



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**

January 2019



Dear Reader,

In the summer of 2017, following the receipt of an International Development Grant from the Society for the Advancement of Behavior Analysis and a generous donation from the Developmental Disabilities Program in the Department of Psychiatry at Western University, the Ontario Association for Behaviour Analysis formed the Ontario Scientific Expert Task Force for the Treatment for Challenging Behaviour (OSETT-CB). OSETT-CB set out to produce guidelines on Evidence-Based Practices for the Treatment of Challenging Behaviour in Intellectual and Developmental Disabilities.

The purpose of this report is three-fold. First, we hope that it will serve as a resource for the many professionals and service providers across the province who are concerned with the safety and well-being of individuals living with intellectual and developmental disabilities (IDD). Second, we hope that the document will prove to be a useful tool for the caregivers, advocates, and policymakers that work hard to ensure that the services provided to individuals living with IDD are the safest and most effective available. Finally, we hope that the information and recommendations drawn from scholarly review and expert consensus will contribute to improved conditions for the individuals and families that too frequently remain underserved, untreated, and in unsafe situations across our province.

This report is dedicated to our closest partners, the individuals, families, and caregivers to whom this work is of the utmost importance.

Sincerely,



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EXECUTIVE SUMMARY

ABOUT THE ONTARIO ASSOCIATION FOR BEHAVIOUR ANALYSIS (ONTABA):

ONTABA is the largest Canadian professional organization representing behaviour analysts. As an affiliate chapter of the Association for Behavior Analysis International (ABAI) and an affiliate of the Association of Professional Behavior Analysts (APBA), ONTABA has served as a resource for practitioners and recipients of behaviour analytic services, a respected community partner, and a dedicated advocate for individuals in need of life-changing behaviour analytic services for more than 20 years.

WHAT IS THE PURPOSE OF THIS REPORT AND WHO IS IT FOR?

This document is intended to (a) serve as a resource for the many professionals and service providers across the province who are concerned with the safety and well-being of individuals living with IDD, (b) to give caregivers, advocates, and policymakers a tool to promote policy and programs that are safe, effective and evidence-based, and (c) to provide recommendations from scholarly review and expert consensus to contribute to improved conditions for the individuals and families that too frequently remain underserved, untreated, and in unsafe situations in our province.

WHO ARE THE AUTHORS AND REVIEWERS?

OSETT-CB is a collective of professionals, educators, and researchers who have a passion for improving the quality of life of individuals with IDD and their families. The contributors and reviewers are parents, psychologists, behaviour analysts and a psychiatrist with expertise in treating and supporting individuals with IDD across the lifespan.

WHAT QUESTIONS ARE ASKED AND WHY?

In April of 2018, after a thorough stakeholder engagement process, the Ontario Brain Institute produced recommendations for Community Priorities for Research on Neurodevelopmental Disorders. ONTABA participated in the final prioritization process in the fall of 2017, and was inspired to leverage the expertise of its membership and partners to answer a number of the priority questions being asked, including:

- 1.** Which are the most effective pharmacological and non-pharmacological treatments for aggressive and self-injurious behaviour in individuals with neurodevelopmental disorders?
- 2.** What are the most effective treatment options/plans (e.g., timing, frequency, duration, type, intensity or dosage) for individuals with neurodevelopmental disorders for both short and long-term benefits?
- 3.** How can treatment decisions for individuals with neurodevelopmental disorders be more precise (i.e., based on the diagnosis, age, functional need of the individual)?

In an attempt to contribute to the important discussion initiated by these complex questions, OSETT-CB set to work on two broad areas —assessment and treatment— and generated a number of sub-questions that aimed to guide individuals, families, professionals, and policymakers in making informed decisions about the treatment of challenging behaviour:

- How are challenging behaviours selected for assessment and treatment?
- What are the current approaches to the assessment of challenging behaviour?
- What are the core components of functional behavioural assessment?
- How are functional analyses interpreted?
- What are the perceived barriers to assessing and intervening on challenging behaviour and how might these be overcome? What does the research suggest?
- What are the setting-specific characteristics that one must consider when assessing and intervening on challenging behaviour?
- Who should conduct and/or supervise assessments of challenging behaviour?
- Which non-psychopharmacological treatments for challenging behaviour by individuals with IDD are considered evidence-based?
- How is treatment effectiveness monitored and evaluated?
- How are treatment decisions made when it comes to treating challenging behaviour (e.g., timing, frequency, duration, type, intensity or dosage)?
- Do behavioural interventions for challenging behaviour generalize to natural settings?
- Which persons (e.g., professionals, parents, client) should be part of an intervention team for reducing challenging behaviour?
- What are the appropriate credentials for implementing behavioural interventions for challenging behaviour?
- Which psychopharmacological interventions are commonly used to treat challenging behaviour by individuals with IDD?
- What are the critical considerations when restrictive procedures are involved?

COMMITTEE PROCESS

The committee first endeavoured to obtain agreement on terminology, including the meaning of *challenging behaviour* and on a pragmatic definition for evidence-based practice. Next, we worked to generate a list of questions (see above) using the Community Priorities for Research on Neurodevelopmental Disorders as a starting point. We then worked to narrow the scope so as to yield specific answers and practical recommendations about some of the more commonly prescribed treatments for challenging behaviour. The research team conducted a targeted review within each sub-topic area and after compiling data and editing the initial drafts at the committee level, sought feedback from a team of external reviewers (parents, advocates, researchers, and practitioners) and the ONTABA Advisory Committee. The chairs then worked together to integrate the feedback in a final round of revisions before submitting the work for approval from the ONTABA Board of Directors.



ASSESSING CHALLENGING BEHAVIOUR - SUMMARY:

- Developmental, environmental, and genetic factors alone or in combination may account for, or contribute towards, the development of challenging behaviour.
- The bio-behavioural model of challenging behaviour indicates that both biological and environmental factors must be considered during assessment and addressed in treatment.
- Traditional methods of classifying and assessing challenging behaviour have relied primarily on observed correlations among challenging behaviours or symptoms, also known as the syndrome or structural classification system.
- A complement to the structural classification system is categorizing challenging behaviour according to environmental events that function to maintain it (i.e., the environmental events that precede challenging behaviour, and which environmental events follow challenging behaviour)
- Results of applied research suggests that the vast majority of challenging behaviour is learned, and acquired through an individual's history of interaction with the social or physical environment.
- The identification of environmental variables responsible for the continuation of challenging behaviour is referred to as "Functional Behaviour Assessment" (FBA)
- FBA is a broad category of procedures used to assess the function of challenging behaviour and consists of indirect assessments, descriptive assessments, and functional analysis.
- The use of indirect assessments such as rating scales and interviews is not unique to the FBA approach, and has been adopted by many health care professionals. Indirect assessments include gathering information about the challenging behaviour and relevant

environment in which it occurs by speaking with individuals who know the client engaging in challenging behaviour the best.

- Descriptive assessments occur in the natural environment of the individual thus allowing clinicians the ability to assess situations in which challenging behaviours occur. Descriptive assessments yield correlational descriptions of environment-behaviour relations.
- Indirect and descriptive assessments often fail to accurately predict what maintains challenging behaviour (i.e., the function of challenging behaviour cannot be identified using these strategies alone).
- A functional analysis is an assessment tool used to identify the function(s) of challenging behaviour by systematically altering environmental events and providing predetermined consequences immediately after the target behaviour occurs.
- Functional analysis allows us to identify causal relations between challenging behaviour and the natural environment.
- Functional analysis assessment procedures should be supervised and overseen by a Board Certified Behavior Analyst (BCBA®) or equivalently certified professional.
- Barriers to conducting comprehensive FBAs that include functional analysis can be overcome by making analysis modifications or by communicating the necessity of the assessment procedures to relevant stakeholders.
- Interventions based on comprehensive FBAs have shown to be more effective than alternative approaches including pharmacological interventions alone.

TREATING CHALLENGING BEHAVIOUR - SUMMARY:

- Research tends to feature child participants more frequently, however there are many interventions that may be considered empirically established for both adults and children with IDD, including: (1) functional communication training; (2) non-contingent reinforcement treatment packages; (3) differential reinforcement with extinction procedures; (4) time-out treatment packages; and (5) response blocking and protective equipment interventions. For children, antecedent intervention met empirically established criteria while for adults, antecedent interventions met criteria for being promising interventions.
- Research suggests that cognitive behavioural therapy (when conducted with adults) meets criteria as a promising intervention.
- The evidence base for sensory integration therapy, gentle teaching, electroconvulsive therapy, transcutaneous electric nerve stimulation, exercise and room management met criteria for either 'inconclusive' or 'ineffective' in treating challenging behaviour in IDD.
- In general, there is limited evidence suggesting that psychotropic medications are effective in treating challenging behaviour. However, risperidone and aripiprazole are FDA

approved for treating general symptoms of agitation and irritability in persons with autism spectrum disorder. Similarly, literature on combined interventions, described as the concurrent application of psychotropic medication and behavioural intervention, is limited. Thus, it is unknown whether combined interventions result in better outcomes than behavioural interventions implemented in isolation.

- Research has yet to establish an ideal treatment duration or intensity, given the individualized nature of each case and corresponding behavioural programming. A comprehensive functional behaviour assessment informs intervention, including projections around the duration and intensity of treatment.
- Practice standards include regular review of data collected by directly observing clients and recording instances of challenging behaviour. Resultant data are graphed and then interpreted using a technique called visual inspection.
- BCBA® who have relevant training and experience, or equivalently certified individuals, should be clinically responsible for overseeing behavioural interventions.
- The principle of least restrictiveness is a guiding tenant for BCBAs®. This means that reinforcement-based interventions and less intrusive interventions should be applied before resorting to more intrusive interventions. On rare occasions, treatment packages may require the use of restraint or seclusion to permit clients to build skills and prevent severe injury to the client or others. Such procedures should be used as a last resort, should be combined with skill-building program components, and application should meet all applicable legal, clinical and ethical standards.
- Few studies have successfully identified which therapeutic variables, if included in treatment, result in clients demonstrating their new skills across every setting, not just the setting where training took place (also called generalization). Regardless, it is recommended that clinicians include as many intervention features as possible to enhance generalization.
- Extensive research supports the value of competency-based training to ensure accurate delivery of services by direct care staff/caregivers. Further, ongoing on-site clinical supervision to support direct care staff in continuing to apply procedures correctly and offer ample feedback opportunities is advised.
- Professionals collaborating on a multidisciplinary team may enhance intervention effectiveness. The client and their caregivers are the most important member on this team, with the complement of a range of professionals depending on the circumstances.

RECOMMENDATIONS:**1. Individuals living with intellectual and developmental disabilities and their families must be treated as active members of the circle of care.**

- a. In all clinical and educational planning, insist on goal setting that includes the individual, their family, and other important members of their community.
- b. Provide regular opportunities for caregiver review of progress and a safe space for feedback.
- c. Ensure families have information on how to voice concerns using legislation, access to program level ministry representatives, agency policy and procedures, and regulatory and professional certification bodies.
- d. Mandate jurisprudence training for all professionals involved in the assessment or treatment of challenging behaviour in Ontario.
- e. Create a direct funding option so that caregivers can access treatment for challenging behaviour from a professional of their choice in a timely manner.

2. The assessments and treatments prescribed for challenging behaviour must be empirically supported and meet the standard of evidence-based practice.

- a. All funded clinical programs should apply only procedures that meet criteria as evidence-based practices. All treatment approaches identified as ineffective or inconclusive should be defunded and treated as experimental until such time that they are supported by the research evidence.
- b. Following functional behaviour assessment, the primary focus of intervention should be rehabilitative in nature, including a combination of function-based challenging behaviour reduction strategies and teaching adaptive and replacement skills for challenging behaviour.
- c. Regularly updated guidelines on evidence-based practices should be funded by government and produced by a group of independent researchers, practitioners and service users with experience in treating or receiving treatment for challenging behaviour.

3. Intervention effects should be monitored and evaluated with a sound measurement system, which has been informed by data collected via direct observations. The resultant data should be analyzed and used in the planning of treatment recommendations

- a. Treatment decisions should be informed by direct observation data collection systems.
- b. In a multidisciplinary environment, data should be summarized and shared regularly with all parties responsible for clinical-decision making.

4. The practice of behaviour analysis should be regulated in Ontario.

- a. In many sectors (children, adult, geriatric), it is common for individuals without formal training, certification, professional liability insurance, or even a criminal record check to provide clinical services to vulnerable populations, this puts vulnerable individuals at risk of harm.
- b. The Ministry of Health and Long-Term Care should take steps to publicly regulate behaviour analytic practitioners, as recommended by all stakeholders that have provided consultation to the Health Professions Regulatory Advisory Council.

5. Develop quality standards and oversight mechanisms for the treatment of challenging behaviour for individuals with IDD.

- a. In consultation with individuals, families, professionals and researchers, Health Quality Ontario should develop standards for the treatment of challenging behaviour in IDD.
- b. The Ministry of Children, Community and Social Services should consult with behaviour analysts in making revisions to the Quality Assurance Measures (QAM; O. Reg. 299/10) to ensure that treatment plans and the mechanisms for oversight and compliance with those plans lead to safe and high-quality behavioural interventions.
- c. Ontario should implement a Local Review Committee model of independent clinical oversight and support to ensure behaviour analytic services are appropriately selected, developed, implemented and monitored in accordance with relevant policy and legislation.

6. Improve policy, service coordination, and referral pathways for individuals that exhibit challenging behaviour.

- a. Develop legislation that optimizes referral pathways by (a) leveraging an Integrated Primary Care (IPC) model to improve access to behavioural health services, (b) mandating quality standards for behavioural supports in schools, hospitals, and long-term care facilities, and (c) incorporating behaviour analysts within the interdisciplinary complement of Family Health Teams in Ontario.

7. Emphasize the longevity and durability of interventions for challenging behaviour in community settings.

- a. Behavioural support services discharge criteria should be individualized and developed based on direct observation data collected during a comprehensive assessment process. Client progress, reflected in the ongoing data collection process during treatment, should also inform discharge criteria.
- b. Ontario's academic, health and educational institutions should fund and encourage research initiatives with the aim of improving the longevity and durability of interventions for challenging behaviour in natural environments.

8. Design educational, health and community living programs with an infrastructure that permits high-quality behavioural treatment.

- a. Programs that support individuals living with IDD should implement a tiered-service delivery model for behavioural assessment and treatment to encourage effective staff training and ongoing clinical oversight.
- b. The Ministry of Training, Colleges and Universities should support the development of doctorate-level behaviour analytic training programs in Ontario.

9. Address the inappropriate use of restrictive procedures and the over-reliance on psychotropic medications, in the treatment and support of persons with IDD who exhibit challenging behaviour.

- a. Through a coalition of professional organizations, regulatory bodies, advocacy groups, and health care providers make a commitment in writing to working together to reduce the inappropriate use of psychotropic medications in IDD treatment.
- b. Develop clear standards and practice guidelines for the use of psychotropic medications in IDD.
- c. Develop and evaluate a collaborative framework between behaviour analysts and prescribing physicians that evaluates medications and their side-effects using direct observation data and functional behavioural assessment.

CONCLUSION:

When left untreated, challenging behaviour can have a devastating impact on individuals living with IDD, their families and caregivers, and on the social system designed to support them. Physical and psychological injury, inappropriate placement and incarceration, loss of housing, a lack of learning opportunities, and limited community involvement and unnecessary exposure to restraint, seclusion, and chemical sedation are common outcomes for these individuals. All individuals living with IDD have the right to a therapeutic environment, services with an overriding goal of personal welfare, treatment by a competent clinician, access to programs that teach functional skills, behavioural assessment with ongoing evaluation, and options to benefit from the most effective treatment procedures available. Assessment and intervention procedures should be based on the best available evidence, direct measure of outcomes, a focus on the function of behaviour and on teaching adaptive skills are in the best interest of individuals, families, caregivers and society. Policy and program development that takes evidence and best-practice into consideration can make a meaningful impact on this complex issue.

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INTRODUCTION

A RIGHT TO EFFECTIVE TREATMENT

In 1988, Van Houten and colleagues proposed a set of guiding principles for the care of individuals in need of behavioural health interventions. The statement affirmed the right of the individual to access: (a) a therapeutic environment, (b) services with an overriding goal is personal welfare, (c) treatment by a competent behaviour clinician, (d) programs that teach functional skills, (e) behavioural assessment with ongoing evaluation, and (f) the most effective treatment procedures available. Three decades later, these principles remain as relevant as ever. Safety, meaningful relationships, opportunities for learning, and community belonging contribute to every individual's quality of life. However, due to a variety of systemic, physiological, and environmental factors, individuals living with IDD often face challenges in accessing these critical components within educational, vocational, residential, therapeutic, and recreational settings. Safety restrictions, extensive waitlists, costs of services, and a lack of professional regulation and enforceable quality standards may impede access to services. When individuals living with IDD engage in challenging behaviour that poses a risk of harm to themselves, their peers, their environment, or caregivers, their quality of life is compromised (Emerson et al., 2000). The American Psychiatric Association (APA) defines IDD as deficits in intellectual functioning (typically identified by standardized IQ scores below 70) and impairments in adaptive functioning (communication, social skills, personal independence, etc) occurring during the developmental period (DSM-5, APA 2013). Several studies have identified a concerning prevalence of challenging behaviour within IDD populations, with the occurrence of physical aggression, self-injury, and destructive behaviour ranging from 6%-52% of samples across a variety of settings (Bowring et al., 2016; Deb, Thomas, & Bright, 2001; Cooper et al., 2009; Emerson et al., 2001; Poppes, Van der Putten, & Vlaskamp, 2010; Tenneij & Koot, 2008). Subgroups within the IDD population may be at an increased risk of developing challenging behaviours. For example, studies that have assessed the prevalence of challenging behaviours, including severe destructive behaviour, in individuals with autism spectrum disorder (ASD) have found that these behaviours can occur at a considerably higher rate than their non-ASD diagnosed peers (Jang, Dixon, Tarbox, & Granpeesheh, 2011; Kozlowski, Matson, & Rieske, 2012).

NOWHERE TO TURN

In August of 2016, Ontario's Ombudsman, Mr. Paul Dubé, released a report titled 'Nowhere to Turn' in response to an investigation of 1,436 complaints of adult developmental services. The investigation found that services were complicated, multi-layered, and difficult to navigate for individuals with IDD and their families. Ontario's general hospitals, long-term care facilities, homeless shelters, psychiatric units, and prisons have become hosts to hundreds of adults with IDD, many with complex medical and behavioural health needs; a phenomenon Ombudsman Dubé referred to as *institutionalization by default* (Ontario Ombudsman, 2016). These inappropriate placements, precipitated

by severe gaps in social services and inaccessibility of effective behavioural health treatments come at a significant cost to the individual, their loved ones, and to the provincial health and social systems. The Ombudsman's report illuminated the plight of individuals with IDD in extreme circumstances, and although some work has been done to address issues, there are prominent problems remaining. Adults living with IDD most frequently find themselves in crises because of inadequate social support, funding shortfalls and the inaccessibility of effective evidence-based treatment for their behavioural health issues. One of the many recommendations provided by the Ombudsman included developing best-practice guidelines and protocols for responding to the challenging behaviour of individuals with IDD. Our hope is that this document will contribute to the fulfillment of that recommendation.

THE CHALLENGE OF CHALLENGING BEHAVIOUR

Challenging behaviour refers to aggressive, self-injurious, and destructive behaviour that poses a significant risk to the individual's health and safety and to that of those around them. Challenging behaviour limits an individual's ability to effectively participate in his or her community, reduces opportunities to learn new skills, poses a barrier to engagement in meaningful activities, and leads to a poorer quality of life. Common challenging behaviours may include physical aggression such as hitting, scratching, choking, or biting others; self-injury such as head-banging, biting self, or eye-gouging; or destructive behaviours such as destroying or displacing items and damaging one's living space or the property of others. Many labels have been used with varying levels of acceptability to describe challenging behaviour including, 'behaviours that challenge', 'problem behaviour', 'maladaptive behaviour', 'contextually inappropriate behaviour', 'disruptive behaviour', 'responsive behaviour', 'externalizing behaviour', or 'emotionally dysregulated' behaviour. Throughout this report, we will use the term *challenging behaviour* to reflect the terminology consistently found in the research literature in the assessment and treatment of individuals with IDD across the lifespan (National Collaborating Centre for Mental Health, 2015). In this context, it should be noted that the term challenging behaviour is not intended to place blame, insinuate inconvenience, or otherwise denigrate the rights and preferences of the individual, but rather to highlight the seriousness and potential for life-altering negative consequences involved. These behaviours are a challenge first-and-foremost for the individual.

Across the lifespan and across settings, the impact of untreated behavioural health issues takes its toll on persons with IDD, families, and social services. Untreated challenging behaviour contributes towards many negative outcomes. Exclusion from community services and programs (Emerson, 1995),

Challenging behaviour limits an individual's ability to effectively participate in his or her community, reduces opportunities to learn new skills, poses a barrier to engagement in meaningful activities, and leads to a poorer quality of life.



exposure to police services, involvement with the criminal justice or forensic mental health systems (Crocker et al., 2006; Raina, Arenovich, Jones, & Lunsky, 2013; Tint et al., 2017), and inappropriate placement (Ontario Ombudsman, 2016) are common outcomes for individuals who exhibit challenging behaviour. Engaging in challenging behaviour increases the likelihood that individuals living with IDDs may be mistakenly diagnosed with a psychiatric illness (Lunsky et al., 2006) and inappropriately prescribed antipsychotic medications (Lunsky et al., 2018; McGillivray & McCabe, 2004; Shennan, 2015); a practice which can have life-altering negative physical side-effects (Sullivan et al., 2018). A significant proportion of persons with IDD are exposed to chemical sedation, physical restraint, and seclusion as a result of challenging behaviour (Emerson et al., 2001; Robertson et al., 2005). Challenging behaviour is the most common reason that individuals with IDD present at hospital emergency departments, and do so at a disproportionate rate as compared to the general population (Lunsky, Gracey, & Gelfand, 2008).

The child, youth and education systems in Ontario have struggled to support individuals exhibiting challenging behaviour over the last several decades. In July 2015, the Toronto Star published two articles on the frequency of critical events, restraint use, and police involvement in publicly-funded community group homes tasked with supporting at-risk youth and individuals living with IDDs, mental health issues, and other complex needs. In 2017, repeated reports of violence within school settings documented the crises students are facing in the absence of behavioural health supports. As a result, students exhibiting challenging behaviours are at risk of seclusion, repeated physical restraint, and exclusion from learning opportunities at school. In addition, there are significant impacts on peer and personnel safety and wellbeing, including reports of educational workers being hit, kicked, or

punched by students (Draaisma, 2017; Westoll, 2017); educational workers wearing Kevlar clothing to protect themselves from injury caused by students (Westoll, 2017); students witnessing acts of violence towards their teachers or being evacuated from their classrooms (Rushowy, 2017); and police officers being called by schools to manage a students' outbursts (Goodfield, 2017). In a recent survey, 90% of Ontario Catholic School Teachers reported they experienced some form of violence or harassment from students who engage in challenging behaviour (Ontario English Catholic Teachers Association, 2017). On January 17, 2017, the Elementary Teachers' Federation of Ontario (ETFO) released a call to action on violence in schools regarding the lack of support for students with special education needs and the high prevalence of workplace injuries. According to People for Education's (2017) Annual Report on Schools, "24% of elementary and 15% of secondary schools report that not all identified students are receiving recommended support" (p. 21). Many parents and educational workers have publicly shared their frustration about long waitlists for students with IDD and mental health concerns to access appropriate assessment and treatment, especially in the rural areas of Ontario. Parents and guardians have also highlighted concerns about the negative portrayal and inappropriate treatment of their children who are frequently in crises due to a lack of appropriate intervention supports (Stone, 2012).

Challenging behaviour takes its toll on caregivers and families. Allen, Lowe, Moore, and Brophy (2007) found that family members exposed to challenging behaviour experienced increased physical and psychological health problems, incurred frequent physical injury, and reported a diminished overall quality of life. Hensel, Lunsky, and Dewa (2012) found that up to 20% of direct care professionals reported injury due to the physical aggression of those they were supporting. Caregivers exposed to challenging behaviour also experience increased mental health problems and burnout (Hensel, Lunsky & Dewa, 2012; Rose et al., 2004), often take more sick days and may resort to ineffective and potentially harmful, even abusive practices (Allen et al., 2007).

The care and treatment of individuals with challenging behaviour also carries a heavy societal burden. Lunsky et al. (2018) estimated the cost of prescribing antipsychotic medications to individuals with IDD in Ontario at approximately \$19.5 million annually. The researchers noted that many of the individuals receiving these life-altering medications did not have a psychiatric diagnosis. Individuals in hospitals presenting with challenging behaviour can cost the healthcare system in excess of \$3,000 per day. Specialized residential programs for individuals with severe and persistent challenging behaviour can cost more than \$600,000 per year, per person (Butterill et al., 2009; Ontario Ombudsman, 2016). A disproportionate number of individuals (approximately 37%) identified as inappropriately placed/long-stay patients in hospital are those with IDD and co-morbid behavioural health disorders (Lunsky, Bradley, Durbin, Koegel, Canrinus, & Goering, 2006). Individuals presenting with challenging behaviours are overrepresented in the forensic mental health and criminal justice system, with most arrested and incarcerated following episodes of physical aggression (Raina, Arenovich, Jones, & Lunsky, 2013). Raina

et al. (2013) found that 10% of crisis responses by police result in arrests for adults with IDD. Although research is limited, the cost of failing to adequately treat individuals with challenging behaviour in the province is substantial (Ontario Ombudsman, 2016).

FILLING THE GAPS OF POLICY AND PRACTICE

In Ontario, several ministries have produced policy directives relevant to the management of challenging behaviour by individuals with IDD. These ministries include the Ministry of Education, Ministry of Health and Long-Term Care, and the Ministry of Children, Community and Social Services. Common amongst these policies are that restraints are only permitted when there is an imminent risk of harm to the individual or others, and that the least amount of physical restraint be used. There are limited policy directives on developing and implementing alternatives to physical restraint, as well as the myriad of programming features (e.g., clinical oversight, program monitoring and evaluation, staff training and oversight) that may mitigate risk and/or circumvent the long-term continued use of restrictive procedures. Of particular concern, there remains no limit on the use of chemical restraint or on time away from school for students that are formally or informally suspended as a result of challenging behaviour.

The Ministry of Education's Policy/Program Memorandum #140 (PPM140) provides direction to school boards to use applied behaviour analysis (ABA) teaching methods for students diagnosed with ASD. Sadly, no such policy exists for children with other exceptionalities who may engage in challenging behaviour and no such mandate exists for children in residential care or other social services. Unlike educational policy in other jurisdictions (e.g. *Individuals with Disabilities Education Act, 2004*) PPM140 and Ontario's Special Needs Strategy for Children and Youth fail to provide directives on training or professional qualifications, and fail to mandate the development and implementation of specific evidence-based procedures (e.g., functional behavioural assessment) by qualified professionals.

In 2017, the Ministry of Children and Youth Services —now the Ministry of Children, Community and Social Services— developed the Ontario Autism Program (OAP). The OAP outlines the use of evidence-based behavioural services, including ABA, for children diagnosed with ASD. It also identifies who may be considered qualified to develop and supervise behaviour plans in this service, although there continues to be challenges with non-credentialed practitioners offering services due to policy loopholes. In 2008, the Ministry of Children and Youth Services developed the *Services and Supports to Promote the Social Inclusion of Persons with Developmental Disabilities Act of 2008*. The act describes rules that agencies and Developmental Services Ontario are mandated to follow. It also includes Quality Assurance Measures (QAM) related to the treatment of challenging behaviour that apply to service agencies who are funded to provide supports to adults with IDD and challenging behaviour. Under the requirements, service agencies must develop an individual behaviour support plan for every adult with a developmental disability who presents with challenging behaviour. The QAM guidelines do not explicitly state the qualifications of the person responsible for writing a behaviour support plan but do provide that the plan needs to be approved by a psychologist, a psychological associate, a physician, a

psychiatrist, or behaviour analyst certified by the Behavior Analyst Certification Board (BACB®) when intrusive measures are involved (QAM, s.18(3)(e)). Many adults living with IDDs live in long-term care facilities in Ontario (Ontario Ombudsman, 2016). In its report on responsive behaviour in long-term care settings, the Ontario Behavioural Support System Project Team (funded by the Ministry of Health and Long-Term Care) indicates that “long-term care homes in Ontario use restraints more often than they do in most other countries” and that “there is evidence that medications such as antipsychotics and benzodiazepines are used when there was no clear indication for their use” (Ontario Behavioural Support System Project, 2010, p. 10). Although the Ministry of Health and Long-term Care funds Behavioural Supports Ontario (BSO), “an initiative created to enhance health care services for older adults in Ontario with complex and responsive behaviours associated with dementia, mental health, substance use and/or other neurological conditions” it does not provide policy direction on quality standards, necessary professional training or credentials, or clinical oversight specific to assessing and treating challenging behaviour in long-term care settings. Despite developments across sectors, existing policy does not mandate the use of evidence-based assessment or treatment of challenging behaviour, nor does any act regulate practitioners employed to develop, implement, or supervise behaviour analytic procedures.

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This document is intended to: (a) serve as a resource for the many professionals and service providers across the province that are concerned with the safety and well-being of individuals living with IDDs, (b) to give caregivers, advocates, and policymakers a tool to promote policy and programs that are safe and effective, and (c) to provide recommendations from scholarly review and expert consensus to contribute to improved conditions for the individuals and families that too frequently remain underserved, untreated, and in unsafe situations. As a starting point, we turn to a brief overview of the term *evidence-based practice*, and the rationale for the criteria selected by the task force.

DEFINING EVIDENCE-BASED PRACTICE

Identifying evidence-based practices (EBP) helps consumers, policy makers, and clinicians to make ethical and well-informed decisions about the assessment and treatment of challenging behaviour. While general definitions exist for EBP (APA Presidential Task Force on Evidence-Based Practice, 2006; Cochrane, 1972; Sackett et al., 1996) and although some disagreement exists on specifics (e.g. see Hitchcock et al., 2014; Smith, 2013), there is a common consensus that EBP “is a decision-making process that integrates (a) the best available evidence with (b) clinical expertise and (c) client values and context” (Slocum et al., 2014, p.44).

In addition to the inclusion of clinical expertise, and the consideration of client values and the context of developmental services in Ontario, this report provides a consensus-based overview of targeted research on the assessment and treatment of challenging behaviour using the levels of evidence suggested by Chambless and Hollon (1998) which are depicted in Table 1.

Table 1. Levels of Evidence for Clinical Treatment

| Effective | Promising | Inconclusive | Ineffective |
|--|--|--|--|
| At least 3 SCDS conducted by independent researchers showing treatment success with at least 9 participants | Initial research results show positive outcomes, but there are less than 3 SCDS conducted, or less than 9 participants across studies. | At least three studies by independent researchers showing conflicting results regarding outcomes of the treatment. | At least three studies within existing research showing poor treatment effects across at least 9 individuals across studies. |
| At least 2 randomized control trial studies showing treatment success and conducted by independent researchers | | | |

Due in large part to the heterogeneity of the IDD population, and the diverse topographies of the behaviour of interest, most evidence and research on treatments for challenging behaviour stem from single-case designs (SCDs). These designs are commonly referred to as single subject designs, single-subject research designs, small N, or ‘N of 1’ experiments. The heterogeneity of the population and behavioural presentations may create comparison challenges for treatment studies applying group designs (e.g. randomized control trials), which may explain why the majority of published studies are SCDs and why few group design studies evaluating non-behavioural treatments produce data on important treatment considerations like generalization, treatment integrity or social validity (Sturmey & Didden, 2014).

Chambless and Hollon (1998) propose “a scheme for determining when a psychological treatment for a specific problem or disorder may be considered to be established in efficacy or to be possibly efficacious” (p. 7). As this particular schematic for identifying empirically supported treatments incorporates SCDs, it may be more effective in examining a literature base consisting largely of this methodological approach, rather than definitions of evidence which rely exclusively on group designs as or fail to differentiate SCDs from case studies or case-control studies (Cochrane: Ali, Hall, Blickwedel, & Hassiotis 2015; National Health and Medical Research Council, 2009; OCEBM Levels of Evidence Working Group, 2011). Other scientific bodies such as the U.S. Department of Education’s Institute of Education Sciences’ (IES) What Works Clearinghouse incorporate SCDs as a valid source of evidence in their reviews and provide a criteria for evaluating the quality of SCD studies (What Works Clearinghouse, 2017).

In typical SCDs, the clinician will systematically conduct baseline (pre-intervention) and intervention conditions. Intervention effects compared to pre-intervention or control conditions are evaluated across several replications either within or across participants, or both. Experimental manipulation of the intervention (independent variable) or its components is often repeated to demonstrate that behavioural changes (dependent variable) reliably correspond with intervention application, allowing the clinician to confirm intervention effects. These concepts will be explored further in the assessment section of this report.

ASSESSMENT

1. How are challenging behaviours selected for assessment and treatment?

Caregivers, guardians, and clients themselves often bring challenging behaviours to the attention of a clinician when an individual's quality of life is compromised by such behaviours. When a clinician is approached about a challenging behaviour, they must first determine the severity of the behaviour(s). They must consider a variety of selection criteria, including: (a) the extent to which changing the behaviour may improve the clients' life experience (Cooper, Heron & Heward, 2007), (b) whether behaviour reduction will promote positive interactions in the individual's natural environment after the treatment ends, and (c) whether the behaviour is truly problematic for the individual themselves, not just those in the individual's environment. In some cases, individuals may engage in multiple challenging behaviours that co-occur (such as tantrums), and in other cases, challenging behaviours may occur in isolation. A thorough assessment process allows clinicians to determine whether the different forms of behaviours (i.e., the topography, or what the behaviours look like) are serving the same purpose for the individual (i.e., function). If the behaviours all appear to serve the same function, or occur for the same reason, the clinician will develop a treatment that targets multiple behaviours. Alternatively, a clinician may need to prioritize challenging behaviours, which means they may treat the most severe behaviours first and later develop interventions for other challenging behaviours and skill deficits. Some factors to consider when prioritizing challenging behaviours for intervention include the social significance of the behaviour, how dangerous it is to the individual or others, whether the behaviour results in the individual being placed in a more restrictive setting, and the extent to which the behaviour interferes with the individual's ability to learn new skills and participate in their community.

2. What are the current approaches to the assessment of challenging behaviour?

Assessing challenging behaviours can be influenced by a number of factors including, but not limited to, comorbid IDD and neurodevelopmental disorders, medical issues, and the complexity or history of the challenging behaviour. All individuals who engage in challenging behaviour should receive a medical assessment to rule out the possibility that the behaviour is occurring due to an underlying medical condition. The Canadian Consensus Guidelines for the Primary Care of Adults with Intellectual and Developmental Disabilities ([Sullivan et al., 2018](#)) provide a comprehensive set of recommendations. These guidelines also identify a number of common medical issues that may contribute to the onset of challenging behaviour. If medical concerns have been ruled out as a cause for challenging behaviour, subsequent assessment strategies should be employed.

It is well-known that the trajectory for individuals who engage in challenging behaviours without appropriate assessment and intervention is unfavourable (Carr, Taylor, & Robinson, 1991). Thus, a great deal of focus has been placed on the etiology and assessment of challenging behaviour (Luiselli, 2012). Developmental, environmental, or genetic factors alone, or in combination, may

account for or contribute to the development of challenging behaviours. Having adequate resources (e.g., staffing, funding) for assessing challenging behaviours such as aggression towards self or others is important in evaluating the overall needs of the individual and for informing the course of treatment.

Historically, non-medical methods for assessing challenging behaviour have been drawn from the IDD and child psychopathology literature (Matson & Nebel-Schwalm, 2007). Typically, from these perspectives, challenging behaviours are evaluated by scaling methods which use behavioural observations of operationally defined target behaviours. Alternatively, contemporary methods for assessing challenging behaviours have included *behavioural assessment* which is based on the extant literature of applied behaviour analysis (ABA).

CHALLENGING BEHAVIOUR RATING SCALES

Rating scales are one of the oldest assessment tools used in mental health, disabilities, and education. Rating scales of challenging behaviour are used to assess personality development, adaptive behaviour, and social-emotional functioning. A variety of behaviour rating scales are available for use in clinical practice, and the majority of these scales are intended for use with children. The majority of rating scales rely on informant and self-report forms. Clinicians can choose from global scales that assess multiple domains of functioning or scales that focus on a specific dimension of behaviour (e.g., *Child Behavior Checklist - Aggressive Behavior Scale*; Achenbach & Ruffle, 2000).

Behaviour rating scales content often conforms to diagnostic criteria (e.g., Diagnostic and Statistical Manual of Mental Disorders-Fifth Edition, DSM-V; International Classification of Diseases, ICD), though it can differ in the way the symptoms are quantified as well as in the way the symptoms are combined. Challenging behaviour rating scales typically quantify the severity of the behaviours or symptoms (e.g., 0 – not present to 4 – severe) or the frequency that the behaviour or symptom is observed (e.g., 0 – never to 4 – always) using Likert-type scales. For some rating scales, scores on the scale or subscales can be summed and converted to a standard score such as a *T score*, which allows for comparison of the frequency of a variety of behaviours to norms for an individual's gender and/or age group. The results are then used to determine the clinical significance of the individual's challenging behaviours.

There are different behaviour rating scales available to clinicians including the *Behavior Assessment System for Children* (BASC-2; Reynolds & Kamphaus, 2004), *Child Behavior Checklist* (CBCL; Achenbach & Edelbrock, 1991), the *Adult Behavior Checklist* (ABCL; Achenbach, 1997), the *Behavior Problems Inventory* (BPI; Rojahn, Matson, Lott, Esbensen, & Smalls, 2001; Sturmey, Fink, & Sevin, 1993; Sturmey, Sevin, & Williams, 1995), the *PDD Behavior Inventory* (Cohen, 2003; Cohen, Schmidt-Lackner, Romanczyk, & Sudhalter, 2003), the *Overt Aggression Scale* (Hellings et al., 2005), and the *Burk's Behavior Rating Scales* (BBRS; Burks & Gruber, 1977). Although this list is not exhaustive and does not cover the full range of available scaling methods for challenging behaviours, it is a good representation of scales that are typically accepted, as determined by surveys of clinicians.

Scaling methods are common in mental health and child psychopathology; however, for some scales, the groups they are normed to and the reliability and validity data is limited (Matson & Nebel-Schwalm, 2007). Addressing existing limitations is important given this assessment strategy serves as a common first step in evaluating challenging behaviours. Rating scales and similar instruments provide a useful means of beginning to identify and prioritize the challenging behaviour in an individual's repertoire. However, once this initial, broad phase of challenging behaviour review is complete, direct observation and behavioural assessment of specific, operationally defined challenging behaviours is necessary. The latter provides more direct information to analyze the conditions that contribute to the development of challenging behaviour.

STRUCTURAL VERSUS FUNCTIONAL APPROACHES TO ASSESSING CHALLENGING BEHAVIOUR

The assessment of challenging behaviour has historically been based on its structural characteristics and the extent to which certain responses co-occur. Traditional methods of classifying and assessing challenging behaviour, such as those based on rating scales, have relied primarily on observed correlations among and sequences of challenging behaviours or symptoms. For example, a child who is easily distracted, who talks over other people, who appears highly energetic, and who often fidgets and squirms might receive a diagnosis of attention-deficit/hyperactivity disorder. A child who engages in peculiar vocal responses, who avoids others, and who has restricted interests might receive a diagnosis of ASD. The approach, which is the foundation of many behavioural assessments in developmental psychology, clinical psychology, and psychiatry, focuses on the structural characteristics of behaviours (i.e., the topographies of challenging behaviour) and on the extent to which certain responses covary (i.e., which challenging behaviours occur together or at the same time).

An ABA-based alternative to this structural classification system of behaviour is to categorize challenging behaviour according to environmental events that function to maintain it (i.e., which environmental events precede and follow the challenging behaviour). With respect to ABA, clinicians and researchers have long understood the importance of analyzing both the structure and function of function of challenging behaviour. As a result, clinicians have increasingly assessed challenging behaviour both in terms of its structural characteristics and its function.

Assessing challenging behaviour both by structure and function is important for the development of treatment. Treatments based on structural characteristics alone assume that all forms of a specific topography of challenging behaviour can be treated the same way (e.g., aggressive behaviour can be treated with aggression-based interventions). However, treatments that also incorporate functional characteristics of challenging behaviour are far more effective as they consider the individual's learning history as well as what environmental events are maintaining challenging behaviour. For example,

Treatments that also incorporate functional characteristics of challenging behaviour are far more effective as they consider the individual's learning history as well as what environmental events are maintaining challenging behaviour

two children who engage in aggressive behaviour might do so for very different reasons. One might engage in aggression during periods in which attention from adults is limited and engaging in aggression typically results in adult attention. Another might engage in aggression during academic task demands and aggression might result in the removal of task demands and escape to a preferred activity. In the functional approach, two individuals engaging in structurally similar forms of challenging behaviour may require substantially different treatments based on function (i.e., aggressive behaviour is treated with function-based interventions). Assessments that take structure and function into consideration have shown to be the most informative for the development of effective treatment for challenging behaviour (Emerson et al., 2001; Holden & Gittlesen, 2006; Iwata et al., 1994; Kahng, Iwata, & Lewin, 2002).

FUNCTIONAL BEHAVIOUR ASSESSMENT OF CHALLENGING BEHAVIOUR

Developmental psychology, clinical psychology, and psychiatry frequently use scaling methods as those described above. Many practitioners in the school psychology and special education fields are likely to have adopted an ABA approach to assessment, which typically relies on an “operant” understanding of challenging behaviour (i.e., what in the environment appears to maintain the occurrence of the behaviour). Operant assessment focuses on determining the environmental events that precede or evoke challenging behaviour (known as antecedents) as well as the environmental events that follow or appear to maintain challenging behaviour (known as consequences). Typical assessment methods employed in the ABA model of challenging behaviour have collectively been referred to as “functional behaviour assessment.” This assessment approach includes many components as core methods of evaluating challenging behaviours, including: (a) developing operational definitions, (b) interviews with those familiar with the individual engage in challenging behaviour, (c) direct observation of challenging behaviour, and (d) systematic manipulation of environmental variables hypothesized to maintain challenging behaviour.

Functional behaviour assessment (FBA) begins with developing objective operational definitions of the challenging behaviour. Operational definitions are brief descriptions of the behaviour and may include: (a) topography (i.e., physical movement of the behaviour or what the individual is doing), (b) frequency of the behaviour, length or duration of the behaviour, and, (c) a description of the behaviour’s intensity. In other words, operational definitions refer to observable characteristics of the behaviour and events in the environment. The definition should be obvious enough that another person unfamiliar with the individual’s behaviour could measure it consistently. Finally, the boundary conditions of the behaviour are clearly delineated so that observers can objectively and reliably determine what is and is not an occurrence of the challenging behaviour.

In addition to operational definitions, FBA takes advantage of direct observation of the challenging behaviour and analyzes interactions among those environmental variables that affect the behaviour in discrete observation periods. Methodologies in which challenging behaviours are observed and coded are important in this regard. FBA provides an alternative strategy to scaling methods. First, the primary strength of this approach (direct observation) enhances validity of the problem

behaviour description. Second, specificity consisting of tailored definitions to each individual's unique problem behaviour is possible since no two individuals engage in precisely the same type of challenging behaviour. Third, the specificity of data makes this assessment method more sensitive to treatment effects than scaling methods. Despite these advantages, the clinician must be very sensitive to the sampling methods employed. Because of the specificity and sensitivity of measurement, the sampling method used can be a major factor in the accuracy of the results (Gardenier et al., 2004).

The most crucial component in the FBA model of challenging behaviour is the systematic assessment of environmental events that maintain challenging behaviour. The method is used to assess which environmental variables may be causing and maintaining challenging behaviour. In instances where events and maintaining consequences for challenging behaviour can be identified, these particular events can be targeted for change. The goal of FBA is to encourage a move away from the application of aversive or unfavorable consequences to challenging behaviour (i.e., punishment). The use of aversive consequences as a strategy is aimed primarily at suppressing the target behaviour while the FBA method is geared toward changing the environmental conditions that have fostered the socially unacceptable behaviour. Another benefit is the emphasis on training replacement behaviour. Teaching replacement behaviour has become one of the primary methods of treating challenging behaviours in recent years and involves teaching adaptive skills that replace the challenging behaviour. Although some see this technique as separate from more traditional psychological assessment in the form of scaling methods, this is not necessarily true. In fact, after initial screening of challenging behaviours has been conducted with a psychometrically-validated rating scale, FBA may be the logical next step.

Teaching replacement behaviour has become one of the primary methods of treating challenging behaviours in recent years

Practitioners use FBA to identify what the maintaining (or reinforcing) variable is within the environment so that it can be used to establish or teach a replacement skill and create a situation in which challenging behaviours no longer result in access to reinforcement. To assess the environmental variables that influence behaviour, practitioners should conduct FBAs. An FBA may be summarized as the process of gathering information by observing behaviours of interest and manipulating environmental variables to develop effective treatments (Kelley, LaRue, Roane, & Gadaire, 2011). FBAs can be classified into three categories: indirect assessments, descriptive assessments, and functional analysis. Each of these assessments varies in the precision of information gathered and ease of usability (Cooper et al., 2007). FBA as a means of identifying the maintaining variables for challenging behaviour have been impressive. Unfortunately, this technology has generally been neglected by most practitioners who are treating based on a syndrome or diagnostic model, versus assessment and treatment of singular challenging behaviours (Matson & Nebel-Schwalm, 2007).

Behaviour occurs in response to both individual and environmental variables. Individual variables consist of an individual's genetic and biological makeup, as well as prior learning history (Wacker, Berg, Harding, & Cooper-Brown, 2011). Environmental variables consist of events that occur both before (antecedent) and after (consequence) a behaviour. The environment-behaviour relation is one that is observable and susceptible to change, and thus is the primary focus of behavioural assessment (Wacker et al., 2011).

Research has demonstrated that the same learning processes accounting for the acquisition of socially appropriate behaviours are also involved in the development and maintenance of challenging behaviour (Iwata & Dozier, 2008). If challenging behaviour is occurring, it is likely a result of a unique learning history, which relates to the individual's interactions and experiences between challenging behaviour and the surrounding environment (Hanley, 2012). For example, harmful behaviours often result in a necessary reaction from caregivers that may strengthen the behaviour if the behaviour is maintained by social attention (Iwata & Dozier, 2008). Occasionally, challenging behaviours interfere with or result in terminating work requirements (e.g., self-injury interferes with a teacher's ability to deliver instructions), which could result in the individual temporarily escaping work activity and indirectly reinforcing the likelihood that it will happen again (if the behaviour is maintained by escape from demands). Other challenging behaviours may have a stronger biological underpinning in origin relative to socially-maintained challenging behaviours and could be maintained by the sensory consequences they produce. For example, severe head-banging might occur in an individual with IDD who is attempting to alleviate a headache. In this scenario, head-banging may temporarily reduce the headache in which case the challenging behaviour is maintained by sensory relief or activation of endogenous opioids (Cataldo & Harris, 1982).

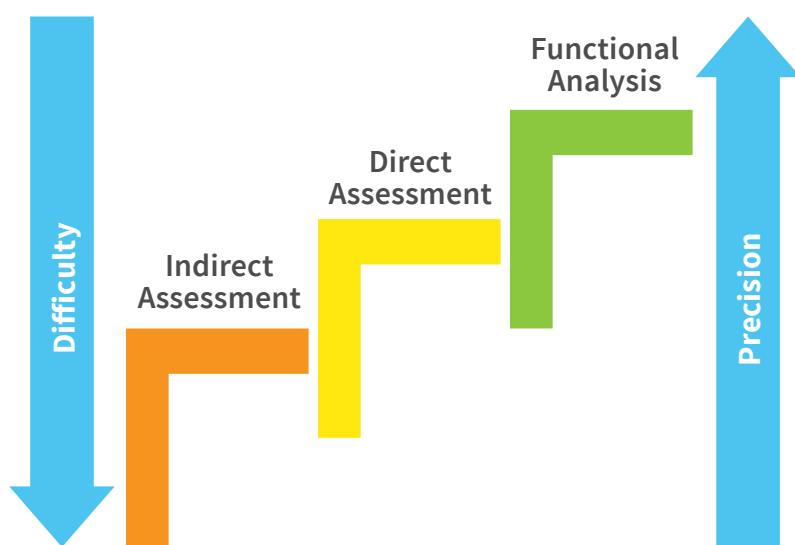


Figure 1. The level of precision and difficulty associated with each FBA category. As precision increases so does difficulty. Functional analysis is the most labour-intensive form of FBA but provides the most accurate information about the environmental events maintaining challenging behaviour.

3. What are the Core Components of Functional Behavioural Assessment?

Functional behaviour assessment is a comprehensive term that includes three primary techniques: (a) indirect assessments, (b) descriptive assessments, and (c) functional analysis. Indirect assessments include interviews and questionnaires with individuals familiar with the client who engages in challenging behaviour to help identify relevant client-specific information (Kelly, LaRue, Roane, & Gadaire, 2011). Descriptive assessments involve the direct observation of challenging behaviour in the natural environment while taking note of environmental events that frequently precede (antecedent) or follow (consequent) the target behaviour (i.e., correlational data; Thompson & Borrero, 2011). Functional analysis involves purposely manipulating environmental events hypothesized to maintain challenging behaviour, combined with direct observation (i.e., causal data; Beavers, Iwata & Lerman, 2013). As environmental variables are directly manipulated in a functional analysis, it allows for the identification of cause-effect relations; therefore, functional relations are demonstrated rather than inferred (Betz & Fisher, 2011).

INDIRECT ASSESSMENT

Indirect assessments consist of gathering information through interviews, rating scales, and questionnaires, with little to no direct observation of the behaviour of interest. These assessments are subjective as they rely solely on an informant's account of the target behaviour of interest (Fryling & Baires, 2016). For example, a clinician may meet with a parent or teacher and begin the FBA process by asking questions outlined in an open-ended interview such as the Functional Analysis Interview Form (FAI; O'Neill et al., 1997). The interview is comprised of specific questions allowing caregivers to answer without constraint, rather than being restricted to a Likert or rating scale. Examples of questions included in the FAI are: (a) what are the problem behaviours of concern, (b) when are the behaviours most/least likely to occur, and (c) does the client typically seem bothered in situations that are crowded and noisy? Indirect assessments represent an important feature within the FBA process; however, there are risks that the caregiver may either omit important information and/or provide information that is not relevant to understanding the behaviour of concern (Fryling & Baires, 2016). As such, these assessments tend to yield less accurate or incomplete information and generally have poor reliability compared to more rigorous FBA methods such as functional analysis (Hanley, 2012; Iwata & Dozier, 2008). Therefore, an intervention should never be created solely on indirect information (Hanley, 2012). Instead, indirect assessments may be used to explore and hypothesize which environmental variables may be evoking and maintaining the challenging behaviour.

DESCRIPTIVE ASSESSMENT

Descriptive assessments involve directly observing the behaviour of interest, which may consist of continuous recording or periodic sampling of the behaviour (Thompson & Borrero, 2011). During descriptive assessments, target behaviours are observed without making changes to environmental conditions (i.e., the behaviour is observed under naturally occurring conditions; Hanley, 2012).



Descriptive assessments may include: (a) ABC (antecedent-behaviour-consequence) recording, wherein clinicians collect information on what occurs before the behaviour, the behaviour of interest, and what happened after the behaviour, (b) narrative/event recording, also referred to as anecdotal reports, (c) ABC checklists, (d) frequency, or how often the behaviour occurs, (e) interval or time-sampling recording, and (f) scatterplots, wherein clinicians collect information on whether challenging behaviour correlates with specific times of the day. Given conditions are not directly manipulated by the clinicians, the assessments only yield correlational descriptions of the behaviour-environment relation. Descriptive assessments do not provide specific information on what maintains challenging behaviour and can produce false-positives, leading to erroneous conclusions regarding the environmental variables responsible for the occurrence of challenging behaviour (Hanley, 2012; Iwata & Dozier, 2008; Thompson & Borrero, 2011). For example, a caregiver or clinician might complete an ABC data sheet by recording the activity (or antecedent) as presentation of task demands, and the consequence for challenging behaviours to be redirection to a new activity with statements of concern from an adult (e.g., “Are you feeling ok? Play with this, it will make you feel better.”). The information may lead one to believe that the function is escape from work as the original activity was removed through redirection. However, through this descriptive assessment alone, it is unclear what role the adult’s statements of concern have with regards to the maintenance of the challenging

Descriptive assessments do not provide specific information on what maintains challenging behaviour and can produce false-positives, leading to erroneous conclusions regarding the environmental variables responsible for the occurrence of challenging behaviour

behaviour (i.e., the maintaining environmental event could be access to adult attention instead of or in addition to escape from work activities).

The results of descriptive assessments often fail to be reliably predictive of what maintains challenging behaviour and may not reveal differences between different environmental events that co-occur with challenging behaviour (Beavers et al., 2013; Iwata & Dozier 2008). Some literature suggests that the utility of a descriptive assessment is not necessarily to inform treatment design but to inform and modify the conditions that will be tested in a functional analysis (Beavers et al., 2013; Hanley, 2012).

FUNCTIONAL ANALYSIS

The functional analysis process has been described as analogous to allergy testing (Hanley, 2012). Individuals go to an allergist/immunologist when they believe they have had a reaction to some allergen in their environment. The specialist cannot determine the exact allergen until they test for all suspected allergens. Testing is done by first safely exposing the patient to each of the suspected allergens to detect which ones produce a small reaction. The specialist then compares this reaction to a control exposure (a saline solution) to ensure the reaction was a result of the allergen exposure rather than a pre-existing condition or a response to some unknown event. The specialist continues to assess the suspected allergens and compares each reaction to the control exposure to discover the allergen and prescribe an appropriate treatment. In a functional analysis, clinicians are similarly testing which hypothesized environmental conditions will produce a slight increase in challenging behaviours (for a brief time) and continue to repeat these conditions until they are confident about the variables that reliably produce the challenging behaviour. With the precise understanding of why the challenging behaviour is occurring, clinicians can prescribe more effective behavioural treatments (Campbell, 2003; Heyvaert, Saenen, Campbell, Maes, & Onghena, 2014). During a functional analysis, individualized antecedents and consequences are purposefully and systematically arranged by the clinician in a series of brief observation periods (referred to as sessions) so that their effects on behaviour can be directly observed and measured (Cooper et al., 2007; Hanley, 2012). There is direct observation of the target behaviour and systematic manipulation of some environmental event to assess how that event affects the occurrence or non-occurrence of challenging behaviour (Hanley, 2012). Specific conditions are designed to identify variables that could be responsible for perpetuating the challenging behaviour. Each test condition is precisely prescribed to include variables that are unique to the individual's life, including setting events or antecedents (i.e., what is reported to trigger the challenging behaviour) as well as outcomes or consequences (i.e., what is reported to happen after the behaviour or how individuals in the environment react). The conditions are arranged according to the prevailing hypotheses regarding the etiology of severe behaviour disorders and are understood as social positive reinforcement, social negative reinforcement, and automatic or sensory reinforcement (Iwata et al., 1982; Iwata et al., 1994).

Social positive reinforcement includes the addition of an event, item or person within the environment following the occurrence of a targeted behaviour. For example, when challenging behaviours result in attention from caregivers or when caregivers give the individual something tangible such as a favourite toy, item, or activity. To better understand this, consider the following examples:

- While waiting in line at the grocery store, a young child's request for a chocolate bar has been denied. As a result, the child begins to tantrum. When the parent gives the child the chocolate bar, the child stops his tantrum. Although the child stopped his tantrum in the present moment, it is very likely that he will tantrum again in the future under similar circumstances because he has learned that tantrums are an effective way of getting a reinforcer (in this case, a chocolate bar) from his/her parent.
- A child cries after being put to bed, and her parents come to her room to comfort her. Although the crying stops in the present moment, it will likely result in an increase in crying behaviour in the future as the child learns that crying is an effective way of getting her parents to come and comfort her during bed time.

When testing for socially-mediated positive reinforcement during a functional analysis, the clinician simulates conditions likely to produce challenging behaviours in the natural environment (e.g., removal of a favourite toy or item; turning away from the individual and speaking to a teacher). The clinician provides either access to a tangible item (e.g., favorite toys, food items, electronics) or access to attention (e.g., brief reprimands/statements of concerns, consoling) when the target behaviour occurs. These conditions are referred to as the tangible and attention conditions, respectively. When challenging behaviours consistently occur in these conditions and immediately cease upon accessing the socially-mediated reinforcer (the favourite item or attention), it suggests that challenging behaviour has been serving the purpose of gaining access to social positive reinforcement. These conditions are often conducted separately to identify which form of positive reinforcement is crucial for the maintenance of challenging behaviour.

Social negative reinforcement includes the removal of an unpleasant or non-preferred event or situation, which leads to an increase in challenging behaviour. For example, when challenging behaviours result in the removal of work requirements or instructions from caregivers. To demonstrate this, consider the following example:

- An adult with IDD living in a community home does not like to brush her teeth. When staff instruct her to brush her teeth, she immediately falls to the floor and begins banging her head. To calm her down, the distraught staff tells her she doesn't have to do it and removes the toothbrush from sight, redirecting the client back to the activity she was engaged in before she had been asked to brush her teeth. This stops the individual's head banging from occurring in the moment; however, it may result in an increase in head banging in the future because she learns that head banging is an effective way of avoiding brushing her teeth.

During a functional analysis, the condition testing for social negative reinforcement is referred to as the escape condition. Typically, in this condition, the clinician presents instructions that have historically been reported to result in challenging behaviours (a situation that has been reported to ‘trigger’ the challenging behaviour based on an indirect or descriptive assessment). When the challenging behaviour occurs, the caregiver provides escape by removing the non-preferred situation or event and/or telling the individual they no longer have to do what was asked. If the challenging behaviours consistently occurs when presented with an undesirable demand and reliably stops when the individual is provided with escape, it suggests that these challenging behaviours may be maintained by removal or elimination of unpleasant or non-preferred events.

Automatic reinforcement differs from socially-mediated reinforcement in that the maintaining environment is not mediated by another person. Rather, the challenging behaviour itself produces its own reinforcing consequence. To illustrate this, consider the following example:

- An adult with IDD frequently engages in ear-slapping throughout the day. Independent of what is occurring around the individual, he continues to slap his ear. Ear-slapping occurs during low-activity periods, high-activity periods, when preferred items are present, when adult attention is given freely, when demands are withdrawn, and even when the individual is alone.

It is hypothesized that automatic, or sensory reinforcement, may be a result of biological or endogenous processes that cannot be easily detected by a clinician (Barrera, Violo, & Graver, 2007). If behaviours are predicted to be automatically reinforced, it is especially important to first conduct a comprehensive medical evaluation to determine if challenging behaviour is a result of an underlying medical or biological concern. However, medical evaluations should be conducted for all individuals who engage in challenging behaviour, independent of whether it is believed that the behaviour is automatically reinforced.

During a functional analysis, clinicians test for automatic reinforcement with an ignore or alone test condition. In this condition, there are no programmed consequences for challenging behaviours, and the individual is observed alone (or is ignored) in a context with low stimulation (e.g., in their bedroom, observation room with a one-way mirror). This condition assesses the extent to which the challenging behaviour (a) occurs when the individual is left alone, or not attended to by the observer, and (b) persists without any socially-mediated consequences.

Functional analysis is considered the gold-standard method of functional behavioural assessment and is strongly recommended as the assessment technique of choice when evaluating and understanding challenging behaviour.

Finally, all functional analyses include a control condition. This condition typically provides the individual with free access to preferred events or items (e.g., tangibles, attention), and there are no demands or non-preferred events present. Given events or stimuli that may evoke challenging

behaviour are absent, the individual's motivation to engage in challenging behaviour is eliminated and challenging behaviour levels are expected to occur at zero or near zero rates. The condition *controls* for each of the variables being assessed in test conditions, and it allows clinicians to compare levels of challenging behaviour to each test condition.

Functional analyses typically consist of five conditions: four test conditions and a control condition. This type of assessment may also be referred to as an “analogue assessment” because suspected maintaining variables are systematically arranged to approximate the individual’s natural environment. The test conditions usually include tangible, attention, escape, and alone or ignore. The conditions are a specified duration of time, usually between 5-15 minutes, and repeated until a consistent and clear pattern of behaviour is observed (e.g., challenging behaviour occurring in one or more of the test conditions and not occurring in the control condition). Conditions can be presented in a fixed or random order and are usually replicated using a SCD to confirm results.

Table 2. Conditions that are typically evaluated in a functional analysis.

| Condition | Antecedent | Consequence for challenging behaviour | Contingency |
|--------------|---|---|---|
| Attention | Low or no attention provided; clinician is busy with something else | Attention (e.g. brief statement/reprimand, comfort/hug, verbal redirection) | Social positive reinforcement |
| Tangible | No attention or toys/items provided, OR toys/items are taken away from individual | Toys given back to individual (e.g. toy, electronic, favourite items) | Social positive reinforcement |
| Escape | Instructions and related materials are presented | Instructions and materials are removed (i.e., escape) | Social negative reinforcement |
| Control | Free access to preferred items and, attention; No instructional materials present | N/A | N/A |
| Alone/Ignore | No attention provided; individual is ignored | None | N/A Tests for automatic reinforcement (i.e., sensory/endogenous) |

Over time, clinicians have improved functional analysis methodology in a number of ways including, but not limited to, increasing its efficiency (e.g. Derby et al., 1992; Northup et al., 1991), accuracy (e.g. Vollmer et al., 1995), generality to the natural environment (e.g. Mace & Lalli, 1991), applicability to other populations, and to identify more complex antecedent-behaviour-consequence relations (Beavers et al., 2013; Betz & Fisher, 2011). Currently, functional analysis is considered the gold-standard method of functional behavioural assessment and is strongly recommended as the assessment technique of choice when evaluating and understanding challenging behaviour.

Table 3. This table summarizes various assessment tools that are used during a functional behavioural assessment (FBA).

| Indirect Assessments | Descriptive Assessments | Functional Analysis |
|--|--|--|
| Interviews <ul style="list-style-type: none"> FAI- Functional analysis interview form (O’Neil et al., 1997) Open-ended functional analysis interviews (Hanley et al., 2014) Rating Scales <ul style="list-style-type: none"> MAS- Motivation Assessment Scale (Durnad & Crimmons, 1988) FAST- Functional Assessment Screening Tool (Iwata, DeLeon, & Roscoe, 1996) QABF- Questions About Behavioral Function (Matson & Vollmer, 1995) | ABC Narrative recording ABC checklist Frequency, Interval, Time-Sampling Scatterplots | Brief functional analysis (Northup et al., 1991) Pairwise design (Iwata, Duncan, Zarcone, Lerman, & Shore, 1994) Trial-based functional analysis (Sigafoos & Saggers, 1995) Latency-based functional analysis (Thomason-Sassi, Iwata, Neidert, & Roscoe, 2011) Extended-sessions functional analysis (Kahng et al., 2001) Precursor functional analysis (Smith & Churchill, 2002) |

4. How are functional analyses interpreted?

To interpret a functional analysis, clinicians must first graphically display client responding across control and test conditions using a SCD. Next, the clinician uses a technique called ‘visual inspection’ to identify behavioural patterns. Specifically, clinicians determine which conditions produced consistently higher levels of challenging behaviour, and whether these high rates were consistently higher relative to those observed during the control condition. If target behaviour levels are higher in a test condition compared to the control condition, it suggests that the environmental variables present in the test condition may be maintaining the individual’s challenging behaviour. For example, a pattern of responding that is characterized by higher rates of challenging behaviour in the attention condition relative to the control condition is generally interpreted as ‘attention-maintained’ challenging behaviour. In this case, the functional analysis would be described as *differentiated* because there is a difference in the amount (e.g., rate) of challenging behaviour between the test and control condition. Alternatively, *undifferentiated patterns* are observed when levels of challenging behaviour are variable or elevated across all conditions. None of the test conditions show higher levels of responding than the control condition and results of the functional analysis may be considered inconclusive. However, clinicians must be aware that patterns can appear *undifferentiated* when they are indicative of an automatically-reinforced behaviour (sensory function) or multiply-controlled behaviour (i.e., more than one function); necessitating a finer-grain analysis.

Challenging behaviour that is multiply-controlled means that the behaviour serves two or more functions (e.g., access to adult attention and access to preferred tangible items). In these cases, challenging behaviour is characterized by elevated levels of responding in two or more test conditions relative to the control condition. Accurate visual inspection of functional analysis data is critical given assessment results inform treatment development. An element of subjectivity persists around data interpretation; thus, appropriate training and supervision in visual inspection and SCD is necessary to accurately analyze functional analysis results. Researchers have attempted to further minimize inaccurate functional analysis interpretation by developing structured visual-inspection criteria (Hagopian et al., 1997; Roane et al., 2013; Saini, Fisher, & Retzlaff, 2018). These criteria typically take the form of generating two criterion lines, one about one standard deviation above the mean of the control condition and the other about one standard deviation below the mean of the control condition. The clinician then determines the number of test conditions that fall above or below the two mean lines.

Challenging behaviour that is multiply-controlled means that the behaviour serves two or more functions (e.g., access to adult attention and access to preferred tangible items)

Roane and colleagues (2013) showed that using the objective criteria increased agreement of whether a function was observed during a given functional analysis data set. The authors also showed visual inspection criteria have good criterion validity and can be used to supplement visual inspection when interpreting functional analysis results.

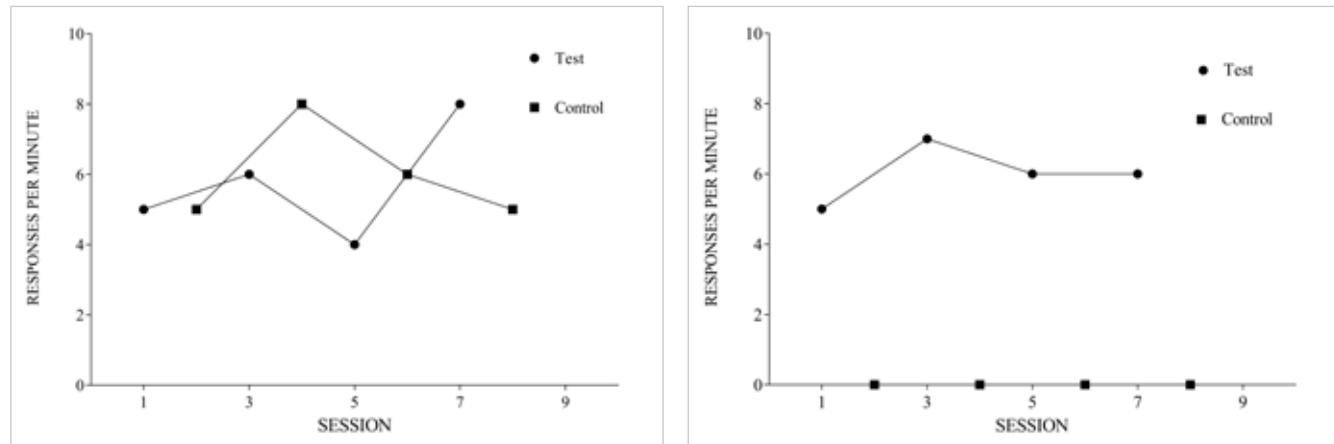


Figure 2. The graph on the left depicts functional analysis results that are undifferentiated, indicating that the function of challenging behaviour cannot yet be identified. The graph on the right depicts functional analysis results that are differentiated, suggesting that the environmental event presented in the test condition is maintaining challenging behaviour.

ADVANTAGES OF FUNCTIONAL ANALYSIS

Functional analyses produce the most reliable and valid results and serve as the standard to which other functional behavioural assessments are compared (Betz & Fisher, 2011). Functional analysis is the only method that requires clinicians to directly manipulate environmental variables suspected to maintain challenging behaviours. It is this feature that affords information which can yield more precise, effective, and efficient behaviour treatments (Cooper et al., 2007; Didden et al., 1997; Hanley, 2012; Hanley et al., 2003; Iwata et al., 1994; Kuhn, et al. 1999; Smith et al., 1993). Establishing treatments that yield better, more efficient client outcomes may reduce the likelihood that individuals are seen as ‘treatment-resistant’, and thereby reduce the risk of being exposed to more restrictive behaviour management practices such as restraint and seclusion. Additionally, ineffective treatments mean that clients continue to engage in challenging behaviour which further strengthens those behaviours and could lead to the development of new, potentially more dangerous behaviours.

It is important to note that meta-analyses have indicated that behavioural treatments based on functional analysis tend to be more effective than pharmacological interventions (Didden, Duker, & Korzilius, 1997; Iwata et al., 1994; Kahng et al., 2002). Functional analyses have also been described as a more humane practice, given information as to why an individual is engaging in the challenging behaviour is sought and what purpose the behaviour is serving prior to implementing a treatment (Hanley, 2012; Hanley et al., 2003). Hanley (2012) suggests that the answer to helping individuals with challenging behaviour can be found in understanding the effect their challenging behaviours are having on their environment. Furthermore, the prevailing hypotheses regarding challenging behaviour support the notion that these behaviours are not a manifestation of an underlying cause but are instead supported through historical learning and contextual influences.

Functional analysis is the only method that requires clinicians to directly manipulate environmental variables suspected to maintain challenging behaviours. It is this feature that affords information which can yield more precise, effective, and efficient behaviour treatments

LIMITATIONS OF FUNCTIONAL ANALYSIS

When conducting a functional analysis, the clinician may reinforce challenging behaviour for a brief time to test various events that may maintain the behaviour. As a result, there could be a temporary increase in challenging behaviour during and following the functional analysis. However, a properly designed functional analysis almost always results in lower intensity behaviours than those occurring outside of the assessment context (Hanley, 2012; Kahng et al., 2015). Rates of injury during a functional analysis were investigated by Kahng et al. (2015), the researchers compared these rates to time spent outside of the functional analysis context for individuals who engaged in self-injurious behaviours.

They concluded that injuries were relatively low across both situations. In those rare instances in which injuries occurred, the severity of the injury was low.

Safety during a functional analysis is enhanced by developing clear termination criterion, which are prescribed criteria indicating when to discontinue the analysis. Clinicians may also determine the extent to which additional safety precautions (e.g. access to protective equipment and/or provide medical treatment if needed) should be taken prior to conducting a functional analysis. The supervising clinician must first assess any potential risks in collaboration with other professionals, where appropriate, to include safety measures as needed (e.g., medical examinations/termination criteria; Iwata et al., 1982/1994). A pre-assessment cost-benefit analysis helps determine whether the benefits of the functional analysis outweigh the risks (BACB, 2017; Beavers et al., 2013; Weeden, Mahoney, & Poling, 2012).

5. What are the perceived barriers to assessing and intervening on challenging behaviour and how might these be overcome?

The following is a description of commonly perceived barriers with recommended solutions from the existing applied literature and clinical expertise regarding considerations when assessing challenging behaviour.

COMPANY POLICIES DO NOT ALLOW FOR FUNCTIONAL ANALYSIS

Even though functional analysis is considered best-practice with regards to the assessment of challenging behaviour, some organizations may not promote its use and/or may actively discourage its use. If “company policy” is a barrier, employees should first review the policy. Sometimes, an unwritten rule, (mis)interpretation, or a modifiable procedure is in place and not an actual agency policy against this evidence-based practice. If existing procedures include approval processes and/or supervision requirements that prevent efficient implementation, employees may speak with supervisors about revisiting the process. If policies present as barriers, employees may explore the policy history with supervisors. It may be that capacity building or professional development is required. Agency leaders may be encouraged to institute a systems-wide change if the following documentation is brought to their attention, including: (a) other agency policies (e.g., individualized treatment, risk assessment), (b) government mandates (e.g. O. Reg. 299/10), (c) professional and ethical compliance codes (e.g., Behavior Analyst Certification Board’s Professional and Ethical Compliance Code; Canadian Psychological Association, Canadian Code of Ethics for Psychologists), (d) position statements and guidelines (e.g., Association for Behavior Analysis International, 2010), and (e) scholarly literature. Bringing legislation and policy to the attention of agency leaders may encourage them to review and revise such policies. While awaiting official policy revisions, employees may seek permission to proceed with assessment and treatment for individualized cases.



INSUFFICIENT TIME TO CONDUCT FUNCTIONAL ANALYSIS

Functional analysis variations are plentiful and have meant that this assessment can take as little as 30 minutes to complete (Hanley, 2012). In further comparing procedural efficiency, the functional analysis often proves less time intensive than counterparts such as descriptive assessments (e.g., ABC analysis) and would be a better approach than trial-and-error interventions that are not informed by functional analysis (Mace, 1994). The relative brevity of functional analysis methodology serves to mitigate the risk of prolonged exposure to reinforcement for challenging behaviour and provides a viable solution to determine a function-based intervention for clinicians working in outpatient settings under time constraints (Jessel et al., 2018). Further, if behaviour function fails to be correctly identified at the outset, valuable resources will be spent revising and re-revising the treatment plan because gains might not be achieved.

In further comparing procedural efficiency, the functional analysis often proves less time intensive than counterparts such as descriptive assessments (e.g., ABC analysis) and would be a better approach than trial-and-error interventions that are not informed by functional analysis

Rather than forgoing the assessment phase due to perceived time constraints, the key question to ask is “do we have the time, and luxury, *not* to complete a functional analysis?” With poor correspondence between descriptive assessments and functional analyses (e.g., Thompson & Iwata, 2007), and the potential to implement contraindicated interventions, clinicians may not be able to

afford omitting this critical step because it could lead to a prolonged assessment process, and the development of ineffective interventions. For example, implementing an intervention that is not based on the correct function of challenging behaviour identified via a functional analysis could lead to the persistence of challenging behaviour over time. Moreover, the clinician may be required to restart the assessment process due to a failed intervention.

6. What are the setting-specific characteristics that one must consider when assessing and intervening on challenging behaviour?

CHALLENGING BEHAVIOUR IS SETTING SPECIFIC

Research suggests that assessment setting can influence client responding during a functional analysis (Lang, Sigafoos, Lancioni, Didden, & Rispoli, 2010). In the event that a target behaviour is setting specific, it may be appropriate to conduct a setting-specific functional analysis using available resources, which may increase the likelihood that the intervention will yield favourable outcomes. A setting-specific functional analysis may also capitalize on setting-specific idiosyncratic variables (see review by Schlichenmeyer et al., 2013). The seminal studies on functional analysis methodology were completed in controlled laboratory settings. Since that time, functional analysis methodology has been successfully applied in natural settings such as homes and residential facilities (e.g., O'Reilly, 1995), public spaces (e.g., Tarbox, Wallace & Williams, 2003), and schools (e.g., Bloom, Iwata, Fritz, Roscoe, & Carreau, 2011). Although specialized assessment rooms have been successfully utilized by clinicians for decades, research supports the notion that functional analyses conducted in controlled settings are likely to have strong concurrently validity with the events that maintain challenging behaviour in the natural environment (Thomason-Sassi, Iwata, Neidert, & Roscoe, 2013).

7. Who should conduct or supervise assessments of challenging behaviour?

The FBA process for challenging behaviour can be an intricate process because it requires the clinician to follow a prescribed sequence of analysis at each stage of the process. A complete FBA requires a specific knowledge that can be achieved through graduate training and supervised fieldwork. However, many studies have shown that teachers in classrooms or other healthcare professionals (e.g., social workers, speech and language pathologists) can conduct some portions of FBA following training from a behavioural clinician such as a Board Certified Behavior Analyst (BCBA®; e.g., Bloom, Lambert, Dayton, & Samaha, 2013; Ellingson, Miltenberger, Stricker, Galensky, & Garlinghouse, 2000; Iwata et al., 2000; Moore, Edwards, Sterling-Turner, Riley, & McGeorge, 2002; Moore & Fisher, 2007). Ideally, BCBA®, which includes individuals who have had graduate level training in ABA or a related field, should work with caregivers, teachers, and allied healthcare professionals as partners in the FBA process

field, should work with caregivers, teachers, and allied healthcare professionals as partners in the FBA process (Hanley, 2012; Iwata & Dozier, 2008). However, conducting FBA, especially functional analyses, is not something that can be or should be transferred to other healthcare professionals or education personnel, or anyone without specific training.

It is important to note that BCBA designation is considered a minimum competency for conducting FBA. This credential alone may not be necessarily sufficient. BCBA[®]s who are responsible for assessing and treating challenging behaviour should seek out appropriate training or internships that will provide them with the necessary competency-based training to conduct safe and effective FBAs (BACB, 2016).

Although FBA should be supervised by a BCBA[®] (or equivalently qualified professional), it is possible that other professionals or Board Certified Assistant Behaviour Analysts (BCaBA) can implement components of the assessment procedures, including data recording of challenging behaviour and participating in a functional analysis test condition. However, the design and interpretation of the FBA, as well as ensuring the safety of the client while upholding assessment validity, is the responsibility of the supervising BCBA[®] (or equivalently credentialed professional).

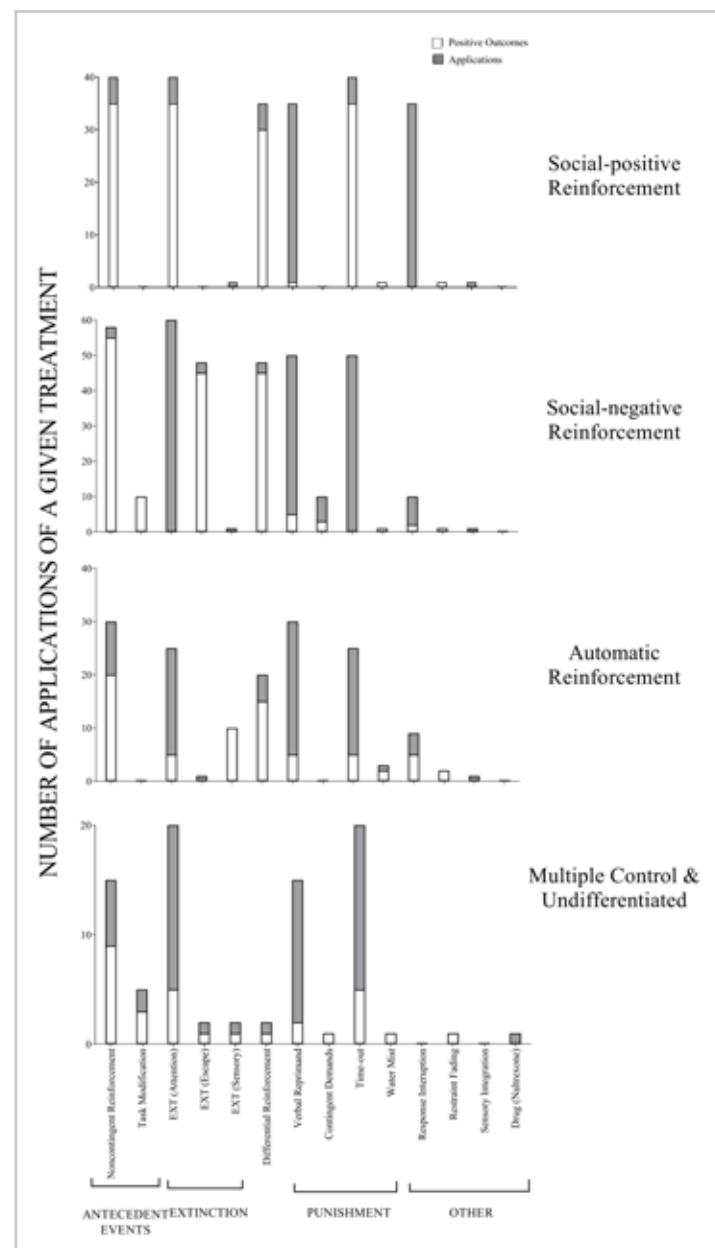


Figure 3. Treatment effects grouped by intervention and behavioural function as found in Iwata, B. A., Pace, G. M., Dorsey, M. F., Zarcone, J. R., Vollmer, T. R., Smith, R. G., ... & Goh, H. L. (1994). The functions of self-injurious behavior: An experimental-epidemiological analysis. Journal of Applied Behavior Analysis, 27, 215-240.

TREATMENT

1. Which non-psychopharmacological treatments for challenging behaviour are considered evidence-based?

Treatments for challenging behaviour should be rehabilitative in nature. This means that following a comprehensive assessment, interventions should incorporate a combination of function-based strategies for reducing challenging behaviour *and* skill-building procedures that will teach meaningful replacement behaviors and adaptive skills that promote safety, dignity and personal independence. Socially valid treatments for challenging behaviour focus on skill acquisition, with the goal of increasing the capacity of individuals to participate effectively in their immediate environment and to belong within their communities and within society at large.

As individuals living with IDD have extremely unique needs with few individuals sharing the exact same clinical profiles (which researchers often refer to as *population heterogeneity*), interventions for challenging behaviour are designed to be highly personalized, to fit each individuals' specific needs. The variety and idiosyncratic nature of challenging behaviour (intensity, topography, function) also necessitates an approach that is 'tailor-made' for each individual within their context. Although such treatment customization may bode well for the individual receiving clinical services, it often renders the large-scale group designs common in psychological research inappropriate. For this reason, many of the research articles that report on the efficacy of treatment for individuals living with IDD feature single-case design methodologies. To capture studies from both single-case and group-based research approaches, we applied Chambless and Hollon's (1998) framework for treatment efficacy in examining thirteen non-pharmacological treatments. It should be noted that this synthesis is not intended to serve as a comprehensive review of all available treatments for challenging behaviour. There are likely many purported treatments for challenging behaviour with emerging or inconclusive research, and more with no research support at all. A full review is beyond the scope or purpose of this report. The treatments selected were prioritized for investigation by the committee based on (a) a consensus of their social validity and widespread application in the treatment of challenging behaviour in clinical practice setting in Ontario, and/or (b) on the frequency of their evaluation within existing review syntheses and meta-analytic research on challenging behaviour.

Based on the levels-of-evidence schematic provided by Chambless and Hollon (1998), a number of treatment approaches, described in the section below, have been identified as having an 'established' evidence base. For a description of all procedures listed in tables 4 and 5, including those identified as promising, inconclusive, or ineffective, refer to the glossary at the end of this report.

Antecedent interventions are a common component of successful treatment packages and are considered an established treatment for children (<18 years of age) and a promising treatment for adults (>18 years of age) who engage in challenging behaviour. Antecedent interventions are

strategies implemented in advance of the target behaviour, they alter the environment to reduce the likelihood that challenging behaviour will occur and to increase the likelihood that replacement behaviour will occur. For example, if an individual engages in challenging behaviour in response to new or difficult tasks but can perform easy or known tasks well, a caregiver may opt to place several simple instructions prior to placing a more difficult instruction. Antecedent interventions may also include stimulus control procedures (identifying when reinforcement is or is not available), demand fading (starting with easy instructions and gradually incorporating more challenging ones), choice-based interventions (allowing a student to select the sequence of events in a lesson plan) and environmental enrichment (increasing access to reinforcing stimuli in the setting where challenging behaviour is likely to occur).

Differential reinforcement plus extinction packages are among the most common behavioural treatment approaches recommended for challenging behaviour and are identified as ‘established’ interventions for both children and adults. Differential reinforcement includes withholding reinforcers in the presence of challenging behaviour, a procedure also known as *extinction*; while providing access to reinforcement when some predetermined criteria has been met. There are several variations of differential reinforcement, some of the most common examples include: (a) differential reinforcement of alternative behaviour (DRA), (b) differential reinforcement of other behaviour (DRO), and (c) differential reinforcement of incompatible behaviour (DRI). DRA involves withholding reinforcers for challenging behaviour and delivering that same reinforcer in response to a specific replacement behaviour. For example, a client that engages in head hitting to access preferred edible items (e.g., chips, chocolate, coffee) would no longer receive edible items when he engages in head hitting. Instead he would be taught an alternative appropriate response (e.g., asking for ‘chip’) to access the edible. DRO is a procedure that requires the individual to demonstrate an absence of challenging behaviour for a designated period to be offered access to the reinforcer. For instance, a client who engages in aggression to avoid having to complete academic work, would be required to refrain from engaging in aggressions for a set interval of time to be eligible for a break from the work interval. DRI is described as withholding reinforcement for challenging behaviour and offering reinforcement when the client engages in a specific behaviour that is incompatible with the challenging behaviour. For example, a person cannot yell and speak at an appropriate volume at the same time; therefore, if a disruptive employee reliably yells out across the office to get her colleagues attention, she would no longer receive attention for yelling. Rather she would receive attention for speaking at an appropriate workplace volume. Regardless of the differential reinforcement type, extinction (withholding reinforcement) is a important active ingredient. Extinction refers to the programmed termination of reinforcement for a specific behaviour, which results in a gradual reduction in the frequency of that behaviour. For example, in the case of a child who cries when her father leaves the room and does not stop until he returns to the room. Extinction occurs if the child’s crying no longer resulted in her father returning to the room. The father might purposely wait in another room until the child stopped crying before re-entering the room to ensure crying does not produce reinforcement for the child (e.g., father’s return).

Functional communication training (FCT) is a variation of DRA and is also an ‘established’ intervention for children and adults with IDD and challenging behaviour. FCT involves teaching the individual an alternative, appropriate communication response (e.g., verbal request, picture exchange system) which results in access to the desire item/activity while challenging behaviours are no longer reinforced. For example, a child who slaps his legs when he has trouble opening a door, tying his shoe, or opening a jar, will be taught to raise his hand for help. Raising his hand will result in getting the help he needs, while hitting his legs will not.

Noncontingent reinforcement treatment packages are identified as ‘established’ for children and adults with IDD and includes the concurrent application of non-contingent reinforcement (NCR) and procedural extinction, followed by a protocol referred to as schedule thinning. NCR includes identifying the stimuli/sources of preferred interaction with others that are known to act as reinforcers and delivering those item(s) or activities on a set schedule regardless of the occurrence of challenging behaviour; identified through functional analysis. This would be applied at the same time as procedural extinction, wherein the client is no longer accessing reinforcement for the challenging behaviour. Procedural extinction would persist as schedule thinning is applied. Schedule thinning involves a gradual decrease in how often reinforcement may be offered. For example, if the client has been offered ‘non-contingent’ access to a preferred activity/item every 5 minutes (to decrease the likelihood of the challenging behaviour); during schedule thinning this interval would be stretched longer and longer, such that the client becomes tolerant to extended intervals wherein access to the preferred item/activity is not permitted. This is one of many examples of the schedule thinning technique.

Time-out treatment packages are ‘established’ for children and adults and consist of the concurrent application of a time-out from positive reinforcement procedure plus differential reinforcement (see description above). There are several time-out variations, and they are applied in response to the occurrence of a challenging behaviour. If applied properly, informed by a functional analysis, their application should result in an immediate decrease in the challenging behaviour. Variations may include removing the client from the immediate area for a set interval of time, or having the client remain in the area but prohibiting them from participating in an activity/event for a set period.

Response blocking and protective equipment interventions are identified as ‘established’ treatments for children and adults with severe challenging behaviour. Response blocking is often described as a procedure in which the caregiver/therapist physically intervenes as soon as the challenging behaviour occurs to prevent its completion. One example could be a parent moving into the path of her child to prevent the child from running out onto a street. Another example may be a therapist deflecting an attempted self-injury by placing his hand in the path of the client which prevents her from hitting her head. Protective equipment interventions feature devices that are specifically designed to protect the wearer’s body from injury. In the context of an intervention, a caregiver may apply the protective gear as soon as the client begins to engage in the challenging behaviour, which may serve to prevent its completion and/or protect the individual from harming himself. Alternatively, in more severe cases, devices may be worn regularly - rather than being applied in response to an attempt to engage in challenging behaviour.

Tables 4 and 5 display a list of non-pharmacological treatments for challenging behaviour based on the available evidence for children and adults with IDD. All articles that informed these tables can be found in Appendix A.

| Effective | Promising | Inconclusive | Ineffective |
|-----------|-----------|--------------|-------------|
|-----------|-----------|--------------|-------------|

Table 4. Treatment for children (<18 years old)

| Intervention | Evidence-base status | SCD | Group Design | Review |
|--|----------------------|-------------------|--------------|--------|
| Antecedent Interventions | Established | >3 | 0 | 2 |
| Functional communication training | Established | >3 | 0 | 4 |
| *Differential reinforcement (Alternative, Incompatible, or Other) + Extinction | Established | >3 | 0 | 7 |
| Noncontingent reinforcement treatment package (NCR + Extinction + Schedule Thinning) | Established | >3 | 0 | 2 |
| Time-out treatment packages (TO + Differential Reinforcement) | Established | >3 | 0 | 2 |
| Response Blocking & Protective Equipment Interventions | Established | >3 | 0 | 1 |
| Sensory Integration Therapy (including Auditory Integration, Weighted Vest Interventions, and Snoezelen Rooms) | Inconclusive | >3 | 3 | 1 |
| Gentle teaching | Inconclusive | >3 | 0 | 0 |
| Electroconvulsive Therapy | Ineffective | 1 | 0 | 0 |
| Transcutaneous electric nerve stimulation | Ineffective | 1 | 0 | 0 |
| Exercise | Ineffective | >3 | 0 | 0 |
| Room Management | Ineffective | <9 (participants) | 0 | 0 |
| Cognitive Behaviour Therapy | Limited Evidence | 0 | 0 | 0 |

Note: The values listed in SCD, group design and review paper columns are those papers informing the status of evidence base for the corresponding intervention. Full references are cited in Appendix A.

**Most studies used extinction to reduce target behaviours" (Petschner et al., 2009, p. 417).

| Effective | Promising | Inconclusive | Ineffective |
|-----------|-----------|--------------|-------------|
|-----------|-----------|--------------|-------------|

Table 5. Treatment for adults (>18 years old)

| Intervention | Evidence-base status | SCD | Group Design | Review |
|--|----------------------|-------------------|--------------|--------|
| Functional communication training | Established | >3 | 0 | 2 |
| *Differential Reinforcement (Alternative, Incompatible, or Other) + Extinction | Established | >3 | 0 | 4 |
| Non-contingent reinforcement treatment package (NCR + Extinction + Schedule Thinning) | Established | >3 | 0 | 2 |
| Time-out treatment packages (TO + Differential Reinforcement) | Established | >3 | 0 | 1 |
| Response Blocking & Protective Equipment Interventions | Established | >3 | 0 | 1 |
| Antecedent Interventions | Promising | <9 (participants) | 0 | 1 |
| Cognitive behaviour therapy | Promising | 0 | 3 | 1 |
| Gentle teaching | Inconclusive | >3 | 0 | 0 |
| Electroconvulsive therapy | Ineffective | >3 | 0 | 0 |
| Transcutaneous electric nerve stimulation | Ineffective | <9 (participants) | 0 | 0 |
| Exercise | Ineffective | >3 | 0 | 0 |
| Room management | Ineffective | <9 (participants) | 0 | 0 |
| Sensory integration therapy (including Auditory Integration, Weighted Vest Interventions, and Snoezelen Rooms) | Limited Evidence | 0 | 0 | 0 |

Note: The values listed in SCD, group design and review paper columns are those papers informing the status of evidence base for the corresponding intervention. Full references are cited in Appendix A.

**Most studies used extinction to reduce target behaviours” (Petschner et al., 2009, p. 417).

Function-based interventions are generally more effective and appropriate compared to alternative non-psychopharmacological interventions (Heyvart et al., 2014; Karsh, Repp, Dahlquist, & Munk, 1995; Newcomer & Lewis, 2004). Function-based interventions can take many forms but typically center around two primary goals: (a) modifying the individual’s environment to decrease the likelihood challenging behaviour will occur, and (b) teaching functionally appropriate and adaptive skills as replacements to challenging behaviour. Clinical considerations for restrictive behaviour management protocols are described in detail in the final section of the manuscript.

2. How is treatment effectiveness evaluated and monitored?

One of the defining tenants of ABA is that behavioural interventions produce large enough effects that result in a meaningful and positive change in an individual's life (Baer, Wolf, & Risley, 1968; Cooper, et al., 2007). To understand how treatment effects are monitored and evaluated, it is important to appreciate the overall approach to treatment clinicians take. First, target behaviours are identified, and a comprehensive FBA is conducted. Second, overall intervention goals are set in collaboration with the client and those in their environment where appropriate. Assessment outcomes, intervention objectives, and resultant proposed interventions inform the data collection processes that clinicians will use to determine whether the treatment is having its intended effect (Cooper, et al., 2007). Data collected before an intervention is implemented is referred to as *baseline*. After a *stable* baseline level of challenging behaviour is observed, meaning the clients' responding seems to have levelled (see Figure 4 for an example of stable baseline); the intervention is applied and comparisons across challenging behaviour recorded during baseline and those recorded during the intervention phase are made. Once clinicians observe predetermined acceptable rates of challenging behaviour during the intervention phase (e.g., a 90% or greater reduction), program revisions may be made to systematically fade (or remove) some intervention components, as appropriate. Data collected during this *fading* period, referred to as the *follow up* phase, ensure treatment gains are maintained under the new, less intensive programming. Data collected during all intervention phases are used to populate graphs that clinicians use to visually inspect client progress, and informs whether program changes are warranted, a process referred to making 'data-based treatment decisions. This process affords clinicians the freedom to make treatment adjustments, discontinue ineffective treatments, or continue effective treatments as needed (Cooper, et al., 2007; Johnston & Pennypacker, 2009).

Clinicians use visual analysis as their primary means of evaluating treatment effectiveness. In ABA, evaluating treatment effects consists of clinicians reviewing graphed data looking for level, trend, and stability of the data. For example, in considering data *level*, a clinician may look for the absence of data points that overlap across baseline and intervention phases (see Figure 4). A clinician may also examine the trend or direction of the data path; in the event that baseline data is 'trending' up, while intervention data is 'trending' down, treatment may be considered effective (Cooper, et al., 2007) (see Figure 5). This is because when a challenging behaviour is trending up in baseline (the absence of treatment) and then immediately begins to trend down after applying a treatment, as illustrated in Figure 5, it suggests that the treatment may have reversed the trend reducing challenging behaviour instances. Alternatively, if an adaptive behaviour is trending up in baseline and continues to trend up after applying the intervention; the situation could mean that the behaviour would have continued to trend up with or without the application of the intervention. Figure 6 illustrates an ineffective intervention because many of the data points

Behaviour analytic clinicians use visual analysis as their primary means of evaluating treatment effectiveness.

overlap across baseline and treatment phases. Figure 7 denotes an ineffective intervention. This means that the target behaviour has not been changed substantially by applying the intervention. At times, clinicians may opt to summarize data by calculating the mean or median in the baseline and treatment phases and comparing them. However, doing so may potentially obscure results by masking important features including trend, variability, and/or range (e.g., maximum and minimum data points) (Cooper, et al., 2007, Johnston & Pennypacker, 2009).

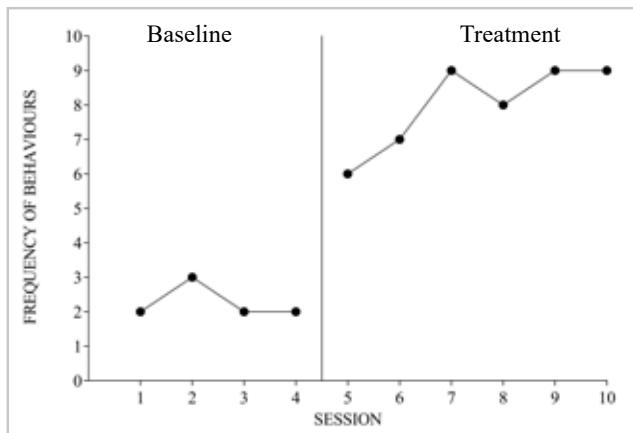


Figure 4: Effective Treatment

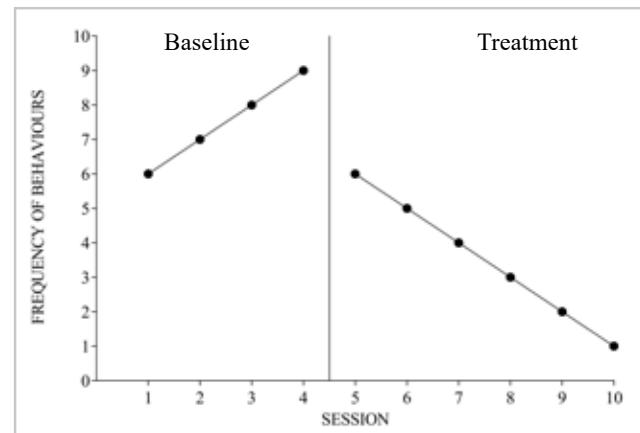


Figure 5: Effective Treatment

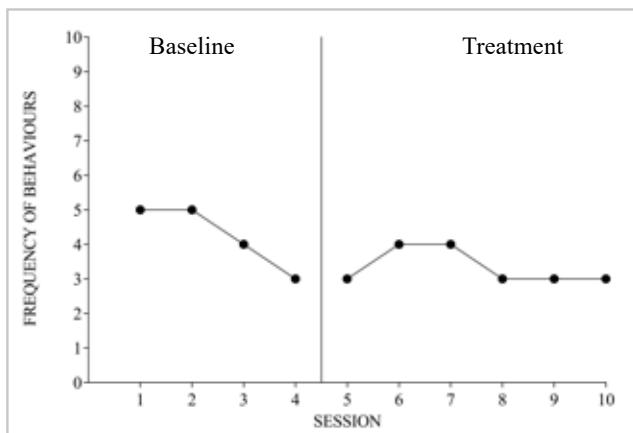


Figure 6: Ineffective Treatment

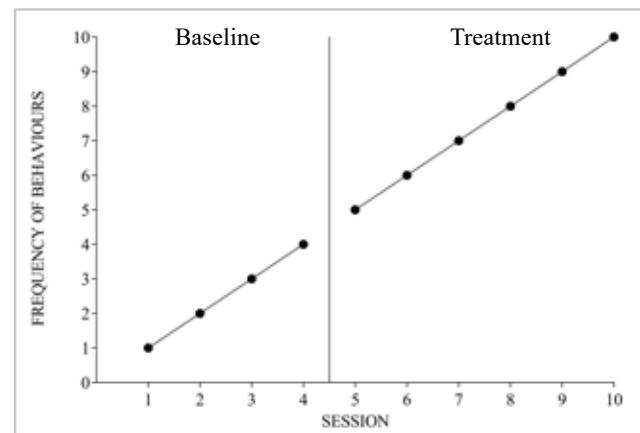


Figure 7: Ineffective Treatment

Using visual analysis to interpret treatment effectiveness requires experience and technological graphing knowledge (Johnston & Pennypacker, 2009). Without expertise in interpreting graphic

displays, there is a risk of making incorrect conclusions or misinterpreting the data. Kahng et al. (2010) conducted a study that examined the consistency of visual analysis across different raters with varying levels of expertise. They found that clinicians properly trained in visual analysis were able to make consistent interpretations of single case research data. BCBAs® complete training, both coursework and through supervised practicum placements, to develop competency in the application of single-case designs and data interpretation (Johnston & Pennypacker, 2009).

When researchers aim to evaluate the overall effectiveness of a specific intervention (e.g., functional communication training, noncontingent reinforcement, or extinction) they will compile all relevant articles evaluating that intervention and use specially designed meta-analytic strategies to calculate an interventions' overall effectiveness. Often researchers will report an overall effect size which communicates to the reader the overall effectiveness of an intervention type. It is these review syntheses that are used, in part, to determine whether a treatment may be considered 'empirically established'. There are a variety of ways to calculate effect size for SCD including percentage of non-overlapping data, percentage of zero data, percentage of data points exceeding the median of baseline data, and so on. A comprehensive explanation of how effect sizes are specifically calculated goes beyond the scope of this paper.

3. To what extent are timing, frequency, duration, type, intensity, and dosage considered during the development of treatments for challenging behaviour?

Individualized intervention components are developed based on the results of a recent comprehensive functional behaviour assessment. Correctly assessing challenging behaviour provides vital, specific information regarding the individual's challenging behaviour. Other information gathered during the assessment process includes: (a) relevant intervention procedure planning (e.g., non-contingent reinforcement, differential reinforcement, extinction), (b) how the intervention should be applied, (c) projected treatment duration, and (d) intervention intensity. The evaluation process follows the assessment process and includes developing an individualized measurement system that allows client progress to be measured and closely monitored (BACB, 2014). The data collection system will also be used to inform treatment variables, and adjust the original clinical projections (i.e., treatment duration, intensity). Ongoing data review may range from daily data review to every 1-2 weeks, depending on severity (California Association for Behavior Analysis, 2011; Minnesota Northland Association for Behavior Analysis, 2012); and adjustments to the treatment variables may be made accordingly.

Individualized intervention components are developed based on the results of a recent comprehensive functional behaviour assessment



In addition to client data and characteristics, caregiver feedback may also influence treatment decisions. Clinicians may solicit feedback from caregivers and/or implementers to gain a sense of how caregivers' feel the intervention is going, and how easily the program can be implemented. Caregiver/implementer feedback is important because of *treatment fidelity*, described as the extent to which the intervention is being applied exactly as planned (Cooper, et al., 2007). Treatment fidelity plays an important role in whether an intervention is ultimately successful. This is because failing to implement the intervention as it had been originally designed, also referred to as poor or low treatment fidelity, can negatively impact client progress by leading clinicians to make false positive or negative conclusions about intervention effects. For example, a false negative is demonstrated by a situation wherein the intervention appears ineffective; however, if the treatment had been implemented correctly (high treatment fidelity) the intervention would have had its intended effects (St. Peter Pipkin, Vollmer, & Sloman, 2010). Ultimately, poor treatment fidelity may result in slow client progress, make it appear the target behaviour is resistant to treatment, and/or result in extended, unnecessary treatment exposure.

Some evaluation of the effects of treatment intensity and duration has been conducted in relation to learning across different treatment domains; however, these variables have not yet been evaluated in the treatment of challenging behaviour (Linstead et al., 2017). This may be in part because treatment is highly individualized when it comes to challenging behaviour. Several client characteristics such as: (a) age, (b) size, (c) learning history, (d) co-occurring diagnoses, (e) behaviour function, and (f) challenging behaviour severity, require consideration and will invariably impact treatment duration, type, and outcome. With regards to dosage, a variety of recommendations are provided in the literature. For example, focused behaviour analytic intervention services (i.e., targeting a specific set of skills

and/or challenging behaviours) may fall within the range of 10-25 hours of direct treatment (plus direct and indirect supervision and caregiver training) per week (BACB, 2014). Programming for clients exhibiting severe forms of challenging behaviour may require more than 25 hours per week of direct therapy. It is also important to note that at times an appropriate community placement *may* be required prior to initiating treatment to maintain the safety of all involved including community members at-large (e.g., extremely violent acts using weapons towards self or others). In these cases, active intervention duration per week may be considerably longer, given the client will require constant supervision by paid professionals (e.g., Developmental Service Workers; Registered Behavior Technicians). Practitioners would develop functional daily activity schedules that support staff are expected to ensure clients adhere to during their waking hours. Front-line staff would also be available to safely manage repeated episodes of severe challenging behaviour throughout the day. Ultimately, adjustments to service delivery should always be data-driven and are therefore individualized. One example may be a gradual increase in the number of service hours per week at the beginning of treatment (e.g., over the first 6 months) followed by a gradual decrease in hours when transitioning toward discharge (Behavior Analyst Certification Board, 2017; California Association for Behavior Analysis, 2011; Minnesota Northland Association for Behavior Analysis, 2012).

Adjustments to service delivery should always be data-driven and are therefore individualized.

The incorrect application of an intervention (poor treatment fidelity) can significantly undermine treatment effects (St. Peter Pipkin et al., 2011). Different kinds of treatment implementation errors (e.g., accidentally reinforcing a challenging behaviour vs. missing an opportunity to reinforce an appropriate behaviour) and the overall percentage of errors made in the application of a treatment, may differentially impact client gains (Fryling, Wallace, & Yassine, 2012; St. Peter Pipkin, Vollmer, & Sloman, 2010). Treatment fidelity (poor or good) may impact one, or all, treatment variables. It is important that front-line implementers receive competency-based training at the outset of treatment, as well as ongoing supervision. Finally, implementers should be given an opportunity to provide programming feedback to the clinician to maintain treatment fidelity (Reid, Parsons, & Green, 2012).

As with recommended dosages, there are no universal timeframes associated with intervention in the treatment of challenging behaviour. Total service duration for each client will vary. Several factors will impact the course of intervention. These may include client characteristics (e.g., target behaviour severity, history of reinforcement of target behaviour, client age, current residential placement), treatment fidelity, and available resources. However, the process of intervention planning should always consist of the following phases: (a) assessment (including medical, dental or other case-

relevant assessments conducted by appropriate professionals), (b) overall service planning (including, peer review and/or human rights committee to review program plan, as applicable) (Vollmer et al., 2011); (c) training for program implementers/mediators (Reid et al., 2012), (d) program implementation, monitoring and generalization planning, and (e) follow up. Generalization is described as a behaviour change that occurs over time, persons and, settings (Osnes & Lieblein, 2003). In planning for generalization, a clinician incorporates certain programming features to increase the likelihood that clients will demonstrate behavioural improvement across all settings.

There are no universal timeframes associated with intervention in the treatment of challenging behaviour

4. Do behavioural interventions for challenging behaviour generalize to natural settings?

A program aimed at reducing challenging behaviours that has also facilitated ‘generalized’ outcomes, is one where the client engages in newly learned appropriate behaviours and/or refrains from engaging in challenging behaviours across any setting and/or with persons not directly involved in initial, intensive treatment. Clinicians and researchers agree on the need to program for generalization at the outset and demonstrate that treatment gains can ‘generalize’ outside of training sessions and can be maintained over time (BACB, 2014; CalABA, 2011; Osnes & Lieblein, 2003). Unfortunately, at present the overall theoretical conceptualization of generalized treatment effects exceeds the available evidence-base in research and applied work (Osnes & Lieblein, 2003). With regards to severe challenging behaviour, few studies have evaluated which therapeutic variables, if included in therapy, will reliably produce generalized effects (Osnes & Lieblein, 2003). However, it is recommended that treatment explicitly programs for generalization, which may include evaluating treatment effects across settings and with various implementers under the supervision of a BCBA®, or an equivalently certified professional (BACB, 2014). To ensure treatment programs are practical and effective, behaviour analytic services need to place a emphasis on caregiver training so that they may participate in applying the intervention across all treatment phases, if safe to do so (MNABA, 2012). Caregiver involvement in the early stages of treatment may promote maintained treatment gains once services have been faded. Finally, after challenging behaviour has been successfully reduced - careful, periodic monitoring by a clinician should be available to provide consultation around any potential counterproductive effect or relapse of the challenging behaviour (Lattal & St. Peter Pipkin, 2009; Mace & Nevin, 2017; Osnes & Leiblein, 2003).

5. Which team members (e.g., professionals, parents, client) should be part of an intervention team for reducing challenging behaviour?

The most important team members are the client and his/her caregivers. A team of multidisciplinary professionals is often recommended and may be comprised of various members according to client need (BACB, 2014; Vollmer et al., 2011). The team may include: a BCBA®, family physician, occupational therapist, social worker, staff members/direct frontline care providers, physical therapist, psychiatrist, and psychologist. Those with behavioural expertise are responsible for monitoring the intervention plan and ensuring it is implemented correctly (Association for Professional Behavior Analysts, 2009). Other team members will be responsible for evaluating programing that directly relates to their respective areas and/or providing family support as needed. For example, a physician would be able to determine that medical issues are not the reason for the client engaging in challenging behaviour. Additionally, in rare cases where restraints are required, a physician may confirm there are no medical contraindications to the planned intervention and may make recommendations around proper medical safeguards (APBA, 2009; BACB Professional and Ethical Compliance Code, 2017; Vollmer et al., 2011). Alternatively, BCBAs® can collaborate with a prescribing physician by attending client consults in order to share a non-technical summary, informed by direct observation data, of client behaviour in response to a psychotropic medication trial.

6. How are behavioural treatment services accessed?

In Ontario, access to services for challenging behaviour is fragmented across ministries, programs, age groups, and settings. In the adult developmental sector, individuals and families are first directed to Developmental Services Ontario for an eligibility assessment and then for a needs assessment. If they are determined to be eligible (confirmation of an IDD), they may be placed on waitlists for housing, day programming, case management, direct funding for community participation supports, caregiver respite, and person-directed planning (i.e., Passport Program). They may also gain a referral for behavioural services to a government funded regional service provider. Referrals can also be made (typically by a physician) to specialized mental health services that offer assessment and treatment services. Older individuals with IDD living in long-term care settings or receiving community supports may access services by completing a referral to one of fourteen regional programs associated with Behavioural Supports Ontario. Services and access vary considerably within the education system, with each school board, and even each school having different referral pathways and criteria for clinical services. Some schools have clinical services dedicated to behavioural assessment and intervention, while others do not. In most cases, behavioural services in schools are reserved for children with ASD, while children with other exceptionalities go without. The professional complement within each school board also varies considerably, so clinical consultation for challenging behaviour may produce access to psychology, speech language pathology, occupational therapy or a behavioural specialist. Across most school boards the training and credentials of staff assigned to assess and treat challenging behaviour vary widely; behavioural specialists might be teachers, child



youth workers, or educational assistants. In most cases, referrals for clinical services in schools are initiated at the discretion of the teacher. Unlike direct access clinical services such as occupational therapy or speech and language pathology, behaviour analytic services frequently first require an “in-school” planning meeting, and then if indicated a referral to a regional team, which may or may not have access to a behaviour clinician. In the provincially funded Ontario Autism Program, a single point of access directs families to one of nine regional service providers ([RAPON](#)). These agencies provide access to a waitlist for ‘Direct Service Option’ and ‘Direct Funding Option’ behavioural treatment providers. A number of fee-for-service psychological and behavioural services also exist that families can access independently if they have the funds. These referral systems and service pathways are often complex and require significant resources to navigate effectively. An unfortunate commonality across most programs and sectors is that many individuals and families living with IDD languish on waitlists that can be in excess of several years.

One possible alternative service pathway could be a system called Integrated Primary Care; a process wherein primary care physicians refer patients directly to behavioural service providers. However, one ongoing issue is that professionals outside the field of ABA have limited understanding of ABA’s potential scope of practice. This narrow view of ABA practice is not entirely unfounded (see Friman, 2010) and it is reflected in the funding streams directed at ABA clinical programs across Ontario (Ministry of Children, Community, and Social Services, 2015). Despite ABA research being influential in the establishment of many evidence-based treatment approaches for a wide variety of behavioural health concerns, ABA practitioners are largely absent within mental health treatment programs in Ontario. The narrow application of ABA in Ontario is an important barrier to consider when discussing collaborative efforts within healthcare. Specifically, primary care deals with the general population and

ABA services are not a readily available to primary care patients in Ontario. In other words, primary care doctors may not refer to BCBA's® because ABA is not a service that is funded or marketed well for the clients presenting concerns, which may well be challenging behaviour (Friman, 2010). Physician education on the availability of specialized services can absolutely be improved. However, it can be argued that enhancing referral rates for this small population will not promote more collaboration between BCBA's® and primary care physicians, nor increase access to ABA. To establish a collaborative relationship with primary care physicians, the services BCBA's® provide must be accessible to patients and delivered in a manner that can be supported within a mainstream healthcare environment.

The first issue is referral related. Within the United States, where mental health is covered by most public and private insurance plans, it has been documented that in spite of physician's efforts to make referrals to connect patients with the mental health services they need, patients tend to avoid following through with outside referrals (Cunningham, 2009). If ABA is to become more visible to primary care physicians, it is important to understand that patients are hesitant to access referrals even when provided directly to them by their primary care doctor.

The second issue is related to funding, in that even when services are accessed, they are inadequate, underfunded, fail to deliver recommended evidence-based treatments, or are plagued with waitlists compartmentalized by age groups (Children's Mental Health Ontario, 2016; Kolko, 2014; Rushton et al., 2002). For those who have private mental health insurance through occupational benefit packages, they likely would not have coverage for ABA services. Despite the potential for ABA practitioners to be effective interventionists for a variety of behavioural health problems that commonly present in primary care, including challenging behaviour, ABA often falls outside the scope of "mental health" in Ontario. Behaviour problems are commonly presented in primary care (Christopherson, 1982; Friman, 2010) yet they are not considered "health problems" and therefore are not covered under Ontario healthcare. ABA is excluded from an already underfunded and underserved segment of behavioural health service delivery. Often this means behaviour analytic treatment is delayed until the problem is so pronounced that crisis-based services are required.

7. What are the appropriate credentials for implementing behavioural interventions for challenging behaviour?

An individual supervising behavioural intervention services should be a BCBA® or an equivalently credentialed professional who is trained and experienced in assessing and treating challenging behaviour (Vollmer et al., 2011). Research outlining specifics on how much training and supervision is recommended before a BCBA® can declare competency is still emerging however, Dixon et al. (2016) suggests that increased

An individual supervising behavioural intervention services should be a BCBA® or an equivalently credentialed professional

quantity and quality of supervision can differentially impact client treatment gains. Commentary on recommended clinical supervisory qualifications published by the Ontario Association for Behaviour Analysis (2017) may further inform considerations regarding who may consider themselves competent in delivering and overseeing treatment programs.

8. Which psychopharmacological interventions are commonly used to treat challenging behaviour by individuals with intellectual and developmental disabilities?

Psychotropic medications are frequently used to treat the challenging behaviour of individuals with IDD (Spencer et al., 2013). However, the evidence base on treatment effectiveness is relatively limited. Medications that have been used to treat challenging behaviours include dopamine antagonists (antipsychotics, neuroleptics), anticonvulsants, lithium, and alpha agonists (guanfacine, clonidine) (Accardino et al., 2016; Fung et al., 2016). Several dopamine antagonists for the treatment of challenging behaviours, most commonly ‘irritability’, have been studied in randomized, double-blind, controlled trials. These include haloperidol, risperidone, aripiprazole, and olanzapine (Fung et al., 2016; Hirsch et al., 2016; Jesner et al., 2010). All have been shown to be more effective than placebo. However, these studies are limited by small sample sizes and relatively short duration of therapy (typically 12 weeks). Several studies of longer duration, up to twelve months, suggested continued benefit (Findling et al., 2014, Marcus et al., 2011; Nagaraj et al., 2012; Research Units on Pediatric Psychopharmacology, 2005). However, these benefits from dopamine antagonists must be weighed against the potential for significant adverse effects, particularly weight gain, which can be substantial leading to the increased likelihood of poorer physical health (Yoon et al., 2016). Other possible side effects can include sedation, motor abnormalities, metabolic abnormalities, and liver impairment (Pillay et al., 2018; Shafiq et al., 2018). Anticonvulsants have also been used to treat challenging behaviours in people with IDD, including people without a seizure disorder (Fung et al., 2016; Huband et al., 2010; Politte et al., 2014). Studies using valproic acid have demonstrated efficacy relative to placebo but with a lower effect size than antipsychotics (Accardino et al., 2016; Fung et al., 2016). A wide range of other medications have been used to treat challenging behaviours in people with IDD. In general, there is limited evidence, at best, to support their use in the treatment of challenging behaviours in people with IDD.

There are significant limitations to medication studies. First, the studies all tended to be short term, typically at most 12 weeks, with a small number being up to 12 months. Consequently, it is difficult to draw conclusions about the long-term effectiveness of these medications. Second, these studies typically have been done with children and adolescents with ASD, which also limits the ability to make inferences about the effectiveness of these treatments with adults and with people with IDD who do not have ASD. Third, most of these studies have failed to distinguish between aggression and self-injurious behaviour, thus minimizing the ability to examine the relative effectiveness of pharmacotherapy for different types of challenging behaviour. Finally, the data are clouded by the differences in outcome measures, and assessments were based on parent rating scale rather than direct measurement



of behaviours. In general, the evidence base for using psychotropic medications to treat challenging behaviour is not yet well established and requires further exploration to determine where and when medications may produce meaningful improvements in challenging behaviour.

Combined interventions are described as the concurrent application of psychotropic medications and behavioural intervention. The overall lack of concomitant non-pharmacological intervention literature may be in part because the purpose is to assess the efficacy of the medication under consideration, and other interventions are not initiated during the pharmacological intervention study. The situation limits the ability to assess the interaction between pharmacological and non-pharmacological treatments.

A few studies have, however, been completed in which treatment includes both pharmacological and non-pharmacological interventions (Blum et al., 1996; Campbell et al., 1978; Fisher, Piazza, & Page, 1989). More recently, large-scale group design studies have evaluated combined vs. unimodal interventions (Aman et al., 2009; Frazier et al., 2010). In general, these studies have shown greater reductions with combined therapy than with medication alone. However, few have included an important third arm – non-pharmacological therapy without medication. The lack of the arm makes it difficult to assess the added benefit of medication. Overall the number of studies is limited, the outcome measures vary across studies, and few different types of psychotropic medications have been featured.

CONSIDERATIONS FOR THE USE OF RESTRICTIVE PROCEDURES

Restrictive behaviour management practices include restraint, seclusion, restriction of movement through environmental modification, and the use of sedating ‘as-needed’ psychotropic medications (i.e., PRNs). The Association of Professional Behavior Analysts (APBA) defines seclusion and restraint in the following way, “seclusion involves isolating an individual from others, and restraint involves either personally holding the individual, or securing the individual in a mechanical restraint that restricts his/her activities” (APBA, 2009, p. 2). Other descriptions have separated restraints into four categories, including: (a) physical (applying human force), (b) mechanical (applying external devices to an individual), (c) chemical (administering medication to sedate an individual), and (d) ambulatory (depriving an individual of a compensatory device) (Merineau-Cote & Morin, 2013; Vollmer et al., 2011). With regard to chemical restraints, the College of Nurses of Ontario (2017) has described this as drug administration not meant to treat a psychiatric illness but rather, “to intentionally inhibit a particular behaviour or movement” (p. 4). This type of restraint, as with those listed above, is not without risk. The Quality Assurance Measures (O. Reg. 299/10) under the Services and Supports to Promote the Social Inclusion of Persons with Developmental Disabilities Act, 2008, S.O. 2008, c. 14 define *intrusive behaviour interventions* as “a procedure or action taken on a person in order to address the person with a developmental disability’s challenging behaviour, when the person is at risk of harming themselves or others or causing property damage.” The terms ‘restrictive’ or ‘intrusive procedures’ should not be inappropriately conflated with the application of contingent aversive stimuli as in procedural punishment. Although, the stimuli listed above (restraint, seclusion, emergency medications) may be considered restrictive as they limit movement or intrusive as their addition may have unpleasant effects, they are not necessarily punishing in the technical sense; that is, applying these procedures immediately following challenging behaviour may not lead to reductions in future instances of challenging behaviour. In fact, these procedures may result in an increase in challenging behaviour, and thus may be functioning as positive reinforcers in some cases (see Glossary). For these reasons, in situations that may warrant planned physical restraints, or the application of protective equipment that limits movement, several clinical considerations should be made prior to recommending their use (see below).

Researchers and practitioners tend to agree that there are risks when applying restraint and/or seclusion, and that there are several risk mitigation strategies (e.g., appropriate clinical supervision, transparency, staff training) (APBA, 2009; Mohr, 2010). The Association for Behavior Analysis International (ABAI) is the largest organization for individuals interested in the philosophy, science, application, and teaching of behaviour analysis. In 2011, the Executive Council of ABAI generated statements around restraint

and seclusion by conducting a comprehensive review of the literature, having the Executive council vote, unanimously, on the statements and two-thirds majority vote of the general membership. ABAI opposes the inappropriate or unnecessary use of seclusion, restraint, or other intrusive interventions including psychotropic medications and outlines three critical guiding principles:

- 1. The Welfare of the Individual Served is the Highest Priority.** Procedures should be in the person's best interest, and take precedence over the agendas of any other institution or organization.
- 2. Individuals (and Parents/Guardians) Have a Right to Choose.** Individuals and those that are legally responsible for their care have the right to choose interventions that are necessary, safe and effective.
- 3. The Principle of Least Restrictiveness.** Priority should be given to "treatment that affords the most favourable risk-to-benefit ratio, with specific consideration of probability of treatment success, anticipated duration of treatment, distress caused by the procedures, and distress caused by the behaviour itself".

Clinicians tend to agree on the principle of least restrictiveness, and which procedures may be considered least or most intrusive (Killebrew, Harris, & Kruckberg, 1982). Unfortunately, within the context of treating challenging behaviours, 'least intrusive' may not be reflected in practice, as alluded to in the recent population-based study by Lunsky et al. (2018). These authors concluded that there is currently an overreliance on psychotropic medication use in persons with IDD who engage in challenging behaviour. It is important to note that, prolonged use of procedures that are less intrusive, but ineffective, may unnecessarily expose individuals to opportunities to engage in extremely harmful behaviour. A risk-benefit analysis may reveal that the short-term use of an intrusive procedure may minimize harm and yields more immediate, meaningful decreases in dangerous behaviour while attempts are made to increase learning opportunities (VanHouten et al., 1988). Interventions that are least intrusive and most likely to be effective may be the safest and most ethical approach. To this end, ABAI's *Statement on Restraint and Seclusion* (2010) indicates that "although many persons with severe behaviour problems can be effectively treated without the use of any restrictive interventions, restraint may be necessary on some rare occasions with meticulous clinical oversight and controls" and "one may conclude from this premise that a non-intrusive intervention that permits dangerous behaviour to continue while limiting participation in learning activities and community life, or results in a more restrictive placement, may be considered more restrictive than a more intensive intervention that is effective and enhances quality of life." This issue is also highlighted in APBA's *Position Statement on the Use of Restraint and Seclusion as Interventions for Dangerous and Destructive Behaviors* which states that "in some cases, however, severe problem behaviors can be resistant to positive interventions, and carefully designed and monitored restraint or seclusion procedures can be essential for minimizing the risk of harm" (APBA, 2010, p. 4).

There are a number of important considerations when the severity of challenging behaviour necessitates the use of planned intrusive behavioural interventions or restrictive procedures as part of crisis responding:

- 1. Functional appropriateness (intervention based on FBA):** Procedures should be based on a thorough understanding of the function of challenging behaviour as informed by a comprehensive FBA. In some cases, the use of some forms of restraint or seclusion may be contraindicated based on the function of behaviour. For example, applying a ‘time out’ procedure or seclusion when a client who is engaging in challenging behaviour to escape a task, or applying a physical hold to a client who is engaging in challenging behaviour to access attention. These are examples of contraindicated uses of seclusion and restraint, respectively.
- 2. Clinical oversight:** When there is a risk of harm to the individual resulting from the challenging behaviour they are engaging in, the *minimum* standard is that the agency providing behavioural services provides clinical leadership and oversight of the behaviour intervention plan (AACP, 2002). A specialized committee (peer-review) within the agency should be involved when treatment includes the possibility of restraint or seclusion, to review the intervention, approve the restraint equipment proposed, oversee staff training and retention, and address client and caregiver concerns (AACP, 2002). It is further recommended that clients and families are included within the membership of these committees to be available to review any concerns. In the adult developmental disability sector in Ontario, the Quality Assurance Measures indicate that behaviour support plans with intrusive procedures must be approved by a qualified professional (O. Reg. 18(3)); although specific recommendations around clinical oversight of ongoing treatment are not specified. It is vital that clinicians overseeing the case have the appropriate expertise and properly monitor any program including intrusive or restrictive measures.

Risk assessment and ethical considerations: Clinicians must be diligent in conducting a thorough cost-benefit analysis (BACB Ethics Code, 4.05) and meet all recommended programming standards to mitigate potential risks. This means programming plans should include: (a) oversight by properly qualified professionals, (b) competency-based staff training, (c) full due process, (d) transparency, (e) accountability, and (f) rigorous evaluation of the effectiveness of intervention (APBA, 2009). BCBAs®, or other equivalently credentialed professionals, need to conduct a risk assessment in accordance with their ethical code so that an appropriate recommendation can be applied. BCBAs® specifically are required, “to the extent possible, a risk-benefit analysis should be conducted on the procedures to be implemented to reach the objective” (4.05). Additionally, BCBAs® are held to ethics code 1.02 which dictates that “all behaviour analysts provide services, teach, and

BCBAs® must have the appropriate training to be considered competent in making recommending and overseeing cases which may involve the use of restrictive or intrusive measures as emergency responses or as part of a comprehensive support plan.

conduct research only within the boundaries of their competence..." (p. 4). Thus, BCBAs® **must** have the appropriate training to be considered competent in making recommending and overseeing cases which may involve the use of restrictive or intrusive measures as emergency responses or as part of a comprehensive support plan.

3. Challenging behaviour characteristics including severity, intensity, frequency, and long-standing nature of a challenging behaviour. Clinicians should examine whether there is evidence to suggest that: (a) less intrusive strategies implemented have not been effective, (b) the behaviour has not decreased in response to lesser intrusive behavioural programming or has not reduced rates sufficiently, (c) the behaviour is so dangerous that allowing it to occur just once could be lethal for the client or others (e.g., elopement towards busy road), and/or (d) prolonging the application of an intrusive procedure will place the individual in severe danger (e.g., the case where an individual eats inedible items such as glass, metal, cigarette butts, and so on) (APBA, 2010).

4. Medical/physical health status: A number of medical issues may preclude the use of restraint (e.g., spina bifida, heart condition, ventriculoperitoneal shunt). When severe challenging behaviour occurs and where restrictive measures may be applied, it is important to ensure that the appropriate medical evaluations have been conducted by a qualified and licensed medical professional and that biological causes have been ruled out (e.g., tooth abscess, ear infection, urinary tract infection, and so on).

5. Informed consent: Caregiver/Guardian/Client is fully informed and supports the application of the intervention. BACB ethics codes 4.03 and 4.05 require practitioners to obtain informed consent regarding, not only the intervention procedures but also the objectives of recommended procedures. Informed consent, regarding either intrusive or lesser intrusive programming should be seen as an ongoing process. The *Canadian Code of Ethics for Psychologists* Item I.17 states that "obtaining informed consent is a process that involves taking time to establish an appropriate trusting relationship and to reach an agreement to work collaboratively and may need to be obtained more than once". Further, clinician language must be delivered in a format that is understandable to the decision maker. Regarding informed consent, BACB ethics code 1.04 (a) states that "behaviour analysts are truthful and honest", which suggests transparency must be paramount in discussions around intrusive programming recommendations.

6. Caregiver capacity/treatment fidelity: In the event that the caregiver has indicated they are unable to implement procedures with fidelity, it may not be appropriate to recommend interventions with intrusive or restrictive components until the appropriate resources and supports have been put in place. Further, it is important to ensure that the individuals' caregivers (paid support staff or loved-ones) can reliably create an enriched environment wherein the client is actively engaged in functional activities throughout their day. Without this feature, more intrusive interventions are ill-advised (Foxx, 2003).



7. Staff training and support: Staff training recommendations provide that prior to introducing a behaviour intervention plan, a formalized performance and competency-based training model (e.g., behaviour skills training) may be used to train staff on the implementation of all programming aspects (Reid et al., 2012). Upon training completion caregivers should be able to demonstrate a high degree of competence implementing all aspects of the behaviour plan using objective measures of performance while being supervised by a BCBA or equivalently qualified individual (Vollmer et al., 2011). Staff members should receive competency-based training in implementing skill-building programs, as well as the management of challenging behaviour and the use of any crises response procedure or protective equipment (AACP, 2002). Those persons implementing crisis management, restraint, or seclusion procedures should only implement the plan as designed by the BCBA. Plans should include de-escalation techniques in accordance with their training, only apply the minimum level of physical restrictiveness necessary, and withdraw the restraint according to the specified criteria (Vollmer et al., 2011). Additional training should be provided to complete proper documentation with periodic audits to ensure adherence (AACP, 2002). In addition to the training mentioned, the AACP (2002) recommends that implementers should have hands-on training with protective equipment and techniques by an approved crisis intervention program, as well as biannual CPR training by a nationally accredited agency. The minimum or accepted education background of these individuals is not discussed but could include Registered Behaviour Technicians (RBTs®), BCaBAs®, Behaviour Support Technicians (BSTs), or equivalently certified individuals.

RECOMMENDATIONS

1. Individuals living with intellectual and development disabilities and their families must be treated as active members of the circle of care.

The most important team members are the client and his or her caregivers. The effective treatment of challenging behaviour requires a high degree of treatment fidelity (i.e., the intervention is implemented as it is prescribed). Open communication and collaboration between invested parties, including the individuals receiving services, their loved ones and support workers, at each step of the assessment and treatment process increases the likelihood that treatments will be carried out as intended and that treatment maintenance regimes will persist after formal supports are faded or withdrawn. Individuals and caregivers should be: (a) directly involved in goal setting, (b) given frequent opportunities to safely provide feedback about the services they are receiving, and (c) given explicit instructions how to voice concerns or make formal complaints when necessary (e.g., filing a Notice of Alleged Violation with the Behavior Analyst Certification Board or making a formal complaint through a regulatory college). Professionals should make every reasonable effort to ensure that individuals receiving services understand and approve of the assessment and treatment procedures. Professionals must adhere to pertinent policy and legislation on consent, capacity and confidentiality. To this end, the province should mandate jurisprudence training for all individuals treating challenging behaviour in Ontario. Finally, individuals and families should be provided with choices in accessing clinical services for treating behavioural disorders. Accessible funding options, such as those currently provided through the Developmental Services Ontario Passport Program should be mobilized to allow families to access clinical services for challenging behaviour from a provider of their choice in a timely manner.

2. The assessments and treatments prescribed for challenging behaviour must be empirically supported and meet the standard of evidence-based practice.

All individuals who engage in severe challenging behaviour have the right to effective treatment (Van Houten et al., 1988), which includes exposure to assessments and treatments that satisfy the rigorous criteria for evidence-based practice. Evidence-based practices for challenging behaviour should be used exclusively throughout the intervention process to ensure goals are met. Inconclusive, ineffective, and “fad” interventions should be discontinued and defunded as they lack evidence and may be harmful. Challenging behaviour should be assessed using a functional behaviour assessment that includes, but is not limited to, a functional analysis. A comprehensive functional behaviour assessment emphasizes the relevance of environmental events that come to maintain challenging behaviour. Functional analysis is the only empirical method for determining the events responsible for the persistence and maintenance of challenging behaviour and is considered the gold-standard method for assessing

challenging behaviour. Following functional behaviour assessment, the primary focus of intervention should be rehabilitative in nature, including a combination of function-based challenging behaviour reduction strategies and teaching adaptive and replacement skills for challenging behaviour. Evidence-based treatments for challenging behaviour focus on skill acquisition, with the goal of increasing the ability and capacity of individuals to participate effectively in their immediate environment as well as society at large. Interventions based on a functional analysis have been shown to be more effective than those not informed by a functional analysis, as well as psychopharmacological treatments. Evidence-based interventions that have reliably shown significant reductions in challenging behaviour across a wide range of populations and presenting problems include, but are not limited to, functional communication training, extinction, antecedent interventions, and noncontingent reinforcement. The principle of least restrictiveness is recommended; in that the use of restrictive procedures are considered only if (a) objective data has demonstrated that other approaches have been ineffective, and (b) it can be demonstrated that such procedures are warranted to produce safe and clinically meaningful reduction in challenging behaviour. The process of applying evidence-based practices should be supervised by a BCBA, or equivalently credentialed professional, who has expertise assessing and treating challenging behaviour. Regularly updated guidelines on evidence-based practices should be produced by a group of researchers, practitioners and service users with experience in treating or receiving treatment for challenging behaviour.

3. Intervention effects should be monitored and evaluated by developing a complete and accurate measurement system, which should guide treatment recommendations.

The collection and analysis of directly observed behaviour data is a hallmark of ABA and facilitates quality service delivery. This is in part because intervention decisions should be informed by direct observation data collection systems that reflect client responding to targeted program changes. Frequently monitoring and evaluating client responding allow practitioners to determine intervention effectiveness and modify the treatment plan as needed. The absence of data collection, objective measurement, and direct observation of intervention effects could lead to harmful or ineffective interventions being implemented for lengthy periods, or could lead to the premature termination of effective interventions. The BCBA® maintains accountability of data collection, data monitoring, and data retention, as well as the behavioural treatment recommendations informed by this data. In a multidisciplinary environment, data should be summarized and shared with all parties responsible for clinical-decision making.

4. The practice of behaviour analysis should be carefully regulated in Ontario.

Challenging behaviours carry an inherent risk of harm, especially if not treated by a qualified professional. Ontario remains one of the few jurisdictions in North America that has yet to regulate behaviour analytic practitioners. The status quo is that anyone in Ontario can advertise services as a behavioural consultant regardless of their education, training, or experience. In many sectors (children, adult, geriatric), it is common for individuals without formal training, certification, professional liability insurance, or even a criminal record checks to provide private consultative services to vulnerable populations. The lack of regulation places the consumer at risk. Although clinicians with other training may claim to provide behaviour analytic services, the clinical practice of ABA is a highly specialized behavioural health treatment approach. Most academic training programs or regulatory bodies within other professional disciplines do not provide or require any training in this area. As of January 1, 2018, eight professional associations and regulatory bodies in Ontario provided written statements to the Health Professions Regulatory Advisory Council outlining their concerns regarding the risk of harm involved in behaviour analytic interventions. All eight bodies recommended public regulation of behaviour analytic service provision.

5. Develop and/or refine quality standards and quality oversight mechanisms for the treatment of challenging behaviour for individuals with intellectual and developmental disabilities.

Ontario currently has quality standards to guide families and professionals in clinical decision making for behavioural symptoms of dementia, major depression, chronic pain, alcohol use disorder, and asthma in children and adults. According to Health Quality Ontario (HQO):

Quality standards outline for clinicians and patients what quality care looks like; focusing on conditions or topics where there are large variations in how care is delivered, or where there are gaps between the care provided in Ontario and the care patients should receive, quality standards are grounded in the best evidence (HQO, 2018).

At this time, no such standards exist for behavioural disorders associated with IDDs, even though extreme variations in care provision can be observed across the province. The development of quality standards for the behavioural health issues of individuals living with IDD is overdue. Although policy provides some guidance on the development of behaviour support plans (e.g., O. Reg. 299/10) and other requirements for agencies that support adult clients with IDD, they are restricted to the adult population and fall short in ensuring treatment procedures are developed by qualified professionals. They also do not provide a mechanism for clinical support or remediation, and rely heavily on administrators who do not have behaviour analytic training (e.g., QAM Compliance Officers) to ensure compliance with quality measures. A significant risk is created when administrators make clinical recommendations or request changes to support plans without the appropriate clinical training or credentials. In addition

to quality standards and regulatory oversight, professionals that treat challenging behaviour should be monitored and supported by independent bodies comprised of qualified professionals, family members, and advocates who can ensure that behaviour analytic services are appropriately selected, developed, implemented, and monitored in accordance with relevant policy and legislation. The Local Review Committee / Peer Review Committee (LRCs/PRCs) framework first demonstrated in Florida may serve as an appropriate model for Ontario.

6. Improve service coordination and referral pathways for individuals with challenging behaviour.

Integrated Primary Care (IPC) models have been shown to improve access to behavioural health services within primary care across the United States (Campo et al., 2015; Kolko et al., 2014). IPC brings behavioural health services directly to the setting in which patients are most likely to present with behavioural health problems. Rather than expecting patients to access external services, the referral source is made available to them within their primary care office. Studies have cited dramatic increases in referral follow-through with the implementation of IPC in pediatric primary care clinics, ranging from 60 to 80% follow-through with the first appointment (Kolko et al., 2014; Monson, 2012). Integrated clinics result in improved access to care and positive patient outcomes according to research (Kolko et al., 2014). Integrated behavioural health services are needed within Ontario's publicly funded healthcare system. To improve families' access to clinicians best-suited for the issue they bring to their primary care physician, ABA practitioners should be advocating for a pathway that leads directly from primary care to behavioural services (a.k.a integrated behavioural health services). The integration of behaviour analysts on Family Health Teams in the province would also be a step in the right direction. BCBAs® have the knowledge and clinical backgrounds needed to provide a wide range of services that can improve behavioural health and physical health of millions of Ontarians presenting in primary care. Doing so may also serve to circumvent the need for crisis-based services due to delays in service access. An important question remains surrounding how these behavioural health problems will be funded. Ontario faces a mental health crisis similar to that experienced in the U.S. and the link between physical health and mental health is becoming much more evident at a population level. Policy makers should support legislation that would move towards an IPC model, and legislation in Health and Education that mandates quality of behavioural supports in schools, hospitals, and long-term care facilities. Policy makers should support legislation that would move services towards an IPC model and mandate a minimum quality of behavioural supports in schools, hospitals, and long-term care facilities. Policymakers, families and behaviour analysts should collaborate in drafting such legislation so that it considers all the barriers and variables listed above.

7. Emphasize the longevity and durability of interventions for challenging behaviour in community settings.

Clinicians and organizations that support individuals with IDDs should place emphasis on incorporating intervention features that may promote generalized behaviour change, which includes a therapeutic change over time and across settings. Behavioural supports should remain in place until the occurrence of adaptive behaviour and elimination of challenging behaviour is observed under different conditions and in novel situations. It is necessary to conduct assessments on levels of generalization, to intervene when deficits are identified, and to specifically teach skills that promote generalization to novel settings. Due to the dearth of empirical evidence supporting the longevity and durability of interventions for challenging behaviour, it is recommended that research initiatives with the aim of improving long-term outcomes in natural settings be supported. Research initiatives may include (a) understanding the variables that contribute toward or against longevity of interventions in natural settings, (b) reframing the clinical care system to support durable interventions for individuals who engage in challenging behaviour, and (c) refining intervention components during initial assessment and treatment. Placing an emphasis on generalization and maintenance ensures that behavioural interventions will be most effective in situations for which they are designed (i.e., in the individual's typical environment). Doing such also increases the probability that the individual who demonstrates challenging behaviour will be able to participate in community activities, contribute to society, and have a sense of belonging. Interventions that plan for generalization are more likely to reduce stress on the political and financial system in the province and decrease the need for extensive community supports.

8. Design educational, health and community living programs with an infrastructure that permits high-quality behavioural treatment.

Poor environmental and professional supports are a common barrier to the effective treatment of challenging behaviour in provincial hospitals, schools, residential placements and community day programs. Low staffing ratios, long waitlists for medical assessment and treatment, and the unavailability of high-support treatment settings or specialized inpatient settings for assessment and treatment trials often result in a reliance on sedating medications and restrictive behaviour management practices to manage challenging behaviour in the community. The lack of behaviourally trained and clinically supervised direct care professionals, educational personnel, and consultants has a deleterious effect on the quality of those services, and poses a serious risk to the well-being of individuals and their loved-ones. Many programs in Ontario often function in a linear structure, where clinical oversight and direct care staff management are separate independent systems. Effective programs for individuals who display challenging behaviour include consistent full-time staffing at appropriate ratios, and a tiered service delivery model for behavioural supports. For instance, in the case of a specialized resource for adults with behavioural health issues living in the community,

a tiered service delivery model might include: (a) a doctorate level BCBA® (BCBA-D®) that provides support on ethical dilemmas, program challenges, and complex clinical issues, (b) a supervising BCBA® that oversees the clinical programming, provides training, and communicates with stakeholders, (c) an assistant/associate level consultant (BCaBA®) who provide supports on assessment and treatment implementation and helps disseminate treatment plans to direct care professionals, and (d) the direct care professionals (e.g., RBTs®) who interact with individuals most frequently and directly implement procedures.

Support clinicians in accessing training (education). We described clinicians' capacity as a potential barrier to effective services in Ontario. Specifically, a clinician who is board certified may not have the expertise to support all potential challenging behaviour situations. It is important for agencies to facilitate frequent trainings and skill-building opportunities for behaviour clinicians. This may include: (a) permitting clinicians to take short leaves to attend a conference without having to use vacation days, (b) hiring behaviour consultants for brief periods in situations where agency clinicians have identified further expertise is needed, (c) hiring behaviour experts to conduct hands-on training workshops, and/or (d) offering to supplement costs associated with conference attendance or continuing education sessions. To increase capacity in the province, Ministry of Training, Colleges and Universities should support the development of doctorate-level behaviour analytic training programs.

Support the removal of barriers to assessment and treatment. As previously mentioned, policy and procedures may make it difficult for behaviour clinicians to implement functional analysis and, at times, specific intervention strategies. Given functional analyses are considered best practice, clinicians should advocate for agency-wide revisions if the policies governing their agency prohibit assessments. In contrast, agency policy makers should be actively working with clinicians who identify procedural barriers for both assessments and treatments. In addition, policy makers may begin to mandate functional behaviour assessments, alongside proof that these assessments were conducted, prior to developing and implementing a behavioural intervention.

9. Address the inappropriate use of restrictive procedures and the over-reliance on psychotropic medications for persons with intellectual and developmental disabilities who engage in challenging behaviour.

Across sectors and settings individuals with IDDs are exposed to police contact, chemical sedation, physical restraint, and seclusion as a result of untreated challenging behaviour (Emerson et al., 2001; Ontario Ombudsman, 2016; Robertson et al., 2005; Tint et al., 2017). As the majority of developmental, educational, and mental health services in Ontario are not equipped to delivery high-quality behavioural health services, these default strategies have become the status quo in hospitals, schools, and group homes across the province. In primary and mental health care, individuals that present with challenging behaviour are often misdiagnosed and inappropriately prescribed antipsychotic medication when practitioners lack an understanding of the function of their behaviour (Green et al., 2018). When psychotropic medications are used, they should be part of a comprehen-

sive behaviour program rather than in isolation; with a primary emphasis placed on behavioural intervention. The benefits and side-effects of medication should be carefully monitored, and the possibility of reducing or discontinuing medication should be considered on a regular basis. Psycho-pharmacological intervention should follow a methodical and planned approach, such as proposed by McGuire et al. (2016). Medications with limited or no evidence for efficacy should be avoided, as should polypharmacy (the use of multiple medications simultaneously). Finally, it may be of value to follow the example of other countries and organizations who endeavoured to address the issue of an overreliance on psychotropic medications for persons with IDD and challenging behaviour (e.g., STOMP-LD in the United Kingdom). These countries established a coalition of agencies and professional organizations so that they may collaborate and develop clear standards and practices. Collaboration between primary care physicians, psychiatrists, psychologists, behaviour analysts and other professionals to ensure the use of psychotropic medications aligns with these clinical guidelines may also work towards rectifying medication over-reliance in this population (Lunsky et al., 2018).

Conclusion

When left untreated, challenging behaviour can have a devastating impact on individuals living with IDD, their families and caregivers, and on the social systems designed to support them. Physical and psychological injury, inappropriate placement, incarceration, homelessness, lost learning opportunities, a lack of community belonging, and unnecessary exposure to restraint, seclusion, and chemical sedation are common outcomes for these individuals. All individuals living with IDD have the right to a therapeutic environment, services with an overriding goal of personal welfare, treatment by a competent clinician, access to programs that teach functional skills, behavioural assessment with ongoing evaluation, and options to benefit from the most effective treatment procedures available. Assessment and intervention procedures should be based on the best available evidence, direct measure of outcomes, a focus on the function of behaviour and on teaching adaptive skills that are in the best interest of individuals, families, caregivers and society.

Policy and program development that takes evidence and best-practice into consideration can make a meaningful impact on this complex issue. We encourage researchers, clinicians, and advocates to build upon this report, to rigorously evaluate the research and our current systems of social, educational and behavioural health supports, and to work together to improve services and supports for vulnerable individuals within our communities.

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GLOSSARY

Antecedent: is an event, action or situation that occurred prior to the behaviour of interest. (Cooper et al., 2007)

Adaptive behaviour: is the collection of conceptual, social, and practical skills that are learned and performed by people in their everyday lives. (<http://aaidd.org/intellectual-disability/definition>, 2017)

Antecedent interventions: are described as strategies implemented in advance of the target behaviour, often to decrease the likelihood that the challenging behaviour will occur. For example, if an individual engages in challenging behaviour in response to new or difficult tasks but can perform easy or known tasks well, caregivers may opt to place several simple instructions prior to placing one more difficult instruction, or place fewer difficult instructions compared to simple instructions.

Applied behaviour analysis (ABA): consists of the use of scientific methodology to understand and develop interventions to change behaviour of social significance and demonstrate those interventions that were responsible for the measured change in the behaviour (Baer et al., 1968; Cooper et al., 2007). ABA can be applied to a wide range of human problems and is not limited to any diagnostic age or group.

Autism spectrum disorder (ASD): is a psychiatric diagnostic category of a disorder characterized by persistent deficits in social communication, and restricted, repetitive behaviour or activities (see American Psychiatric Association Diagnostic and Statistical Manual, Fifth Edition (DSM-V) for actual diagnostic criteria).

Automatic reinforcement: is behaviour that persists because it produces an experience that is valued by the individual and occurs independently of other individuals in the environment.

Baseline: is a condition where no experimental or clinical changes have been made. (Cooper et al., 2007).

Behavior Analyst Certification Board (BACB)®: is a non-profit corporation that maintains an international certification program and ensures the standards and criteria for the credentialing process.

Board Certified Assistant Behaviour Analyst (BCaBA)®: is an undergraduate-level certification in behaviour analysis. Professionals who are certified at the BCaBA level may not practice independently but must be supervised by someone certified at the BCBA/BCBA-D level. In addition, BCaBAs can supervise the work of Registered Behavior Technicians, and others who implement behaviour-analytic interventions.

Board Certified Behaviour Analyst (BCBA)®: is an independent practitioner of behaviour-analytic services. BCBA's have a graduate degree, have completed supervised practice, have passed a certification exam and are in good standing with the Behavior Analyst Certification Board.

Behaviour function: is the purpose or reason an individual engages in a behaviour.

Behaviour rating scale: is “an assessment instrument designed to obtain the perceptions or judgments of a subject’s behaviour in a standardized format” (Walrath, 2011).

Challenging behaviour: refers to aggressive, self-injurious or destructive behaviour that poses a significant risk to the individual’s health and safety and to that of those around them. Challenging behaviour limits an individual’s ability to effectively participate in their communities, reduces opportunities to learn new skills, poses a barrier to engagement in meaningful activities, and leads to a poorer quality of life.

Cognitive behaviour therapy: is a psychotherapy based on the cognitive model suggesting that the way in which individuals perceive situations (maladaptive thoughts) is closely connected to their reaction; and therapists help clients change their unhelpful thinking and behaviour to modify mood and improve functioning over the long term through a process often referred to as ‘cognitive restructuring’.

Combined intervention: is the concurrent application of behaviour and psychotropic medication to treat challenging behaviour.

Consequence: is any response that follows a behaviour of interest. For example, a cashier returns your change and you immediately respond “thank you” before leaving the store. The words “thank you” are considered a consequence of the returned change.

Data trend: is the direction in which a series of data points are moving. Data that are moving in an upward path are said to be “increasing” and data moving in a downward path are said to be “decreasing”.

Descriptive assessment: is a method of assessment whereby descriptions about the challenging behaviour and environment-behaviour relations are derived from direct observations. Descriptive assessments typically use strategies such as ABC checklists, narrative recording, and scatterplots.

Differential reinforcement: includes withholding reinforcers in the presence of challenging behaviour, while only offering reinforcers when the client has met some predetermined criteria along a specific behavioural dimension. There are several variations of differential reinforcement, some of the most common examples include: (a) differential reinforcement of alternative behaviour (DRA), (b) differential reinforcement of other behaviour (DRO), and (c) differential reinforcement of incompatible behaviour (DRI). DRA involves withholding reinforcers for challenging behaviour and delivering that same reinforcer in response to a specific replacement behaviour. For example, a client that engages in head hitting to access preferred edible items (e.g., chips, chocolate, coffee) would no longer receive edible items when he engages in head hitting. Instead he would be taught an alternative appropriate response (e.g., asking for ‘chip’) to access the edible. DRO is a procedure that requires the individual to demonstrate an absence of challenging behaviour for a designated period to be offered access to the reinforcer. For instance, a client who engages in aggression to avoid having to complete academic work, would be required to refrain from engaging in aggressions for a set interval of time to be eligible for a break from the work interval. DRI is described as withholding reinforcement for challenging behaviour and offering reinforcement when the client engages in a specific behaviour that is incompatible with the challenging behaviour. For example, a person cannot yell and speak

at an appropriate volume at the same time; therefore, if a disruptive employee reliably yells out across the office to get her colleagues attention, she would no longer receive attention for yelling. Rather she would receive attention for speaking at an appropriate workplace volume.

Direct observation: is a method by which the individual and target challenging behaviours are observed in real-time (i.e., as the events occur) by a therapist or clinician.

Electroconvulsive therapy: is conducted under general anesthesia, wherein small electric currents are passed through the brain triggering brief seizures, and resultant changes in brain chemistry.

Emerging (Promising, Probably Efficacious) Treatments: are treatment methods for which the quantity and/or quality of research evidence supporting efficacy is weaker but somewhat positive. These approaches may go on to garner additional research which could help determine, one way or another, whether they are evidence-based. In the meantime, they should either not be used or used only if other interventions have not worked or cannot be provided, and only with careful data-based monitoring of effectiveness and possible side effects.

Evidence-based practice (Well-established treatment): includes components of expert clinical judgment and patient/client values and context, but the heart of it is the fundamental assumption that decisions about use or non-use of treatments/interventions/practices should be based on the best available research evidence. Some clinicians define evidence-based practice as "... a decision-making process that integrates (a) the best available evidence with (b) clinical expertise and (c) client values and context" (Slocum et al., 2014, p.44).

Extinction: is described as withholding reinforcement in response to a specific behaviour. For example, in the case of a child who cries when her father leaves the room and does not stop until he returns to the room. Extinction occurs if the child's crying no longer resulted in her father returning to the room. The father might purposely wait in another room until the child stopped crying before re-entering the room to ensure crying does not produce reinforcement (e.g., father's return).

Functional analysis (FA): is an analysis of the reasons an individual engages in challenging behaviour. In this assessment, antecedents and consequences that are present in the individual's natural routine are arranged so that the clinician can observe and measure these variables' in relation to the challenging behaviour. (Cooper et al., 2007).

Functional behavioural assessment (FBA): is a systematic method of assessment for "obtaining information about the purposes (functions) of a problem behaviour serves for a person; results are used to guide the design of an intervention for decreasing the problem behaviour and increasing appropriate behaviour" (Cooper et al., 2007, p. 697)

Functional communication training (FCT): is a variation of DRA. FCT involves teaching the individual an alternative, appropriate communication response (e.g., verbal request, picture exchange system) which results in access to the desire item/activity and challenging behaviours are no longer reinforced. For example, a child who slaps his legs when he has trouble opening a door, tying his shoe, or opening a jar, will be taught to raise his hand for help. Raising his hand will result in getting the help he needs, while hitting his legs will not.

Generalization: is when a behaviour that was taught in one context occurs spontaneously or with minimum teaching in a similar, but un-taught context (i.e., with a different person, in a different environment, with a different stimulus).

Group design studies: are research designs that involve group(s) of participants, often involving comparing an experimental group (who receive the intervention of interest) to one or more control / comparison groups (who receive no intervention or a different intervention). Scores on variables of interest (usually standardized measures, questionnaires, etc.) are analyzed statistically to determine whether the mean of the groups differ significantly across time and/or across groups.

Indirect assessment: is an information gathering process that usually includes conducting a structured interview, and having a caregiver complete a rating scale

Integrated primary care: is combined medical and behavioural health services, wherein both are offered within the same clinical setting.

Intellectual disability: is a disability characterized by significant limitations in both intellectual functioning and in adaptive behaviour, which covers many everyday social and practical skills. This disability originates before the age of 18 (AAID, 2017).

Data level: is the “value on the vertical axis around which a series of behavioural measures converge” (Cooper et al., 2007, p. 698)

Local/peer review committees: are independent committees comprised of professionals, family members, and advocates to ensure behaviour analytic services are appropriately selected, developed and implemented in accordance with relevant policy and legislation.

Maintenance: is the “extent to which a learner continues to perform the target behaviour after a portion or all of the intervention has been terminated” (Cooper et al., 2007, pp.698-699).

Negative reinforcement: is removing an activity, event or situation immediately after the occurrence of a behaviour of interest, increasing the likelihood that the behaviour of interest will happen again in the future under similar circumstances.

Non-contingent exercise: is described as any form of physical leisure activity implemented to achieve a health-related objective (e.g., improved fitness, decreased stress)

Non-contingent reinforcement: includes identifying the stimuli/sources of preferred interaction with others that are known to act as reinforcers and delivering those item(s) or activities on a set schedule regardless of the occurrence of challenging behaviour; identified through functional analysis. For example, a clinician may determine that their client will be offered access to a break from his work every 10 minutes, regardless of whether the client engaged in challenging behaviour or not during that 10-minute interval.

Non-evidence based (unestablished) treatments: includes treatment methods that do not have research evidence supporting their efficacy. Sometimes, there is simply insufficient evidence (insufficient in amount and/or quality of evidence) about the method to draw any conclusion one way or another. In a few cases, treatments/interventions have been well studied (good quality and quantity of research) but found not to work (or potentially

even to be harmful).

Operant assessment: is an objective assessment that attempts to determine which environmental events follow or “operate on” behaviour.

Operational definition: is an observable and measurable definition of behaviour (Cooper et al., 2007).

Policy/Program Memorandum 140: is a document to provide direction to school boards to support their use of applied behaviour analysis (ABA) as an effective instructional approach in the education of many students with autism spectrum disorders (ASD). This memorandum establishes a policy framework to support incorporation of ABA methods into school boards’ practices.” (Ontario Ministry of Education, 2007).

Policymakers: are individuals who are actively involved in the development, revision or decision-making process of legislation regarding public supports.

Polypharmacy: refers to the concurrent use of multiple medications in a single patient to treat a single ailment or condition.

Positive reinforcement: is when a behaviour is followed immediately by the presentation of an activity, event or item that increases the likelihood that the behaviour will happen in the future in similar situations.

Professional and Ethical Compliance Code for Behaviour Analysts (BACB, 2016): In 2014, the BACB developed a set of codes organized into ten sections that described expectations for the ethical and professional practice of behaviour analysis. It forms the foundation of any disciplinary review that may occur. The “Code” was most recently updated March 21, 2016 and all BACB applicants, certificants, and registrants are required to adhere to the Code.

Psychotropic medication: refers to chemical substances that cross the blood-brain barrier, act upon the central nervous system and alter mood, thought processes, and behaviour (Julien, 1995).

Punishment: is a technical construct in ABA and does not reflect the common sense of ‘punitiveness’. It is said to have occurred when an activity, event or item immediately follows a behaviour of interest and decreases the likelihood that the behaviour will happen in the future in similar situations. One example is a ‘**time-out**’ procedure, wherein a child during recess engages in challenging behaviour and is not permitted to continue to participate in recess activities for a set period. If the challenging behaviour happens less frequently in the future, then ‘time out’ can be said to have had its intended effect, which was decreasing the challenging behaviour.

Time-out treatment package: a treatment package that consists of a time-out procedure plus differential reinforcement (see DR definition described above).

Randomized controlled trial (RCT): is a group research design that involves randomly assigning participants to either the treatment or the control group, which is likely to mean there are no differences between the groups at the outset. One group receives the treatment; the other does not. If the treatment group improves and the control group (or placebo group) remains

unchanged, then the treatment is said to be efficacious. In some types of studies (e.g., drug studies), participants are “blind” to the procedures of the experiment to reduce bias.

- **Blind:** When the participants of a study do not know which group (i.e. the experimental or control) they have been assigned to (Cooper et al., 2007).
- **Placebo:** A pseudo-treatment given to a control group to minimize the chances that those in the control group realize they are, indeed, in the control group (Cooper et al., 2007).

Registered Behavior Technician (RBT): is the BACB’s newest certification, which is applicable for front-line service providers. “The Registered Behavior Technician (RBT®) is a paraprofessional who practices under the close, ongoing supervision of a BCBA, BCaBA. The RBT is primarily responsible for the direct implementation of behaviour-analytic services. The RBT does not design intervention or assessment plans. It is the responsibility of the RBT supervisor to determine which tasks an RBT may perform as a function of his or her training, experience, and competence. The BACB certificant supervising the RBT is responsible for the work performed by the RBT on the cases they are overseeing” (BACB, 2016).

Restraint: involves “either personally holding the individual or securing the individual in a mechanical restraint that restricts his/her activities” (APBA, 2009, p. 2).

Restraints may also be separated into four categories, including: (a) physical (applying human force), (b) mechanical (applying external devices to an individual), (c) chemical (administering medication to sedate an individual), and (d) ambulatory (depriving an individual of a compensatory device) (Merineau-Cote & Morin, 2013; Vollmer et al., 2011).

Room management: is an environmental programming technique in which one or more “room managers”, moves quickly from student to student providing prompting or positive reinforcement during a series of structured activities within the classroom setting (Pope, 1988).

Schedule thinning: is described as slowly decreasing how often behaviour is reinforced. In the event where it is unreasonable for a client to get reinforced every time they engage in a specific behaviour, clinicians may use this procedure. For example, a child who learned to raise their hand to obtain attention from the teacher. It may not be feasible for the teacher to provide attention every time the child raises their hand. The child may be attended to every other time at first, and then attended to every third instances of raising their hand. This is one example of schedule thinning, although there are many variations of this technique.

Seclusion: involves “isolating an individual from others” (APBA, 2009, p. 2).

Sensory integration therapy: is an intervention in which clients are repeatedly exposed to sensory stimulation in structured way to facilitate brain adaptations. These adaptations are meant to alter how clients process and react to sensations, so that they may do so more efficiently.

- **Auditory integration training:** is based on the hypothesis that individuals with ASD have sensory dysfunctions and may experience a distorted perception of their environment which will in turn impact behaviour. Treatment aims to normalize their hypo and hypersensitivities. This would fall in the category of sensory integration therapy.

- **Weighted vests** interventions operate by providing deep-touch pressure which is hypothesized to have a calming effect on the client and serves to facilitate self-regulation.
- **Snoezelen rooms** are relaxing spaces comprised of soothing sounds, relaxing smells and items that stimulate tactile senses.

Single case design (SCD): is used to “evaluate unambiguously the effects of the independent variable on the behaviour. Demonstrates the relation between the experimental manipulation of a specific independent variable, or treatment, on the change in behaviour (the dependent variable). Behavioral research designs based on repeated measurement of a behaviour under the same and under different conditions of the independent variable (phases). During each phase, sufficient data are collected to depict a convincingly valid representation of the behaviour under that condition. Sometimes referred to as intensive designs, [single-subject experimental designs], repeated measures, time series experimental designs or within-subject design; Alternating treatment design; Multiple baseline design; Reversal design; Withdrawal design.” (Mayer, Sulzer-Azaroff, & Wallace 2012, pp. 714-715). Also referred to as single-case research design, single-case experimental design, ‘N of 1’ research.

Snoezelen room: is a relaxing space comprised of soothing sounds, relaxing smells and items that stimulate tactile senses.

Structured play groups: are interventions using small groups to teach a broad range of outcomes. Structured play group activities are characterized by their occurrences in a defined area and with a defined activity, specific selection of typically developing peers to be in the group, clear delineation of theme and roles by adult leading the and prompting or scaffolding as needed to support the students’ performance related to the goals of the activity.

Termination criteria: are predetermined established criteria to end a given session or assessment which is based on observable events such as patient or therapist safety.

Tiered service delivery model: is a “model in which in which a Behavior Analyst designs and supervises a treatment program delivered by Assistant Behavior Analysts and Behavior Technicians. Tiered service delivery models permit more cost-effective levels of service for the duration of treatment and sufficient expertise to be delivered at the level needed to reach treatment goals (this is critical as the level of supervision required may shift rapidly in response to client progress or need). Tiered service-delivery models can also help with treatment delivery to families in rural and underserved areas, as well as clients and families who have complex needs”. (BACB, 2016, p. 28)

Transcutaneous electric nerve stimulation (TENS): uses electric current to stimulate the nerves; primarily used for pain relief.

Treatment fidelity: is the extent to which an intervention is being applied exactly as planned.

Visual analysis: is a “systematic approach for interpreting the results of behavioural research and treatment programs that entails visual inspection of graphed data” (Cooper et al., 2007, p. 708).

APPENDIX A

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