

Systematic Literature Review: Intervention for Behaviour Problems of Young Children with Autistic Spectrum Disorder (ASD)

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Abstract This paper presents a review of research on intervention of behaviour problem in young children with Autistic Spectrum Disorder (ASD) between 2002 and 2019. This study using the systematic literature review (SLR) approach through PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) method to investigate the relevant literatures. Online search databases on PubMed, ProQuest, and Scopus results 15 literatures include in this review based on inclusion and exclusion criteria that involves 490 participants. The approach that had been effective to reduce the behaviour problems as well as to increase appropriate behaviours are Applied Behaviour Analysis (ABA), Positive behaviour Support (PBS) and Functional Communication Training (FCT), Family-Implemented Treatment for Behavioral Inflexibility (FITBI), Antecedent-Based Intervention, Early Start Denver Model (ESDM), play skills instruction, Stepping Stones Triple P-Enhanced (SSTP-E), Community-based group program based Pivotal Response Treatment (PRT), LEAP (Learning Experiences and Alternative Program), and Social Stories.

Keywords: *behaviour intervention, behaviour problem, young children, Autism*

1. Introduction

Autistic Spectrum Disorder (ASD) is a pervasive neurodevelopmental disorder that impairs communication, social reciprocity, and behaviour or interests (Fulton, Eapen, Črnčec, Walter, & Rogers, 2014). Regardless of their age, children who have ASD exhibit a range of impairments in those three domains (Eikeseth, Klintwall, Jahr, & Karlsson, 2012).

General consensus emerges that the decrease of a behaviour problem is impossible if there is none act of intervention because problem behaviours are maintained by their functional effect. Unless there are changes in the value of, availability of, or access to the consequences maintaining problem behaviours, there should not be an expectation that problem behaviours will decrease (Horner, Carr, Strain, Todd, & Reed, 2002).

Previous studies suggest that behaviour problems are more common among young children with ASD than in other populations (Hill *et al.*, 2014; Johnny L. Matson, Tureck, Turygin, Beighley, & Rieske, 2012). The specific behaviour problems include a wide range of behaviour and emotional problems, with symptoms of anxiety and hyperactivity (Lecavalier, 2006). The problems are related to the delays on language and communication, and social development (Buschbacher & Fox, 2003). Currently, the treatments of behaviour problems in young children with ASD are integrated into some comprehensive intervention programs (Matson, 2009). This paper aims to examine the studies that focus on the intervention of behaviour problems of young children with ASD. In order to gain an in-depth understanding on this topic, the author have been systematically review the related literatures.

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1.1. Purposes, research questions and justification

This research aims to review studies on behaviour problems of young children with ASD and the interventions to tackle the problems through a systematically method of reviewing the literature on this issue. This evidence will contribute to a deeper understanding of behaviour problems that are related to autism to determine effective and evidence-based practices for preventing and treating behaviour problems of young children define with ASD. The research questions of this study are:

1. What are the problem behaviours mostly identified among young children with ASD?
2. What effective interventions for behaviour problems suggested by the literature?

1.2. Theoretical background

Behaviour Problems of Young Children with ASD

The nature of disabilities of young children with ASD makes them in a high risk to behaviour problems (Horner *et al.*, 2002). The behaviour problems that are commonly found include aggression (both physical and verbal), self-injury behaviour (SIB), property destruction, pica, stereotypy, defiance, tantrums, and disruption (Emerson *et al.* 2001, in Horner *et al.*, 2002). Research on behaviour problem prevalence has been conducted by Hartley, Sikora, and McCoy (2008), revealing that one-third of young children with ASD have engaged in behaviour problems such as aggression, withdrawal, and attention disorder. The existence of behaviour problems among young children with ASD has increased the parents' distress on care-giving (Plant & Sanders, 2007).

The Intervention of Behaviour Problems of Young Children with ASD

The current ASD interventions for non-preferred behaviours are efforts to focus on

analysing the functions of such behaviours (whether to escape or to obtain), environment modification, and antecedent arrangements to determine the extent of consequences for prompting behaviour problems in early educational settings to replace opportunities that trigger such problematic behaviours (Westling, 2015). The impact and long-term course of behaviour problems demand the most effective and evidence-based interventions in the scholars' and practitioners' list (Matson, 2009).

Some approaches have been deployed to reduce behaviour problems among young children with ASD. For example, some practitioners have used pharmacotherapy to dismiss some types of behaviour problems such as aggression and self-injury behaviours of young children and adults with ASD (Martin, Koenig, Anderson, & Scahill, 2003, in Matson, Dempsey, & Fodstad, 2009) . The current practices of early interventions for behaviour problems for very young children are integrated into more comprehensive treatment programs that involve various methods (Matson, 2009). For example, Early and Intensive Behavioural Intervention (EIBI) consist of using several ABA procedures such as prompting, extinction, and reinforcement (Eikeseth *et al.*, 2012) and Early Start Denver Model (ESDM) that contains the Denver Model, Roger's and Pennington's Model of Interpersonal Development in Autism, and pivotal-response training (PRT) (Fulton *et al.*, 2014) .

2. Methodology

Design of the Study

This study uses the systematic literature review (SLR) approach through PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) method to investigate literatures that focus on behaviour problems of young children with autism and the interventions to solve the problems. The SLR design works by identifying, assessing, and synthesizing all relevant literatures in order to answer specific questions to minimize

systematic bias or error (Petticrew & Roberts, 2008). Investigating the literature is imperative as an effort to create a deep understanding of a specific topic. In this research, the SLR aims to examine what does and does not work, and what has been done with regard to the intervention of behaviour problems of young children with ASD.

Procedures

The review of studies on the intervention of behaviour problems of young children with autism will be conducted through the following phases:

1. Online search of potential studies on the electronic databases of PubMed, Proquest, and Scopus using the combinations of key words such as *behaviour problem, challenging behaviour, misconduct, maladaptive behaviour, young children with autism/ASD, preschool children with autism/ASD, intervention, and early intervention*.
2. The online results collected and sorted by authors' name initial. Analysis of the abstracts will be conducted to assess the eligibility of the literature. The included studies should have clarity on research rigour such as using empirical data methods for evaluating the intervention of behaviour problems of young children with ASD. Then, the included literature will be transferred to EndNote.
3. The PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) statement will be applied to the whole process in this research (Liberati *et al.*, 2009).

Inclusion and exclusion criteria

The relevant literature selected is based on the following criteria:

1. The targeted age range of the intervention is between 2 and 6 years old (children and preschool students).
2. Published in the last 15 years (between 2002 and 2017) to results a current study in this topic;
3. The literature should be peer-reviewed articles published on online database;

4. Written in English, but not limited to particular nationalities and geographical backgrounds;
5. The target of intervention is young children with ASD and may include other types of disabilities such as Pervasive Developmental Disabilities (PDD) ADHD and intellectual disability.

Meanwhile, the exclusion of literatures is based on the following criteria:

1. Measuring and concerning the intervention of behaviour problems of young children with autism. The studies will be excluded if they only deal with behaviour problems without such an intervention;
2. The studies will be excluded if the participants' ages were mixed or the studies do not focus on young age children;
3. Synthesis and meta-analysis studies in order to focus on study design of an experiment.

Study Result

Online search databases on PubMed, ProQuest, and Scopus using the combinations of key words such as *behaviour problem, challenging behaviour, misconduct, maladaptive behaviour, young children with autism/ASD, preschool children with autism/ASD, intervention, and early intervention* resulted in 11,715 literatures. From that number, 1004 were screened for further relevancy. 10,711 references were rejected after validating the key words on the database searching and 164 of studies were remained for title and abstract analysis. In some cases, the studies did not meet the inclusion criteria (47), did not present intervention outcome (39), involved irrelevant subjects (siblings, parents, teacher) (34), had irrelevant settings (19), focused on assessment tools evaluation (8), and were literature review studies (2). The 15 literatures were included in the study for the review. A flowchart of the study selection process is presented in Figure 1.

Demographic Study

Table 1 shows the reviewed studies which involved 490 participants with gender composition of 61 females, 252 males, and 177 unidentified. The age range is between 2 and 6 years old. The majority of the studies established the diagnosis of ASD, while one study solely involved young children with PDD in which ASD was involved in that group of disorders.

Theme 1 The problem behaviour type in young children with ASD

Regarding the first research question, the results of the analysis indicate 17 types of behavior problems. From 15 studies, 4 studies used “maladaptive” while others recognize off task, loud vocalization, destructive, non-compliance, disruption, aggression, self-injury, repetitive or stereotypic, irritability, defiance, disturbing, maladaptive, challenging, negative, elopement, and dangerous behaviour, which categorized as problematic behaviours. The behaviour problems directly impact on individuals and may be harmful to the individuals.

For example, some studies have reported that engaging young children with ASD in repetitive or stereotypic verbal and physical activities such as hand flapping, echolalia, and body rocking and spinning (Blair *et al.*, 2010; Boyd *et al.*, 2011; Conroy *et al.*, 2005; Lang *et al.*, 2010) might hinder the children’s ability to learn (Conroy *et al.*, 2005), and self-injury (biting pinching, kicking) can be harmful to the

children (Wacker *et al.*, 2013). Moreover, the behaviour problems might give direct effects and be harmful for other people such as defiance, disturbing (Carr & Blakeley-Smith, 2006) and aggression both physical and verbal (Blair *et al.*, 2010; Blair *et al.*, 2010; Schindler & Horner, 2005).

Theme 2 Intervention overview of behaviour problem in young children with ASD

In order to analyse the intervention method, the design and components of each studies are presented in Table 2. The review identified 12 different interventions toward behaviour problems in young children with ASD. From the 12 studies, there are 2 studies using Applied Behaviour Analysis (ABA), Positive behaviour Support (PBS) and Functional Communication Training (FCT). Meanwhile, the other literatures used Family-Implemented Treatment for Behavioral Inflexibility (FITBI), Antecedent-Based Intervention, Early Start Denver Model (ESDM), play skills instruction, Stepping Stones Triple P-Enhanced (SSTP-E), Community-based group program based Pivotal Response Treatment (PRT), LEAP (Learning Experiences and Alternative Program), and Social Stories. Only one study used the combination of Medical intervention and unidentified Behavioral intervention (Carr & Blakeley-Smith, 2006).

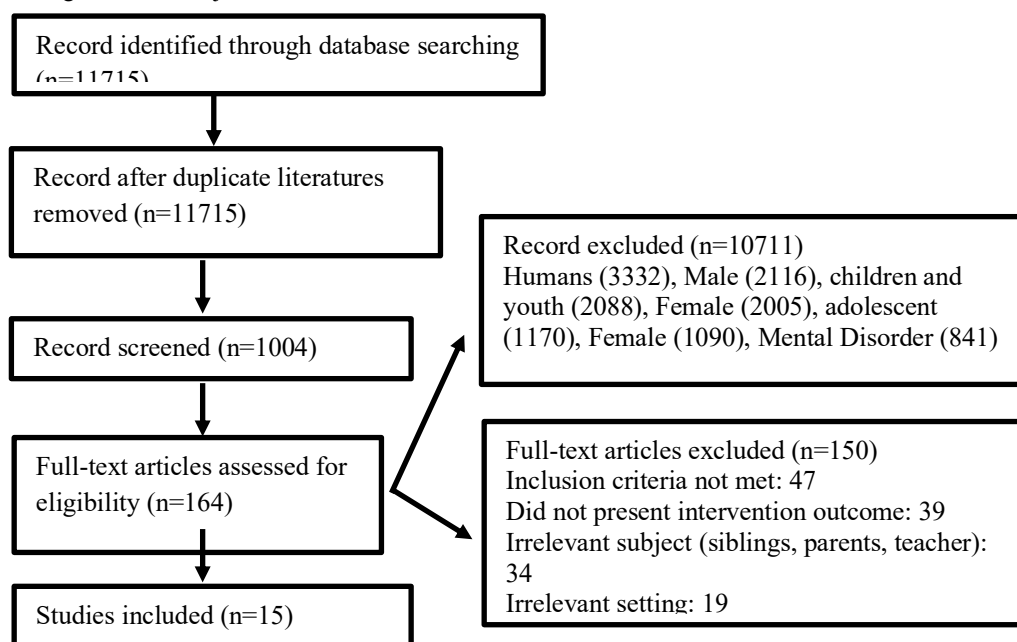


Figure. 1 Flow chart of study selection process. Intervention of problem behaviour in young children with ASD.

Table 1. Summary Demographic of studies

References	Intervention	Sample Size/gender	Diagnosis	Range of Age
Blair, Fox, and Lentini (2010)	Individualized positive behavior support (PBS)	3/ 3M	ASD	<5 years
Blair, Lee, Cho, and Dunlap (2010)	Positive behavior support; family-school collaboration	3/1F 2M	ASD	< 5 years
Boyd, McDonough, Rupp, Khan, and Bodfish (2011)	Family-Implemented Treatment for Behavioral Inflexibility (FITBI)	5 / 5M	ASD	48 Months
Carr and Blakeley-Smith (2006)	Medical intervention and Behavioral intervention	21 / 3F 18M	Pervasive Developmental Disabilities (ASD, PDD and MR)	-
Conroy, Asmus, Sellers, and Ladwig (2005)	Antecedent-Based Intervention	1 / 1M	ASD	< 6 years
Eikeseth et al. (2012)	Early and Intensive Behavioral Intervention (EIBI) consist of ABA	35 / 6F 29M	ASD	3 – 4 years
Fulton et al. (2014)	Early Start Denver Model (ESDM)	38/ 3F 35M	ASD	52.2 months
Lang et al. (2010)	play skills instruction	4/ 2F 2M	ASD	4 – 6 years
Plant and Sanders (2007)	Stepping Stones Triple P-Enhanced (SSTP-E)	74 / 19F 55M	ASD	< 6yars
Rivard, Terroux, and Mercier (2014)	Preparation coaching program for parents covers applied behavior analysis (ABA)	93 / 23F 70M	ASD	33 – 57 months
Schindler and Horner (2005)	functional communication training	3 / 1 F 2M	ASD	<5 years
Stock, Mirenda, and Smith (2013)	Community-based group program based Pivotal Response Treatment (PRT)	12 / 2F 10M	ASD	37 – 59 months

Strain and Bovey (2011)	LEAP (Learning Experiences and Alternative Program)	177 / -	ASD	50 – 52 months
Wacker <i>et al.</i> (2013)	Functional Communication Training via Telehealth	17 / 1F 16M	ASD	-
Wright and McCathren (2012)	Social Stories	4 / 4M	ASD	4 – 5 years

The majority of the literatures were found in the area of stimulus-based method (n = 9), particularly for the provision of intensive treatments such as Applied Behaviour Analysis (ABA), Functional Communication Training, and Family-Implemented Treatment for Behavioral Inflexibility (FITBI). For instance, Blair *et al.* (2010) investigated the effectiveness of support or stimulus to reduce the off-task behaviour through visual cues, frequent attention, verbal praise, and offering choice. Other studies (n = 8) employed in instruction-based method, which includes Family-Implemented Treatment, Antecedent Behaviour Intervention, and Social Stories. For example, Plant and Sanders (2007) evaluated the effectiveness of parents' instructions in home-based treatment for promoting children's social competence, giving physical and verbal prompts, and managing children's behaviour problems.

Study Design

There are two methods of data collection and analysis: individual and group. Multiple phases design of pre intervention, intervention, and post-intervention was employed in seven out of 15; most of the studies used individual measurement and analysis. Pre- and post-tests data were preferable in collecting and comparing data (six out of 15). Meanwhile, a few studies employed alternative designs such as checklist, questionnaire, interview, and observation (Carr & Blakeley-Smith, 2006; Plant & Sanders, 2007).

The most common format was one-on-one (n = 8), with one participant, and one interventionist. The remaining studies (n = 7) conducted sessions in a group with 2-11 children with one interventionist (and one

assistant or prompter). For instance, one study by Wright and McCathren (2012) facilitated social story to one child in a class activity. The comprehension and response of the targeted child was observed during a play with his peers.

Intervention Agent and Setting

The intervention agents of the studies are various. In some studies, some of them were deployed solely by the teacher (6 studies), the parents (3 studies), and a therapist (2 studies). Meanwhile, four other studies involves collaborations between the teacher and parents, teacher and nurse, and therapist and parents. The intervention was mostly conducted in preschool/early education setting (8 studies), clinic or healthcare centres (3 studies), and a combination of home and school, home and clinic, and school and clinic (4 studies). The countries of the corresponding authors include the USA (11 studies), Australia (2 studies), and Canada (2 studies).

Assessment

The assessment delivered identifies and measures the occurrence of behaviour problems. The assessment is important in order to obtain comprehensive information about behaviour problems.

Almost all studies used standardized instruments such as Functional Behavioral assessment; Functional behavioural interview and functional behavioural observation (Blair, Fox, *et al.*, 2010; Blair, Lee, *et al.*, 2010; Schindler & Horner, 2005), Vineland Adaptive Behavior Scales (VABS) (Boyd *et al.*, 2011; Conroy *et al.*, 2005; Eikeseth *et al.*, 2012; Fulton *et al.*, 2014), Repetitive Behavior Scale-Revised (RBS-R), (Boyd *et al.*, 2011), the Irritability subscale of the ABC-Community

(Carr & Blakeley-Smith, 2006), the Childhood Autism Rating Scale (CARS), (Eikeseth *et al.*, 2012), Social Communication Questionnaire (SCQ) and Mullen Scales of Early Learning (MSEL) (Fulton *et al.*, 2014), Questions About Behavioral Functions Scale (QABF) (Lang *et al.*, 2010), Eyberg Child Behavior Inventory (ECBI), Developmental Behavior Checklist-Parent Version (DBC), and Care-giving Problem Checklist (CPC)-Difficult Child Behavior (Plant & Sanders, 2007), the Adaptive Behavior Assessment System-II (Rivard *et al.*, 2014), the Child Behavior Checklist (CBCL) (Stock *et al.*, 2013), *Mullen Scales of Early Learning* (Strain & Bovey, 2011), the Social Responsiveness Scale and the Carolina Curriculum for Infants and Toddlers with Special Needs (Wright & McCathren, 2012). In addition, Lang *et al.* (2010) employ real-time observation to collect the occurrence of behaviors in a certain time.

Theme 3. The Intervention Outcome

Given the variety of assessment instrument used, the key outcomes have been identified from the reports of the 15 studies. The list of the target behaviour and outcomes of each study is presented in Table 3.

Problem Behaviour Regression

The main objective of the intervention of behaviour problems is to reduce unwanted behaviours, both the frequency and duration. All of the studies have reported that the targeted behaviour problem has decreased as the impact of the intervention.

The level of change was differing; some reported significant reduction (Plant & Sanders, 2007; Stock *et al.*, 2013; Strain & Bovey, 2011; Wacker *et al.*, 2013), while some others declared modest and marginal decrease of behaviour problems (Rivard *et al.*, 2014; Wright & McCathren, 2012). The impact degree does not seem to be associated to the length of the intervention. For example, one year STTP-E has a significant effect to the behaviour change (Plant & Sanders, 2007), in

comparison with one year Coaching program for parents that slightly decreased the behaviour problem (Rivard *et al.*, 2014).

Appropriate Behaviour Engagement

Some studies also noted that improving positive behaviours directly affects the reduction of behaviour problems. For example, Boyd *et al.* (2011) highlight that Response Interruption and Redirection (RIR) and Differential Reinforcement of Variability in behavioral responding (DRV) effectively improved five participants' engagement to planned activities as well as eliminated the frequency of repetitive behaviours. Moreover, Lang *et al.* (2010) reported that the improvement in functional play skill across the participants aligned with the regression of challenging behaviour. Further, Strain and Bovey (2011) suggested that a comprehensive improvement in children's skills such as cognitive, language and social will support the decline of inappropriate behaviours.

Some studies noted some additional effects of the applied intervention such as more academic task completion (Carr & Blakeley-Smith, 2006), the increase of children's engagement during circle time activities (Blair, Lee, *et al.*, 2010), and receptive and expressive language (Stock *et al.*, 2013). Autistic symptoms such as unusual language expression (Eikeseth *et al.*, 2012) and difficulty in taking play turn (Rivard *et al.*, 2014) were also reported to be decreased.

3. Discussion

Over the past 15 years, a number of studies have examined the effectiveness of intervention to solve behaviour problems in young children with ASD. This review aims to summarize and evaluate the empirical studies on the intervention of behaviour problems in young children with ASD. A systematic literature search resulted in 15 studies that met the initial inclusion criteria.

Summary of concepts

The behaviour problem in some literatures was represented in a range of behaviour that affects both to the children and others. The behaviours that are categorized as problematic in young children with ASD include loud vocalization, destructive, non-compliance, disruption, aggression, self-injury, repetitive or stereotypic, irritability, defiance, disturbing, maladaptive, challenging, negative, elopement, and dangerous. This result validates the conclusion of Horner et al. (2002) that the behaviours which are commonly identified in young children with autism include aggression/destruction, disruption/tantrums, self-injury, and stereotypy.

In the studies, various approaches have been employed to apply the concept of intervention, including the Applied Behaviour Analysis (ABA), Positive behaviour Support (PBS) and Functional Communication Training (FCT). Meanwhile, other literatures used Family-Implemented Treatment for Behavioral Inflexibility (FITBI), Antecedent-Based Intervention, Early Start Denver Model (ESDM), play skills instruction, Stepping Stones Triple P-Enhanced (SSTP-E), Community-based group program based Pivotal Response Treatment (PRT), LEAP (Learning Experiences and Alternative Program), and Social Stories which are effective to reduce the behaviour problems as well as to increase appropriate behaviours. The list of the intervention provides options to practitioners in managing behaviour problems in young children with ASD.

The preferred study design is baseline-treatment-post treatment that measures the event of change individually. This design is effective for increasing internal validity, even though the small sample size limits the study's external validity (Boyd et al., 2011). In order to establish the assessment credibility, most of the studies used standardized tools, either delivered through interviews, observations, or questionnaires.

Regarding to the intervention agent, some literatures have suggested that there is no recorded difference among the intervention, whether delivered by teacher, parents, nurse and therapist. This finding confirms that intervention efficacy depends on how good the plan of the approach or method is, not on the person who delivered it (Blair, Fox, et al., 2010). On the contrary, Horner et al. (2002) emphasized that agents are associated with improved effects; the effect of behaviour reduction is greater when the intervention is implemented by families and teachers than when it is delivered by other agents such as therapists. This difference needs further research, particularly to compare the effectiveness of an intervention with regard the agents.

Table 2 Summary of Concept of Intervention of Behaviour Problem

Reference	Behavior problem terminology	Method(s) design	Procedure	Intervention Agent	Setting	Assessment Instrument
Blair, Fox, et al. (2010)	off-task behaviour loud vocalization, destructive to object, non-cooperative, physical aggressive	Experiment, A-B-A multiple-baseline design	Stimulus-Based	Parents and teacher	Home and school	Functional behavioural interview and functional behavioural observation
Blair, Lee, et al. (2010)	Disruption, Noncompliance, Aggression, Self-injury	Experiment, A-B-A multiple-baseline design	Stimulus-Based	Teacher	School	Functional behavioural interview and functional behavioural observation
Boyd et al. (2011)	Repetitive behaviours	Experiment, A-B Baseline design	Stimulus-Based	Therapist, parent as observer	Clinic	Vineland Adaptive Behavior Scales (VABS) Repetitive Behavior Scale-Revised (RBS-R)
Carr and Blakeley-Smith (2006)	Aggression, self-injury, and property destruction, irritability, defiance, uncooperative, disturbing.	Experiment, Checklist and questionnaire	Stimulus-Based	Teacher and nurse	School and clinic	the Irritability subscale of the ABC-Community
Conroy et al. (2005)	Stereotypic behavior	Experiment, Baseline-intervention-post intervention (A-B-A) analysis	Instruction-Based	Teacher	School	Vineland Adaptive Behavior Scales (VABS)
Eikeseth et al. (2012)	Mal-adaptive	A quasi-experimental group design, Independent t-tests	Stimulus-Based	Therapist and parents	School and home	Vineland Adaptive Behavior Scales (VABS) the Childhood Autism Rating Scale (CARS)
Fulton et al. (2014)	Mal-adaptive behaviour	Experiment, Pre-post examination	Instruction-Based	Therapist	Autism Specific Early Learning and Care Centre	Vineland Adaptive Behavior Scales (VABS) Social Communication Questionnaire (SCQ) Mullen Scales of Early Learning (MSEL)
Lang et al. (2010)	Repetitive behaviour,	Alternating treatments design	Instruction-Based	Teacher	School	Questions About Behavioral Functions Scale (QABF)

Plant and Sanders (2007)	challenging behaviour, loud vocalization Negative behaviour	Mixed method, Semi-structured interview, observation).	Instruction-Based	Parents	Home	Real time data collection Eyberg Child Behavior Inventory (ECBI) Developmental Behavior Checklist-Parent Version (DBC) Care-giving Problem Checklist (CPC)-Difficult Child Behavior Assessment System-II
Rivard et al. (2014)	Mal-Adaptive behaviour	Quantitative evaluation, Pre-mid-post	Stimulus-Based	Parents	Home	the Adaptive Behavior Assessment System-II
Schindler and Horner (2005)	Aggressive behaviour	concurrent multiple baseline, AB	Stimulus-Based	Teacher	School	Functional behavioural interview and observation
Stock et al. (2013)	Problem behaviour	Quasi-experimental pre-test/post-test design	Stimulus-Based	Therapist	Healthcare Centre	the Child Behavior Checklist (CBCL)
Strain and Bovey (2011)	Mal-Adaptive (-)	Quantitative; clustered randomized comparison design	Instruction-Based	Teacher	School	Mullen Scales of Early Learning (MSEL)
Wacker et al. (2013)	Aggression, self-injury, property destruction, screaming, elopement, repetitive , and dangerous behaviour	Experiment, A-B Baseline design, event-recording data collection	Stimulus-Based	Parent	Home	Response digital recording
Wright and McCathren (2012)	Problem behaviour	Experiment, multiple baseline design, A-B-B-A	Instruction-Based	Teacher	School	The Social Responsiveness Scale and the Carolina Curriculum for Infants and Toddlers with Special Needs

Table 3 Summary of Outcome

Reference	Target behaviour	Intervention	Strategy	Intervention Outcome
Blair, Fox, et al. (2010)	Engagement: appropriately following the sequence of the activity, complying with all teacher instructions/ requests or expectations of the group Behaviour problem; (a) leaving seat on activity (b) off-task behaviour (c) engaging in any activity not directly related to the task (d) crying or screaming, throwing objects, or kicking; (e) hitting peers (f) scratching peers; (g) biting peers; (h) ignoring teacher (i) pushing, pulling, or taking materials from peers; and (j) yelling toward peers or adults.	Individualized positive behavior support (PBS)	Prevention Teaching response	↓ behaviour problem ↑ task engagement
Blair, Lee, et al. (2010)	Appropriate behaviour; engagement to the task or activities. Problem behaviour; (a) Disruption; climbing up and jumping down from book cases or cabinets, screaming, crying, disturbing peer or sibling activity, repetitive vocal sounds, jumping on the floor, and spinning their body. (b) Noncompliance; refusing to follow adult directions. (c) Aggression; hitting, pushing, pinching, or choking others or attempts to engage in these behaviours. (d) Self-injury; head banging or biting hands.	Positive behavior support; family-school collaboration	Prevention Teaching response	↑ Engagement behaviour ↓ Behaviour Problem behaviour family-school collaboration were acceptable and effective.
Boyd et al. (2011)	Repetitive behaviours; Lining up objects, Repetitive touching of flags, preservation with cars, Fixated interest with drawing and writing bank checks, Perseveration with real and pretend elevators, Object attachment to outdoor sticks, Repetitive touching of wind chimes, Hoarding Toothbrushes, Preoccupation with drawing signs and labelling objects with those signs, and Repeatedly watched the same movie	Family-Implemented Treatment for Behavioural Inflexibility (FITBI)	Response Interruption and Redirection (RIR) Differential Reinforcement of Variability in behavioural responding (DRV)	↓ the mean amount of time engaged in repetitive behavior ↑the mean amount of time engaged in appropriate behaviour

Carr and Blakeley-Smith (2006)	aggression, self-injury, and property destruction, irritability, whining, stomping feet, defiance, uncooperative behavior, yelling, and disturbing others.	Medical intervention and Behavioural intervention	Behavioral momentum Increased choice of and access to reinforcers Escape extinction and prompts	↓ levels of problem behavior Completed more academic tasks
Conroy et al. (2005)	Stereotypic behavior: hand flapping engagement: manipulating objects or work materials, facing the instructor or task, or requesting information related to the task.	Antecedent-Based Intervention	visual cue cards verbal contingent prompts	↓ stereotypic behaviour ↑ engagement to task
Eikeseth et al. (2012)	Mal-adaptive (e.g. repetitive behaviour)	Early and Intensive Behavioral Intervention (EIBI) consist of ABA	Discrete-Trials-Teaching in group settings and natural environment teaching.	↓ maladaptive behaviour ↓ autism symptom
Fulton et al. (2014)	Receptive and expressive communication, social skills, joint attention, fine motor, gross motor, imitation, cognition, play skills, and personal independence (eating, dressing, grooming, and chores).	Early Start Denver Model (ESDM)	play natural daily routines joint activity routines	↓ maladaptive behaviours
Lang et al. (2010)	Repetitive behaviour: Odd and repetition act to the toys challenging behaviour: throwing toys, loud vocalization	Play skills instruction	Play with physical, verbal, and then model prompts	↓ frequency of stereotypy and challenging behavior were lower
Plant and Sanders (2007)	Negative behavior	Stepping Stones Triple P-Enhanced (SSTP-E) training for parents	Training to promote children's competence and development, and to manage misbehaviour	↑ functional play Positive changes in child behavior.
Rivard et al. (2014)	Mal-Adaptive behavior and socio-affective competencies such as potty training, eating, and sleeping.	Preparation coaching program for parents covers applied behavior analysis (ABA)	One on one sessions	↓ Negative child behavior ↑ Adaptive behavior, and socio-affective competencies
Schindler and Horner (2005)	Aggressive behaviour; Pinch adult, whine, and scream	functional communication training	one-on-one sessions	↓ Autism symptoms ↓ level and variability of problem behavior

Stock et al. (2013)	Serious problem behaviour (-)	Community-based group program based Pivotal Response Treatment (PRT)	Intensive Teaching Natural and Environment Teaching contexts	↓ problem behaviour ↑ cognitive, receptive and expressive language
Strain and Bovey (2011)	Mal-Adaptive (-)	LEAP (Learning Experiences and Alternative Program)	(a) family skill training, (b) social skills training, and (c) design and inclusive classroom operations.	↑ cognitive, language, social competencies. ↓ problem behavior, and autism symptoms.
Wacker et al. (2013)	Aggression, self-injury, property destruction, screaming, elopement, repetitive behavior, and dangerous behavior	Functional Communication Training via Telehealth	Training to parents on FCT escape, FCT tangible, and FCT attention.	↓ the average problem behavior across all FCT treatments
Wright and McCathren (2012)	Problem behaviour and prosocial behavior	Social Stories	Story reading during play	↓ the problem behaviours

Note: ↓ (decrease), ↑ (increase)

The limited studies included in this review may be considered small. Whether important databases have been discovered to obtain expected literatures, the number of studies is limited. Moreover, as the regions of studies only cover 3 countries, the intervention cannot be generalized.

Conclusion

This review of studies on the intervention of behaviour problems in young children with ASD reveals some approaches or methods which are effective for reducing the behaviour problems as well as increasing appropriate behaviours. There are differences of design, intervention agent, setting, and assessment methods among the studies.

This review provides recommendations for teachers, parents, and practitioners in delivering best-practice intervention for managing behaviour problems in young children with ASD. This review also supports studies on behaviours which are considered problematic, such as repetitive, aggression, disruptive and destructive. Despite the review, there are questions regarding the comparison of the effectiveness of intervention in various settings and with various/different agents.

Bibliography

Blair, K.-S. C., Fox, L., & Lentini, R. (2010). Use of positive behavior support to address the challenging behavior of young children within a community early childhood program. *Topics in Early Childhood Special Education, 30*(2), 68-79. DOI: 10.1177/0271121410372676.

Blair, K.-S. C., Lee, I.-S., Cho, S.-J., & Dunlap, G. (2010). Positive behavior support through family-school collaboration for young children with autism. *Topics in Early Childhood Special Education, 31*(1), 22-36. DOI:10.1177/0271121410377510.

Boyd, B. A., McDonough, S. G., Rupp, B., Khan, F., & Bodfish, J. W. (2011). Effects of a family-implemented treatment on the repetitive behaviors of children with autism.

Journal of Autism and Developmental Disorders, 41(10), 1330-1341. DOI: 10.1007/s10803-010-1156-y.

Buschbacher, P. W., & Fox, L. (2003). Understanding and intervening with the challenging behavior of young children with autism spectrum disorder. *Language, Speech & Hearing Services in Schools, 34*(3), 217. DOI: 10.1044/0161-1461(2003/018).

Carr, E. G., & Blakeley-Smith, A. (2006). Classroom intervention for illness-related problem behavior in children with developmental disabilities. *Behavior Modification, 30*(6), 901-924. DOI: 10.1177/0145445506290080.

Conroy, M. A., Asmus, J. M., Sellers, J. A., & Ladwig, C. N. (2005). The use of an antecedent-based intervention to decrease stereotypic behavior in a general education classroom: A case study. *Focus on Autism and Other Developmental Disabilities, 20*(4), 223-230. DOI: 10.1177/10883576050200040401.

Eikeseth, S., Klintwall, L., Jahr, E., & Karlsson, P. (2012). Outcome for children with autism receiving early and intensive behavioral intervention in mainstream preschool and kindergarten settings. *Research in Autism Spectrum Disorders, 6*(2), 829-835. DOI: 10.1016/j.rasd.2011.09.002.

Fulton, E., Eapen, V., Črnčec, R., Walter, A., & Rogers, S. (2014). Reducing maladaptive behaviors in preschool-aged children with autism spectrum disorder using the Early Start Denver Model. *Frontiers in Pediatrics, 2*, 40, 1-10. DOI: 10.3389/fped.2014.00040.

Hartley, S. L., Sikora, D. M., & McCoy, R. (2008). Prevalence and risk factors of maladaptive behaviour in young children with Autistic Disorder. *Journal of Intellectual Disability Research, 52*(10), 819-829. DOI: 10.1111/j.1365-2788.2008.01065.x.

Hill, A. P., Zuckerman, K. E., Hagen, A. D., Kriz, D. J., Duvall, S. W., van Santen, J. et al. (2014). Aggressive behavior problems in children with autism spectrum disorders:

prevalence and correlates in a large clinical sample. *Research in Autism Spectrum Disorders*, 8(9), 1121-1133. DOI: 10.1016/j.rasd.2014.05.006.

Horner, R. H., Carr, E. G., Strain, P. S., Todd, A. W., & Reed, H. K. (2002). Problem behavior interventions for young children with autism: a research synthesis. *Journal of Autism and Developmental Disorders*, 32(5), 423-446. DOI: 10.1023/A:1020593922901.

Lang, R., O'Reilly, M., Sigafoos, J., Machalicek, W., Rispoli, M., Lancioni, G. E., Aguilar, J. & Fragale, C. (2010). The effects of an abolishing operation intervention component on play skills, challenging behavior, and stereotypy. *Behavior Modification*, 34(4), 267-289. DOI: 10.1177/0145445510370713.

Lecavalier, L. (2006). Behavioral and emotional problems in young people with pervasive developmental disorders: relative prevalence, effects of subject characteristics, and empirical classification. *Journal of Autism and Developmental Disorders*, 36(8), 1101-1114. DOI: 10.1007/s10803-006-0147-5.

Liberati, A., Altman, D. G., Tetzlaff, J., Mulrow, C., Gøtzsche, P. C., Ioannidis, J. P. *et al.* (2009). The PRISMA statement for reporting systematic reviews and meta-analyses of studies that evaluate health care interventions: Explanation and elaboration. *PLoS Medicine*, 6(7), e1000100. DOI: 10.1371/journal.pmed.1000100.

Matson, J. (2009). Aggression and tantrums in children with autism: A review of behavioral treatments and maintaining variables. *Journal of Mental Health Research in Intellectual Disabilities*, 2(3), 169-187. DOI: 10.1080/19315860902725875.

Matson, J. L., Dempsey, T., & Fodstad, J. C. (2009). Stereotypies and repetitive/restrictive behaviours in infants with autism and pervasive developmental disorder. *Developmental Neurorehabilitation*, 12(3), 122-127. DOI: 10.1080/17518420902936730.

Matson, J. L., Tureck, K., Turygin, N., Beighley, J., & Rieske, R. (2012). Trends and topics in early intensive behavioral

interventions for toddlers with autism. *Research in Autism Spectrum Disorders*, 6(4), 1412-1417. DOI: 10.1016/j.rasd.2012.02.010.

Plant, K. M., & Sanders, M. R. (2007). Reducing problem behavior during care-giving in families of preschool-aged children with developmental disabilities. *Research in developmental disabilities*, 28(4), 362-385. DOI: 10.1016/j.ridd.2006.02.009.

Petticrew, M., & Roberts, H. (2008). *Systematic reviews in the social sciences: A practical guide*: John Wiley & Sons.

Rivard, M., Terroux, A., & Mercier, C. (2014). Effectiveness of early behavioral intervention in public and mainstream settings: The case of preschool-age children with autism spectrum disorders. *Research in Autism Spectrum Disorders*, 8(9), 1031-1043. DOI: 10.1016/j.rasd.2014.05.010.

Schindler, H. R., & Horner, R. H. (2005). Generalized reduction of problem behavior of young children with autism: Building trans-situational interventions. *American Journal on Mental Retardation*, 110(1), 36-47. DOI: 10.1352/0895-8017(2005)110<36:GROPBO>2.0.CO;2.

Stock, R., Mirenda, P., & Smith, I. M. (2013). Comparison of community-based verbal behavior and pivotal response treatment programs for young children with autism spectrum disorder. *Research in Autism Spectrum Disorders*, 7(9), 1168-1181. DOI: 10.1016/j.rasd.2013.06.002.

Strain, P. S., & Bovey, E. H. (2011). Randomized, controlled trial of the LEAP model of early intervention for young children with autism spectrum disorders. *Topics in Early Childhood Special Education*, 31(3), 133-154. DOI: 10.1177/0271121411408740.

Wacker, D. P., Lee, J. F., Dalmau, Y. C. P., Kopelman, T. G., *et al.* (2013). Conducting functional communication training via telehealth to reduce the problem behavior of young children with autism. *Journal of Developmental and Physical Disabilities*, 25(1), 35-48. DOI: 10.1007/s10882-012-9314-0.

Westling, D. L. (2015). Evidence-Based Practices for Improving Challenging Behaviors of Students With Severe Disabilities. Retrieved 20 March 2017, from University of Florida, Collaboration for Effective Educator, Development, Accountability, and Reform Center <http://cedar.education.ufl.edu/tools/innovation-configurations/>.

Wright, L. A., & McCathren, R. B. (2012). Utilizing social stories to increase prosocial behavior and reduce problem behavior in young children with autism. *Child Development Research*, 2012, 357291, 1-13. DOI: 10.1155/2012/357291.