

# Challenging behaviour in children with developmental disabilities: an overview of behavioural assessment and treatment methods

ARTICLE

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## SUMMARY

Challenging behaviours often co-occur at high rates among those with autism spectrum disorder and intellectual disability. Challenging behaviours, including self-injury, aggression and property destruction, can be associated with social impairment and increased caregiver demands and stress. These behaviours often arise from and are maintained by a combination of biological and environmental risk factors throughout the lifespan. Given the impact of challenging behaviours on development, function-based assessment and intervention approaches are crucial. The prevalence, risk factors, assessment tools and evidence-based treatment options utilised for individuals with developmental disorders are discussed.

## LEARNING OBJECTIVES

After reading this article you will be able to:

- identify the most common challenging behaviours associated with developmental disabilities in children
- demonstrate an understanding of common assessment tools used to identify the topography, severity and function of challenging behaviours
- demonstrate an understanding of behavioural techniques used to modify challenging behaviours.

## KEYWORDS

Autism spectrum disorder; intellectual disability; challenging behaviour; treatment; functional assessment.

affect the person's education (Jang 2011). Challenging behaviours among those with ASD and/or intellectual disability generally arise from both biological and environmental factors and can result in adverse consequences such as social rejection, increased caregiver stress, exclusion from services or educational settings, and health risks (Didden 2012). Function-based assessment and behavioural interventions most successfully reduce challenging behaviours. In this article, we discuss the prevalence, risk factors, assessment tools and treatment methods for the primary challenging behaviours exhibited among those with developmental disabilities (e.g. self-injury, property destruction, aggression).

## Prevalence and risk factors

Prevalence rates of challenging behaviours among children with intellectual disability range between 10 and 20%, with the prevalence increasing during teenage years (McClintock 2003). Challenging behaviours are more prevalent among children with a diagnosis of ASD (Didden 2012). As many as 56–94% of children with ASD exhibit one or more challenging behaviours, although prevalence estimates vary greatly based on differing research methodologies (e.g. operational definitions, assessment tools) (Kanne 2010). Between a half and two-thirds of individuals who exhibit challenging behaviours exhibit at least two different forms (Murphy 2009).

Several factors may contribute to the likelihood that children will develop challenging behaviours, including diagnostic category (McTiernan 2011). For example, children with a previous ASD diagnosis are more likely to exhibit challenging behaviours compared with their peers (Didden 2012). Specifically, self-injury, aggression and property destruction are more likely to be demonstrated by children with ASD (Jang 2011). Furthermore, ASD symptom severity has been found to be positively correlated with both the frequency and the intensity of challenging behaviours exhibited by children with ASD. Similarly,

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Challenging behaviours often co-occur at high rates among those with developmental disabilities such as autism spectrum disorder (ASD) and intellectual disability (Didden 2012). Although the term challenging behaviour encompasses a variety of topographies, it generally refers to behaviours that are dangerous, socially unacceptable or negatively

severity of intellectual disability has been found to be associated with increased challenging behaviours (Didden 2012). Self-injury and stereotypy are particularly more prevalent among those with severe and profound intellectual disability (McClintock 2003). Comorbid medical conditions and psychopathology, such as gastrointestinal disorders, epilepsy, sleep problems, anxiety behaviours and conduct problems, have also been found to be associated with increased rates of challenging behaviour (Klukowski 2015).

Additionally, challenging behaviours have been found to be associated with deficits in adaptive behaviour in children with developmental disabilities (Baeza-Velasco 2014). Researchers investigating the relationship between adaptive skills and challenging behaviours among children with ASD and other developmental disabilities found that poorer receptive and expressive communication skills, more severe social deficits, as well as restricted and repetitive behaviours, were associated with challenging behaviours such as aggression, self-injury and tantrums (Park 2012). However, other researchers indicated that lower receptive and expressive communication skills were either not associated with challenging behaviour or were strongly associated with lower levels of aggression and self-injury (Kanne 2010).

Demographic factors such as gender and age may also affect the prevalence of challenging behaviours; however, the results of studies on the association between demographic factors and challenging behaviours have varied. Regarding gender, early researchers indicated that males with intellectual disability were more likely to engage in challenging behaviours than their female counterparts, particularly aggression and property destruction (Oliver 1987). However, more recently researchers have suggested that gender has no effect on the rates of challenging behaviours among children and adolescents with ASD (Murphy 2009; Kanne 2010). Similarly, the prevalence of challenging behaviours has been found to increase with age throughout childhood, although younger children have an increased likelihood of exhibiting aggression and self-injury (Didden 2012). Conversely, several other studies found no association between age and prevalence of challenging behaviour among those with developmental disabilities (McTiernan 2011). Differences in the characteristics of the samples used, the behaviours measured and the measures used may account for the variable findings among studies.

## Defining challenging behaviours

### *Aggressive behaviour*

Aggression can be defined as either verbal (e.g. verbal threats or derogatory statements towards

others) or physical behaviour (e.g. hitting, biting, kicking or throwing objects at others) that may result in harm or injury to another individual (Fitzpatrick 2016). Although estimates vary, studies have shown that between 22 and 56% of children diagnosed with ASD exhibit aggression (Kanne 2010). It is essential to treat aggressive behaviour, as it is associated with several adverse outcomes, such as increased use of psychotropic medications, parental stress, educator burnout, relationship deficits and an increased risk of physical abuse (Fitzpatrick 2016).

### *Non-compliant behaviour*

Non-compliant behaviour is generally marked by a failure to respond with desired and appropriate behaviour when presented with a request (Luiselli 2009). Non-compliance may include a 'passive response' in which the individual fails to follow through with instructions, although this is often accompanied by other challenging behaviours, such as aggression or property destruction (Luiselli 2009: p. 176). Prevalence rates between 25 and 65% are reported by studies of children and adolescents without disabilities (Kalb 2003). However, non-compliant behaviours can be especially alarming for caregivers of children with developmental disabilities, as they are associated with poor academic progress and delays in acquiring new skills (Lipschultz 2017a).

### *Property destruction*

Property destruction can be considered a subcategory of aggressive behaviour. Whereas aggressive behaviour is generally directed towards others, property destruction is directed toward objects and includes damaging personal or public property through tearing, hitting, breaking or kicking objects (Didden 2012). As previously noted, it is important to treat behaviours involving property destruction, as they are associated with increased caregiver stress, an increased likelihood of out-of-home placements and of psychotropic medication use, and interference with educational instruction (Didden 2012).

### *Self-injurious behaviour*

Self-injurious behaviour (SIB) is characterised as behaviour directed towards one's own body that can result in harm or tissue damage (Summers 2017). SIB has been reported to occur in approximately 50% of children with ASD and can present on continua of both severity and frequency, ranging from mild forms (e.g. head rubbing, thigh slapping) to severe forms of behaviour (e.g. head banging, eye poking, rumination) (Summers 2017). Among

individuals with ASD and intellectual disability, head banging has been reported as the most common form of SIB, although other forms include head hitting, hair pulling, rumination and pica. SIB can cause serious concerns related to the individual's safety, as well as an increased risk of hospital admission, the use of mechanical and/or physical restraints and psychotropic medication use (Didden 2012).

### *Stereotypical behaviour*

Stereotyped behaviour, defined as repetitive vocal or motor behaviours, are a characteristic feature of ASD (American Psychiatric Association 2013). Some of the most common forms of stereotypical behaviour include body rocking, spinning, repetitive hand movements and posture abnormalities (APA 2013). Although typically developing children may display repetitive motor movements, these often diminish with age and do not interfere with daily living. Compared with other common challenging behaviours, stereotypical behaviour has been considered less problematic. However, engagement in stereotypical behaviours by those with developmental disabilities can impede skill acquisition, be socially stigmatising and may develop into self-injury and other forms of challenging behaviour (Didden 2012).

### *Toe-walking behaviour*

Toe-walking refers to ambulatory stance in which individuals walk with a toe-to-toe gait, without making heel contact with the ground (Sala 1999). Although toe-walking can be present in typically developing children in early childhood, it is not considered to be problematic until after 2 years of age. Toe-walking commonly affects children diagnosed with ASD, with a prevalence rate of nearly 20.1% (Barrow 2011). Toe-walking can be caused by spinal or muscular abnormalities, although its cause is often unknown in individuals with ASD (Sala 1999). Assessment and intervention targeting toe-walking are beneficial, as it can lead to medical difficulties (e.g. foot and ankle abnormalities or pain, limping, bunions), social stigmatisation or reduced exercise if left untreated (Caserta 2019).

### *Transition-related challenging behaviour*

Resistance to change, including extreme distress at small changes and adherence to specific routines, are distinctive features of ASD (APA 2013). Challenging behaviours often occur as a result of resistance to change and can intensify if they are not treated (Neil 2014). These transition-related challenging behaviours can adopt multiple topographies, including destructive behaviour (e.g. aggression, property destruction), elopement

(e.g. leaving a designated area without permission) or uncooperative behaviour (e.g. tantrum or dropping behaviours) (Lehardy 2013). Transition-related challenging behaviours can present safety concerns and can interfere with educational and social opportunities in the classroom (Varni 1979).

## **Assessment tools**

### *Indirect assessment*

Several tools have been developed to properly assess challenging behaviours in those with developmental disabilities. It is essential to identify the function of presented challenging behaviours so that an appropriate behavioural intervention plan can be developed. The first step in identifying the function of challenging behaviours is often the use of indirect assessment tools. These tools typically consist of interviews, rating scales or questionnaires rated by caregiver informants (e.g. parents or teachers) to obtain information about challenging behaviours and the environmental context in which they occur. Several such assessment tools are available, some of which assess the topography, intensity and frequency of the behaviours while others assess their function (Cividini-Motta 2017). Table 1 presents key details regarding a number of rating scales available for the former purpose.

Although the scales identify the topography, severity and frequency of challenging behaviours, other measures provide indirect assessment of behavioural function. The Functional Assessment Interview (FAI; O'Neill 2015) is a semi-structured interview that consists of 11 sections designed to acquire information about setting events (events that 'set off' the behaviour), the immediate antecedent (trigger) and consequences of the behaviour, as well as the possible function(s) maintaining the behaviour. Additionally, information about the individual's communication skills, the efficacy of the behaviour (e.g. amount of effort required, reward frequency), preferred rewards and activities, and previous behavioural intervention strategies is collected to formulate hypotheses about the behaviour. Unlike other indirect measures of behavioural function, the FAI does not produce a score to aid in differentiating a behaviour's functions; however, it provides useful qualitative information for intervention planning (O'Neill 2015). Several brief structured rating scales for assessing the function of behaviour are also available (Table 2).

### *Direct assessment*

Direct assessment requires observation of challenging behaviours in the setting in which they take place, such as the school, home or clinic (Cividini-Motta 2017). Direct observation techniques and

**TABLE 1** Rating scales to assess the severity, frequency and topography of challenging behaviours

Assessment measure	Target population	Behaviours assessed	Number of items/versions	Rating method
Aberrant Behavior Checklist (ABC; Aman 1985)	Individuals with developmental and intellectual disabilities 5+ years	Irritability, lethargy/social withdrawal, stereotypy, hyperactivity/non-compliance, inappropriate speech	58 items 5 subscales	Four-point severity scale
Behavior Problems Inventory-01 (BPI-01; Rojahn 2001)	Individuals with developmental and intellectual disabilities 5+ years	Self-injury, stereotypical behaviour, aggression/destruction	52 items	Five-point frequency scale and four-point severity scale
Developmental Behaviour Checklist (DBC; Einfield 1995)	Individuals with developmental and intellectual disabilities 4–18 years	Total behaviour problems, disruptive/antisocial, self-absorbed, communication disturbance, anxiety and social relating behaviour	5 versions Parent/Carer Versions; Teacher Version; Adult Version; Short-Form; Monitoring Chart	Three-point scale
Baby and Infant Screen for Children with Autism Traits, Part 3 (BISCUIT-Part 3; Matson 2009)	Infants and toddlers between 17 and 37 months	Aggressive/disruptive behaviour, stereotypical behaviour, self-injurious behaviour	15 items 3 subscales	Three-point scale, items rated on the extent the behaviour has been a recent problem
Autism Spectrum Disorder–Behavior Problems for Children (ASD-BPC; Matson 2008)	2–16 years	Aggression, self-injury, disruption, stereotypy	18 items 2 subscales	Three-point scale, items rated on the extent the behaviour has been a recent problem

obtaining quantifiable data can be essential to the development of treatment plans to reduce target behaviours (Cohen 2011). Clinical psychologists primarily use indirect rating scales, whereas psychologists in special education and school psychology may espouse an applied behaviour analysis method to assess challenging behaviours. These direct assessment techniques include constructing operational definitions, antecedent–behaviour–consequence recording and experimental functional analyses (Cohen 2011).

The initial step in direct observation involves the formation of an operational definition of the target behaviour to obtain reliable data. When creating the operational definition, clinicians should describe the target behaviour in detail to prevent disagreement between observers. Rather than identifying the category of a target behaviour (e.g. aggression), the topographies (e.g. hitting, slapping, kicking) should be listed to ensure that the target behaviour can consistently be observed and measured. For example, for one child aggression might consist of multiple behavioural topographies, including biting, hitting and kicking. However, another might engage in just one behavioural topography (e.g. kicking) that serves multiple functions (Cohen 2011).

One of the most widely used forms of direct assessment is known as antecedent–behaviour–consequence (ABC) recording. This form of recording involves tracking the antecedent (events preceding the target behaviour), the target behaviour and the consequence (events following the target behaviour) in a narrative format. These data can aid in hypothesising the function of the target behaviour, as well as identifying any strategies that may reduce the challenging behaviour in the future. ABC recording is frequently used, as it is time effective and requires minimal training. Scatterplots are another descriptive direct assessment method. They can be used to identify time periods that may be associated with challenging behaviours, although they do not assist with the identification of functions maintaining the behaviours (Cividini-Motta 2017).

Other direct assessment techniques involve collecting quantifiable data and, in such cases, specifying the procedures for recording observations, length of time for observations and interval between sessions is crucial. One form of collecting data, continuous recording, involves tracking one or more dimensions of a challenging behaviour each time it occurs. These dimensions include frequency, duration, latency, intensity and physical impact (e.g. whether bruising is caused). Continuous measurement systems allow for a comprehensive record under observation. For example, a clinician may track the frequency of a target

**TABLE 2** Rating scales to assess the functions of challenging behaviours

Assessment measure	Target population	Behavioural function assessed	Number of items	Rating method
Functional Assessment Screening Tool (FAST; Iwata 2013)	Individuals with developmental and intellectual disabilities Any age	Four categories: social positive reinforcement (e.g. tangible access, attention access); social negative reinforcement (e.g. escape from demands); automatic positive reinforcement (e.g. sensory behaviour); automatic negative reinforcement (e.g. pain alleviation)	3 sections Section 1: acquires a description of the target behaviour; Section 2: 16 items related to antecedent conditions and consequences; Section 3: scoring guide 15 min to administer	Dichotomous (yes/no)
Motivation Assessment Scale (MAS; Durand 1988)	Individuals with autism or other developmental disabilities Any age	Four categories: sensory, escape, attention, tangible	16 items 10–15 min to administer	Seven-point Likert scale (Never, Almost Never, Seldom, Half the Time, Usually, Almost Always, Always)
Questions About Behavioral Function (QABF; Matson 1995)	Individuals with autism or other developmental disabilities Any age	Five categories: attention, escape, physical, tangible, non-social	25 items 15–20 min to administer	Four-point Likert scale (Never, Rarely, Some, Often)

challenging behaviour (e.g. tantrum behaviour) using a hand-held counter or electronic counting system. Clinicians may use duration recording for behaviours that are non-discrete, such as persistent mouthing of objects, to track the total amount of time the individual engaged in the behaviour during an observation period. Latency recording tracks the time between the occurrence of an antecedent event and the child starting (or ceasing) to engage in the behaviour of concern. Continuous observation and recording can be difficult and demanding, and as a result several methods (e.g. partial interval recording, whole interval recording and momentary time sampling) have been developed to provide estimates of levels of behaviours while reducing demands on the observer (Cohen 2011).

Following the use of scales or interviews and direct observation methods, an experimental functional analysis (EFA) may be conducted to identify the definite function that a target challenging behaviour serves (Cividini-Motta 2017). The completion of an EFA is considered best practice in the field of applied behaviour analysis, as it allows for function-based treatment plans. Unlike other forms of descriptive direct assessment, such as ABC recording, EFAs experimentally manipulate the antecedents and consequences of a target behaviour in both control and test conditions (Cividini-Motta 2017). Although EFAs are beneficial in developing function-based treatments, they can be impractical to complete in everyday clinical practice as they require specialised training and can be time intensive. As a result, alternative indirect methods that provide information about the functional variables maintaining behaviours, such as the Questions About Behavioral Function (QABF) checklist or Motivation Assessment Scale (MAS) (Table 2), can be especially useful for clinicians.

## Treatment

### Behavioural intervention

The most widely investigated treatment option for ASD is applied behaviour analysis, which provides the basis for several evidence-based interventions for challenging behaviours. Applied behaviour analysis strives to use the least restrictive intervention. Several non-aversive behavioural interventions have been found to be efficacious in reducing challenging behaviour. Behavioural interventions generally consist of both antecedent-based and consequence-based strategies (Lipshultz 2017a). Antecedent-based strategies are interventions that modify environmental stimuli to prevent the occurrence of challenging behaviour, whereas consequence-based strategies involve modifying contingencies of

reinforcement in the environment to promote the reduction of challenging behaviour (Cividini-Motta 2017).

#### Antecedent-based interventions

Commonly used antecedent-based interventions include provision of advance notice, high-probability instructional sequences, activity choice and non-contingent reinforcement (Lipshultz 2017a). Advance notice involves providing information about when a present activity will end and another will begin. Advance notice can be given in many forms, including visual cues (e.g. timers), verbal statements and activity schedules. These cues can be beneficial by increasing the predictability of transitions. Research indicates that the efficacy of advance notice as an antecedent intervention may be dependent on certain variables, including the unpredictability of transition-related events such as changes in the sequence, timing or content of a transition (Brewer 2014).

A high-probability instructional sequence (high-p sequence) involves presenting several tasks that the individual is likely to comply with (i.e. high-probability instructions) before presenting tasks with a lower likelihood of compliance (i.e. low-probability instructions). This method has been used to increase compliance in a range of settings with many different populations, including young children with developmental disabilities. Researchers have suggested that a high-p sequence most effectively increases compliance when highly preferred reinforcers are used with high-probability (high-p) instructions during the sequence. The interval between the last high-p instruction and the first low-probability (low-p) instruction should be short, less than 5 s, to increase efficacy and reduce non-compliance. High-p sequences can also be effective when they are combined with other antecedent-based and consequence-based interventions, such as demand fading or extinction procedures discussed in the next section (Lipshultz 2017b).

Activity choice provides the opportunity for the individual to select the time, location or order in which tasks are presented to them. This antecedent-based intervention can be easily implemented and promotes compliance and reduced challenging behaviours, as it allows the individual to avoid aversive aspects of a task (Geiger 2010). However, activity choice is not an intervention that can be used to respond to challenging behaviours while they are occurring; as a result, activity choice may be most effective if it is combined with a consequence-based procedure to further decrease the behaviour (Geiger 2010).

Non-contingent reinforcement (NCR) is a reinforcement-based antecedent intervention frequently used to treat challenging behaviours. NCR involves

delivering reinforcement on either a fixed or variable schedule regardless of whether the behaviour occurs during the specified time interval (Lloyd 2014). Unlike differential reinforcement interventions (see below), the individual's behaviour during the specified time interval does not influence the receipt of reinforcement (Tucker 1998). For example, an individual exhibiting challenging behaviour maintained by an attention function may receive adult attention in the form of social praise once every 2 min. For challenging behaviours that are maintained by social reinforcement, extinction procedures are often used in conjunction with NCR, such that reinforcement is provided on a time-based schedule and withheld after the occurrence of a challenging behaviour (Lloyd 2014). NCR can be beneficial in that it does not require continuous monitoring of behaviour, making it more practically useful in applied settings (Tucker 1998). Because NCR is an antecedent-based intervention, it can prevent challenging behaviours from occurring at all. When challenging behaviours do occur, NCR immediately reduces the behaviours while still providing reinforcement (Geiger 2010).

#### Consequence-based interventions

Differential reinforcement and extinction are frequently used consequence-based interventions for challenging behaviours. Differential reinforcement involves withholding reinforcement in the presence of challenging behaviour (i.e. extinction) and providing access to reinforcement when a target response is produced (Geiger 2010). There are several variations of differential reinforcement (Box 1).

Differential reinforcement of alternative behaviour (DRA) and differential reinforcement of other behaviour (DRO) are the most commonly used differential reinforcement techniques. They have been shown to effectively reduce a variety of challenging behaviours, including aggression, self-injurious behaviour, pica and property destruction, both as independent treatments and in conjunction with other treatments (Matson 2012). Despite the strong support of differential reinforcement as an effective behavioural treatment, there are some instances in which differential reinforcement procedures can be ineffective. It is essential that differential reinforcement procedures are based on prior functional analyses of the challenging behaviours. If the consequences implemented in a differential reinforcement procedure do not match the maintaining function of the behaviour, then the individual may not experience appropriate reinforcement (Tucker 1998). Differential reinforcement procedures can also be ineffective for challenging behaviours that occur at high rates, such that the

**BOX 1 Variations of differential reinforcement**

- Differential reinforcement of other behaviour (DRO): reinforcement is provided after a specified time interval if the challenging behaviour does not occur during the interval (Tucker 1998)
- Differential reinforcement of alternative behaviour (DRA): reinforcement is provided for a specific alternative behaviour but not for the challenging behaviour (Geiger 2010)
- Functional communication training (FCT): a specific type of DRA in which the alternative response is a communication response (verbal, symbol or gestural) requesting the reinforcing event (Geiger 2010)
- Differential reinforcement of incompatible behaviour (DRI): reinforcement is provided when an individual engages in a behaviour that is not compatible with the challenging behaviour (Zane 2013)
- Differential reinforcement of low rates of behaviour (DRL): reinforcement is provided when fewer occurrences of the challenging behaviour or longer intervals between responses take place (Zane 2013)

behaviour occurs almost continuously and there are few or no opportunities to reinforce the alternative. Additionally, differential reinforcement procedures can be difficult to implement in clinical settings as they require close monitoring of behaviours and timing of intervals (Geiger 2010).

Extinction is also a consequence-based intervention that removes reinforcement of a previously reinforced challenging behaviour. For example, extinction procedures for an escape-maintained behaviour (escape extinction) may involve continued presentation of a non-preferred demand or activity while simultaneously eliminating the possibility of escape from the non-preferred demand (Geiger 2010). Extinction is commonly combined with positive reinforcement procedures such as differential reinforcement and activity choice (Lipshultz 2017a). However, extinction procedures alone typically do not immediately reduce challenging behaviours. These procedures also require a high level of monitoring and expert supervision to ensure that the intervention is implemented with integrity, as low integrity could make the behaviour resistant to extinction procedures. Extinction procedures can also result in a burst of responding and high levels of aggression when they are implemented (Geiger 2010).

**Conclusions**

Challenging behaviours occur frequently among children with developmental disabilities. These behaviours can have a negative impact on the children and their families, as they can be associated with increased parental stress, more restrictive educational placements, social stigma and safety concerns. Consequently, it is crucial to correctly identify the function of these behaviours through indirect, descriptive and direct assessment measures to develop appropriate function-based treatment plans. Behavioural interventions are regarded as the primary treatment recommended for reducing

challenging behaviours. Several evidence-based antecedent- and consequence-based interventions can be used to reduce challenging behaviours in a variety of settings.

Despite the vast amount of research on challenging behaviours among children with developmental disabilities, questions remain and should be investigated in future research.

Regarding identification, it is essential to detect toddlers and young children at risk for developing severe and chronic challenging behaviours as young as possible. Future research might investigate precursor behaviours that precede the onset of challenging behaviours to allow for early intervention techniques such as functional communication training (FCT). Much of the research on behavioural assessment and intervention has been undertaken in highly specialist services, and not enough is known regarding how effectively they can be implemented in home and school environments. Future research on these behavioural assessment and intervention techniques should aim to increase ecological validity and transferability to naturalistic environments. Although there is a vast amount of research that supports the efficacy of behavioural interventions for children with developmental disabilities, more research is needed on assessment and intervention techniques typically provided. For example, many public education systems in the USA require functional behavioural assessments for children provided services under the Individuals with Disabilities Education Act; however, the content of these assessments varies greatly, often not requiring the use of direct assessment techniques (Lloyd 2014). Similarly, direct assessment approaches such as experimental functional analysis are more likely to be used in applied clinical settings with a surplus of resources, such as university-based clinics and private schools. Conversely, behaviour ratings scales and checklists are more commonly used to assess challenging behaviours in less well-resourced community settings or developmental

## MCQ answers

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centres (Lloyd 2014). Future research should evaluate the costs and benefits of these alternative approaches to behavioural assessment and intervention planning, especially since treatment failure can ultimately result in individuals with developmental disabilities being admitted to services that are simultaneously more restrictive and costlier than community alternatives.

### Author contributions

C.T. wrote the body of the article. J.L.M. wrote the outline and edited the article.

### Declaration of interest

None.

### References

- Aman MG, Singh NN, Stewart AW, et al (1985) The Aberrant Behavior Checklist: a behavior rating scale for the assessment of treatment effects. *American Journal of Mental Deficiency*, **89**: 485–91.
- American Psychiatric Association (2013) *Diagnostic and Statistical Manual of Mental Disorders* (5th edn) (DSM-5). American Psychiatric Publishing.
- Baeza-Velasco C, Michelon C, Rattaz C, et al (2014) Are aberrant behavioral patterns associated with the adaptive behavior trajectories of teenagers with autism spectrum disorders? *Research in Autism Spectrum Disorders*, **8**: 304–11.
- Barrow WJ, Jaworski M, Accardo PJ (2011) Persistent toe walking in autism. *Journal of Child Neurology*, **26**: 619–21.
- Brewer AT, Strickland-Cohen K, Dotson W, et al (2014) Advance notice for transition-related problem behavior: practice guidelines. *Behavior Analysis in Practice*, **7**: 117–25.
- Caserta A, Pacey V, Fahey M, et al (2019) Interventions for idiopathic toe walking. *Cochrane Database of Systematic Reviews*, **10**: CD012363.
- Cividini-Motta C, Bloom SE, Campos C (2017) Challenging behavior. In *Handbook of Social Behavior and Skills in Children* (ed JL Matson): 19–46. Springer.
- Cohen IL, Yoo JH, Goodwin MS, et al (2011) Assessing challenging behaviors in autism spectrum disorders: prevalence, rating scales, and autonomic indicators. In *Autism and Pervasive Developmental Disorders* (eds JL Matson, P Sturmey): 247–70. Springer.
- Didden R, Sturmey P, Sigafos J, et al (2012) Nature, prevalence, and characteristics of challenging behavior. In *Functional Assessment for Challenging Behaviors* (ed JL Matson): 25–44. Springer.
- Durand VM, Crimmins DB (1988) Identifying the variables maintaining self-injurious behavior. *Journal of Autism and Developmental Disorders*, **18**: 99–117.
- Einfeld SL, Tonge BJ (1995) The developmental behaviour checklist: the development and validation of an instrument to assess behavioural and emotional disturbance in children and adolescents with mental retardation. *Journal of Autism and Developmental Disorders*, **25**: 81–104.
- Fitzpatrick SE, Srivorakiat L, Wink LK, et al (2016) Aggression in autism spectrum disorder: presentation and treatment options. *Neuropsychiatric Disease and Treatment*, **12**: 1525–38.
- Geiger KB, Carr JE, LeBlanc LA (2010) Function-based treatments for escape-maintained problem behavior: a treatment-selection model for practicing behavior analysts. *Behavior Analysis in Practice*, **3**: 22–32.
- Iwata BA, DeLeon IG, Roscoe EM (2013) Reliability and validity of the functional analysis screening tool. *Journal of Applied Behavior Analysis*, **46**: 271–84.
- Jang J, Dixon DR, Tarbox J, et al (2011) Symptom severity and challenging behavior in children with ASD. *Research in Autism Spectrum Disorder*, **5**: 1028–32.
- Kalb LM, Loeber R (2003) Child disobedience and noncompliance: a review. *Pediatrics*, **111**: 641–52.
- Kanne SM, Mazurek MO (2010) Aggression in children and adolescents with ASD: prevalence and risk factors. *Journal of Autism and Developmental Disorders*, **41**: 926–37.
- Klukowski M, Wasilewska J, Lebensztejn D (2015) Sleep and gastrointestinal disturbances in autism spectrum disorders in children. *Developmental Period Medicine*, **19**: 157–61.
- Lehardy RK, Lerman DC, Evans LM, et al (2013) A simplified methodology for identifying the function of elopement. *Journal of Applied Behavior Analysis*, **46**: 256–70.
- Lipshultz JL, Wilder D (2017a) Behavioral assessment and treatment of noncompliance: a review of the literature. *Education and Treatment of Children*, **40**: 263–98.
- Lipshultz JL, Wilder D (2017b) Recent research on the high-probability instructional sequence: a brief review. *Journal of Applied Behavior Analysis*, **50**: 424–8.
- Lloyd BP, Kennedy CH (2014) Assessment and treatment of challenging behavior for individuals with intellectual disability: a research review. *Journal of Applied Research in Intellectual Disabilities*, **27**: 187–99.
- Luiselli JK (2009) Aggression and Noncompliance. In *Applied Behavior Analysis for Children with Autism Spectrum Disorders* (ed JL Matson): 175–89. Springer.
- Matson JL, Vollmer T (1995) *Questions About Behavioral Function (QABF)*. Disability Consultants.
- Matson JL, Gonzalez ML, Rivet TT (2008) Reliability of the Autism Spectrum Disorder–Behavior Problems for Children (ASD-BPC). *Research in Autism Spectrum Disorders*, **2**: 696–706.
- Matson JL, Boisjoli J, Rojahn J, et al (2009) A factor analysis of challenging behaviors assessed with the Baby and Infant Screen for Children with Autism Traits (BISCUIT-Part 3). *Research in Autism Spectrum Disorders*, **3**: 714–22.
- Matson JL, Neal D, Kozlowski A (2012) Treatments for the challenging behaviors of adults with intellectual disabilities. *Canadian Journal of Psychiatry*, **57**: 587–92.
- McClintock K, Hall S, Oliver C (2003) Risk markers associated with challenging behaviors in people with intellectual disabilities: a meta-analytic study. *Journal of Intellectual Disability Research*, **47**: 405–16.
- McTiernan A, Leader G, Healy O, et al (2011) Analysis of risk factors and early predictors of challenging behavior for children with autism spectrum disorder. *Research in Autism Spectrum Disorders*, **5**: 1215–22.
- Murphy O, Healy O, Leader G (2009) Risk factors for challenging behaviors among 157 children with autism spectrum disorder in Ireland. *Research in Autism Spectrum Disorders*, **3**: 474–82.
- Neil N, Sturmey P (2014) Assessment and treatment of obsessions and compulsions in individuals with autism spectrum disorders: a systematic review. *Review Journal of Autism and Developmental Disorders*, **1**: 62–79.
- Oliver C, Murphy GH, Corbett JA (1987) Self-injurious behaviour in people with mental handicap: a total population survey. *Journal of Mental Deficiency Research*, **31**: 147–92.
- O'Neill RE, Albin RW, Storey K, et al (2015) *Functional Assessment and Program Development for Problem Behavior* (3rd edn). Brooks/Cole Publishing.
- Park CJ, Yelland GW, Taffe JR, et al (2012) Brief report: the relationship between language skills, adaptive behavior, and emotional and behavior problems in pre-schoolers with autism. *Journal of Autism and Developmental Disorders*, **42**: 2761–6.
- Rojahn J, Matson JL, Lott D, et al (2001) The Behavior Problems Inventory: an instrument for the assessment of self-injury, stereotyped behavior, and aggression/destruction in individuals with developmental disabilities. *Journal of Autism and Developmental Disorders*, **31**: 577–88.
- Sala DA, Shulman LH, Kennedy RF, et al (1999) Idiopathic toe-walking: a review. *Developmental Medicine & Child Neurology*, **41**: 846–8.



Summers J, Shahrami A, Cali S, et al (2017) Self-injury in autism spectrum disorder and intellectual disability: exploring the role of reactivity to pain and sensory input. *Brain Sciences*, 7(11): 140.

Tucker M, Sigafoos J, Bushell H (1998) Use of noncontingent reinforcement in the treatment of challenging behavior: a review and clinical guide. *Behavior Modification*, 22: 529–47.

Varni JW, Lovaas OI, Koegel R L, et al (1979) An analysis of observational learning in autistic and normal children. *Journal of Abnormal Child Psychology*, 7: 31–43.

Zane T, Davis C (2013) Differential reinforcement procedures of low rates of responding (DRL). In *Encyclopedia of Autism Spectrum Disorders* (ed FR Volkmar): 958–62. Springer.

### MCOs

Select the single best option for each question stem

**1 Which of the following is an antecedent strategy used to treat challenging behaviours in children with developmental disabilities?**

- a extinction
- b non-contingent reinforcement
- c differential reinforcement of other behaviour
- d experimental functional analysis
- e antecedent–behaviour–consequence (ABC) recording.

**2 Which of the following is not a common challenging behaviour observed in children with developmental disabilities?**

- a transition-related behaviour
- b aggression
- c rumination
- d property destruction
- e non-compliance.

**3 Which measure specifically assesses challenging behaviours in toddlers?**

- a the Behavior Problems Inventory
- b the Functional Assessment Screening Tool
- c the Aberrant Behavior Checklist
- d the Baby and Infant Screen for Children with Autism Traits, Part 3
- e the Functional Assessment Interview.

**4 Which of the following is not a common consequence strategy used to treat challenging behaviours in children with developmental disabilities?**

- a differential reinforcement of other behaviour
- b punishment
- c extinction
- d differential reinforcement of incompatible behaviour
- e differential reinforcement of alternative behaviour.

**5 Which of the following is a common measure used to assess behavioural function in children with developmental disabilities?**

- a the Behavior Problems Inventory
- b the Motivation Assessment Scale (MAS)
- c Aberrant Behavior Checklist (ABC)
- d Baby and Infant Screen for Children with Autism Traits, Part 3 (BISCUIT-Part 3)
- e Developmental Behaviour Checklist (DBC).