exhibited no target behaviours, suggesting complete stimulus control by our environmental and staffing set-up. Over half, 58% showed an extinction burst within 5 minutes. The mean latency to the first extinction burst was 32.5 minutes, 77% showed more than 90% reductions in TBs from the beginning to end of the assessment, and 68% showed complete extinction with zero rates. The mean length of task tolerance, defined as no target behaviours and full task completion, was 118 minutes or about 2 hours (10' to 255'), a result highly favorable compared to many published studies of FCT.

Figure 1 shows the mean rate of TBs per 15 minutes from the first extinction burst. To smooth the data, three 5-minute intervals were combined. Extinction appears complete within the first 75 minutes of SE with a mean 88% percent reduction from 5.3 to 0.6 per 5-minutes. Two subsequent bursts were seen associated with generalization conditions across tasks with diminished peak rates at 2.3, 2.6 and 1.4 and reductions of 70%, and 81%, respectively. The mean duration of the first extinction burst was 36 minutes.

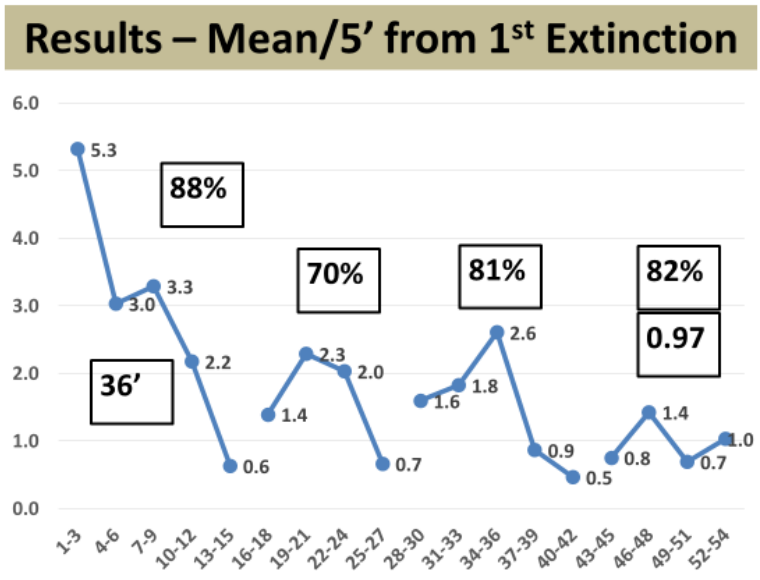

Figure 1. Mean Rate of TBs for 15' intervals from the First Extinction

This demonstrates the effectiveness of SE and the usefulness of 1-day SE assessments in confirming program effectiveness.

Effect of Mechanical Restraint. Early in the development of the SE assessment protocol, mechanical restraint was not used – 16 assessments were conducted with physical interventions only, 10 with mechanical restraints to aide in safe extinction implementation. This enabled a test of the hypothesis that mechanical restraint helped in the extinction process. The difference in mean duration of first extinction, 38 vs 25 minutes, approached statistical significance, t (25) = 1.41, p = .08. It was hypothesized that mechanical restraints worked as aides to reduce escape from physical guidance during hand-over-hand escape extinction.

Long Term Outcomes. Long-term treatment success of SE was evaluated with 10 cases. All of these cases had had SE assessment prior to treatment. The mean length of treatment was 772 days (25.7 months) with a range from 336 days to 1,580 days. To assess effectiveness, the mean daily rate of major target behaviour for the 1st vs last 60 days of treatment were calculated. A mean percent reduction of 88% (35% to 100%) was found with 60% showing 90% or more reductions, and 50% were reduced to zero levels.

Positive Reinforcement Only vs SE Outcomes. Many philosophies of behavioural programming emphasize that positive reinforcement alone is capable of producing favorable outcomes even for those with SBD (e.g. Positive Behavioural Support PBS, Carr et al, 2002; Gentle Teaching, McGhee, 1990). Our clinical experience has not supported this hypothesis – many SBD cases we have work with require some form of intrusive intervention to safely enable extinction procedures. We tested this hypothesis from within the SE assessment process by comparing a day of positive reinforcement and shaping procedures only to our standard day of SE assessment. The positive reinforcement only day (PRO) involved: parent/caregiver interviews, skill and FBA self-report questionnaires (QABF, FAST, ABAS), functional behavioural assessment across standard conditions of demand, tangible, attention, alone, control, stimulus preference assessment, and shaping task participation via positive reinforcement. If non-compliance and aggression occurred verbal and gestural redirection was used only; at not time was extinction attempted with safety restraints. Three individuals were given both days of assessments.

Results were clear. A mean of 108 tasks were completed under SE conditions as compared to 11 tasks for PRO. The mean length of task tolerance was 108 minutes for SE and only 5 minutes for PRO. For 2 of the 3 clients, the PRO assessment had to be terminated prematurely because of unacceptably high risk due to severe aggression.

DISCUSSION

Safe Extinction assessment procedures were successful in substantially reducing severe aggressive behaviour among 27 cases in one day by 77%, a result that was more rapidly achieved when mechanical restraints were used to supplement physical interventions. Long-term implementation of these procedures as a treatment strategy was successful in 10 cases by reducing severe aggression by 88%. And, SE assessment procedures were superior to positive reinforcement-only by a factor of 10 to 20 depending on measure. Clearly, the difficult decision about the use intrusive safety procedures must take into consideration these rapid positive outcomes.

The decision about when to use intrusive interventions continues to challenge practicing behavioural analysts. Guidelines are provided by most professional ABA regional and international organizations (e.g. ABAI, 2010; APBA, 2009, 2010, ONTABA, 2019). Generally, they all emphasize that (1) intrusive interventions should be a last resort after less intrusive procedures have been tried and failed, (2) the client has been medically cleared, (3) the staff have been adequately trained in the intervention, (4) the intervention outcomes are being objectively measured, and (5) the intervention is professional monitored by a suitably qualified responsible clinician. No guidelines are provided about if or when intrusive interventions should be tried – e.g. after all else has failed and when the cost/benefits of intrusive vs non-intrusive interventions favor intrusive intervention. As a result, the practicing behaviour analysis must struggle to weight the cost-benefits on their own often feeling that such interventions do not have full professional support. This report was intended to provide data about the expected

benefits of intrusive interventions and costs of non-intrusive interventions for cases of severe behavioural disorders.

It should be finally noted that the primary goal of safe extinction treatment is to establish instructional control over negative behaviours that normally interfere with teaching skills that further reduce aggressive behaviour. As such, once successfully achieved, the second step is providing effective skill acquisition programs (e.g., language, anger management, life skills, community skills) and more normalized community integration now made possible because of instructional control.

REFERENCES

Association of Behavior Analysis International. (2010). *Statement on Restraint and Seclusion.* https://www.abainternational.org/about-us/policies-and-positions/restraint-and-seclusion,-2010.aspx

Association of Professional Behavior Analysts. (2010). *Position Statement on the Use of Restraint and Seclusion as Interventions for Dangerous and Destructive Behaviors: Supporting Research and Practice Guidelines.* *https://cdn.ymaws.com/www.apbahome.net/resource/collection/1FDDBDD2-5CAF-4B2A-AB3F-DAE5E72111BF/Support_for_APBA_Pos_Stmt_-_Restraint_&_Seclusion.pdf*

Association of Professional Behavior Analysts. (2009). *The Use of Restraint and Seclusion as Interventions for Dangerous and Destructive Behaviors* *https://cdn.ymaws.com/www.apbahome.net/resource/collection/1FDDBDD2-5CAF-4B2A-AB3F-DAE5E72111BF/Restraint_Seclusion_.pdf*

Carr, E.G., Dunlap, G., Horner, R.H., Koegel, R.L., Turnbull, A., Sailor, W., Anderson, J., Albin, R., Koegel, L.K., & Fox, L. Positive Behavior Support: Evolution of an Applied Science. *Journal of Positive Behavior Support.* (2002).

Cooper, J.O., Heron, T.E., Heward, W.L. (2006). *Applied Behavior Analysis.* (2nd Edition).

Hagopian, L. P., Fisher,W.W., Sullivan, M. T., Acquisto, J., & LeBlanc, L. A. (1998). Effectiveness of functional communication training with and without punishment: A summary of 21 inpatient cases. *Journal of Applied Behavior Analysis*, 1998, 31, 211–235.

Linder, B., Meissner, A., Hieminga, J. "Back to the Future" in Behavioural Management for Children with Severe Behavioural Challenges and Autism: The Role of Intrusive Interventions. Paper presented at *Ontario Association for Behaviour Analysis (ONTABA) Conference, November, 2013.*

Linder, B., & Minervini, D. (20190. The effectiveness of "safe extinction" of escape-motivated severe aggression in individuals with developmental disorders and severe behaviour disorder. Paper presented at *Ontario Association for Behaviour Analysis (ONTABA), November, 2019.*

Ontario Association of Behaviour Analysts (2019). *Evidence-Based Practices for the Treatment of Challenging Behaviour in Intellectual and Developmental Disabilities: Recommendations for Caregivers, Practitioners, and Policy Makers.* Report of the Ontario Scientific Expert Task Force for the Treatment of Challenging Behaviour.
McGhee, J. *Gentle Teaching.* (1990).

Rooker, G.W., Jessel, J., Kurtz, P., Hagopian, L. (2013). Functional communication training with and without alternative reinforcement and punishment: an analysis of 58 applications. *Journal of Applied Behavior Analysis,* 2013, 46, 708–722.