A SYSTEMATIC REVIEW OF INTERVENTIONS FOR EMOTIONALLY DYSREGULATED CHILDREN

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COMPULSORY DECLARATION

This work has not been previously submitted in whole, or in part, for the award of any degree. It is my own work. Each significant contribution to, and quotation in, this dissertation from the work, or works, of other people has been attributed, and has been cited and referenced.

Signature: Signed by candidate Date: 6/02/2020

ABSTRACT

Emotion regulatory problems in children, such as uncontrollable tantrums, kicking, and screaming, are a concern for parents. When parents and caregivers have no tools at their disposal to deal effectively with this, they may resort to physical measures of discipline, which may lead to physical abuse and also have negative effects on the wellbeing of the child. There is a need for a set of skills for what to do during these crisis moments. However, the state of evidence on this is unknown. Thus, a systematic review of interventions for emotionally dysregulated children was conducted in order to ascertain the state of evidence and to provide parents, teachers, hospital staff and caregivers with a "toolbox" of skills they can use. The findings of the studies indicated that the skills worked when used in a non-coercive manner. Overall the quality of the studies was weak: most were single-case studies. This review provides tentative suggestions of skills that parents and caregivers may find useful with dysregulated children, but further research into the effectiveness of these skills is needed.

Keywords: Positive discipline parenting skills, crisis interventions, emotion dysregulation, children

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Chapter 1: Introduction

Childhood emotion regulatory problems are a constant concern for parents (Winsper & Wolke, 2014). Temper tantrums, crying, screaming, irritation and aggression are some of the behaviours that make parenting stressful. Emotion regulation is the ability to understand and control one's emotions and expressions in order to achieve a state of interpersonal functioning (Jahromi, Bryce & Swanson, 2013). It is considered an important developmental task in early childhood: when a child fails to self-regulate they may have poor social and academic outcomes (Jahromi et al., 2013). When parents have no tools or skills at their disposal to deal with difficult behaviour, they may resort to punitive measures of discipline (for example, spanking) which has been shown to be problematic and, in extreme forms, may escalate into physical abuse, with potentially serious consequences for the child (Barbara, 2005; Gershoff, 2013; Winsper & Wolke, 2014). The negative effects of physical punishment or violent discipline practices have been studied extensively and research reveals consequences such as impairment of the parent-child relationship, aggression, and antisocial behaviour (Barbara, 2005; Gershoff, 2002). On the other hand, positive parenting behaviours such as warmth, emotional expressivity and quality attachment promote self-regulation in children (Kim-Spoon, Haskett, Longo & Nice, 2012; Crandall, Ghazarian, Day & Riley, 2016). Taken together, these bodies of literature make it an imperative that parents learn positive ways in which to deal with children's inevitable episodes of dysregulation.

Parents are not the only caregivers who need to deal with children's emotional dysregulation. Others include the staff of schools, children's care homes and psychiatric hospitals. In residential care facilities for at-risk children, caregivers may resort to physical restraint and seclusion timeout to manage the inappropriate and aggressive behaviour displayed by a child (Ryan, Peterson, Tetrault & Hagen, 2010). However, there are a number of dangers associated with seclusion timeouts and physical restraint. Couvillon, Peterson, Ryan, Scheuermann, and Stegall (2010) report that some of the risks associated with restraint include physical injuries due to resistance from the child for example, falling or bumping into furniture. Children may also suffer psychological trauma as a result of restraints (Couvillon et al., 2010). One of the main criticisms of seclusion timeouts and physical restraint is the lack of established guidelines or policies to monitor their use (Ryan et al., 2010). This makes the use of these aversive strategies susceptible to improper use, thereby causing harm to the child and to the caregiver who may not feel comfortable using these strategies (Ryan et al., 2010; Bonner, Lowe, Rawcliffe & Wellman, 2002). The need for interventions that prevent or

intervene in crisis situations and avoid the use of restraint or other forms of harsh discipline is paramount.

Collectively, the set of skills known as crisis interventions offer the hope of effectively managing the emotional and behavioural problems that all children (and particularly children at risk) exhibit from time to time, without causing harm to the child or distressing the caregiver.

Defining Crisis Interventions

Crisis interventions are a set of skills which parents, teachers and caregivers can use when a child is emotionally dysregulated or exhibiting aggressive behaviour. Greenstone and Leviton (p. 23, 2002) define a crisis intervention as "a skilful intrusion into a personal crisis to defuse a potentially disastrous situation before physical and emotional destruction occurs". It is about helping the child cope with troubling thoughts, feelings and behaviour so that they are able to function. The cornerstone of crisis intervention is de-escalation, which encompasses a range of verbal and nonverbal communication skills to ease the situation (Hallett & Dickens, 2015). It involves mutual respect, cooperation and expressing empathy (Hallett & Dickens, 2015).

What do we know about crisis interventions?

There are several programmes for teachers and caregivers in other institutions that teach skills for managing children's dysregulation.

Life Space Crisis Interventions (LSCI) is a program for adults who work with children that emerged in the United States. It incorporates a number of strategies, beginning with some for the moment of dysregulation, and thus provides a process that addresses conflict taking into consideration the emotional, developmental and social needs of youth (Long, Fecser, & Wood, 2001). Thus, instead of punishing or dismissing the child for being emotionally dysregulated, the adult learns ways of communicating with the child to understand the origin of the conflict as well as to turn it into a moment of growth and learning for the child (Soenen, Volckaert, D'Oosterlinck, & Broekaert, 2014; Whitson & Chambers, 2014). Some of the goals of LSCI include changing the youth's behaviour, fostering self-confidence, diminishing anxiety, and improving children's understanding of their own feelings and behaviour as well as those of other people (Soenen et al., 2014). The components of the training include acknowledging the child's feelings, using affirming and listening skills

to understand their point of view, and helping the child re-integrate back to their 'life space' - for example, school (Soenen et al., 2014).

A study of LSCI training with teachers in a rural Pennsylvania middle and high school shows that the intervention was effective as it reduced disciplinary referrals significantly (Forthun, McCombie, & Freado, 2006). Specifically, there was a decrease in fighting, disruptive classroom behaviours and disobedience. The teachers also reported that their experience with LSCI helped them to improve their relationships with students. Similar results were evident in a study with children with emotional and behavioural difficulties in a Flemish centre (Soenen et al., 2014). The staff reported that there was a better organizational climate over and above the improvements in academic performance. Certainly the goal of LSCI is to help children understand their own emotions. In one study of 517 children in residential care in Belgium, the LSCI intervention decreased their aggression and hostility and found that the children learnt coping mechanisms for their anxiety (D'Oosterlinck, Goethals, Broekaert, Schuyten, & De Maeyer, 2008).

LSCI is a classroom strategy for children with emotional and behaviour problems: other crisis interventions exist for at-risk children in institutions such as hospitals. The focus is on the reduction of aversive strategies such as physical restraint and seclusion. This involves both adult and child populations. For example, Forster, Cavness, and Phelps (1999) investigated the effect of crisis management training on the use of seclusion and restraint in an acute hospital. The results show that annual restraint use decreased by 13.8% and staff injuries were also minimized. Similarly, Martin (1995) investigated how to improve staff safety through an Aggression Management Program. Although the program did not yield a significant drop in the number of assaults, it decreased the severity of injuries as well as staff absenteeism. Thus physical restraints and seclusion timeouts do not only have negative consequences for children, but the staff too; and that appropriate interventions can reduce consequences for staff as well as children.

De-escalation is another important skill that is used in crisis interventions and proves to be effective in reducing timeouts and restraints. For example, a study by Ryan, Peterson, Tetreault, and Hagen (2007) indicates a 65.6% reduction in the use of seclusion timeout procedures for at-risk children. Similarly, Van Loan, Gage, and Cullen (2015) report that physical restraint decreased significantly post-intervention. Furthermore, the caregivers reported that the intervention was easy to use and effective when dealing with emotional crises, which suggests that the intervention has social validity. Evidently, when caregivers know which other skills to use instead of restraints and seclusions, they will use them. To

prevent the risk of counter-aggression by staff members in a residential facility, Nunno, Holden, and Leidy (2003) implemented the 'Therapeutic Crisis Intervention'. The results of the study indicate that the intervention was successful in reducing physical restraints, and staff knowledge and confidence about interventions improved. Thus it is evident that there are studies that indicate that there are effective tools that can be used for emotion dysregulation, which in turn help to reduce restraints and seclusion, as well as punitive measures of discipline such as hitting the child.

What is not known about Crisis Interventions

At the most basic level, I could not identify any review on crisis interventions for emotionally dysregulated children, thus we do not know what the state of evidence is currently. The studies mentioned above are all programs targeted for a special population and the components thereof are sometimes unclear. Clear intervention components within evidence based research are important because they help practitioners identify the working ingredients of interventions, and tailor an intervention to an individual client based on their needs, demographics and context (Chorpita, Daleiden, & Weisz, 2005; Embry, 2008). This approach can lead to a better understanding of treatments and point to possibilities for new interventions (Embry, 2008). Furthermore, most of the research is done in the United States, with children in special schools for emotional and behavioural difficulties. There is a dearth of research into crisis interventions in South Africa, with only one study which investigated the experiences of teachers with crisis counselling, interventions and prevention in rural schools in Kwa-Zulu Natal (Duma, 2014). In this study, the author considers crisis situations such as interpersonal violence and political violence which are out of the scope of the present study; however, it is possible that de-escalating a crisis early may at least prevent interpersonal violence. The results of the study are alarming and suggest the need for crisis interventions: 90% of the teachers indicated that they did not have approaches to respond to the acts of school violence; another 90% indicated that the notion of crisis intervention was novel and uncomfortable to them; and 60% also indicated that they do not interview a victim learner when intervening in a crisis situation. Although there are many organisations in South Africa that do crisis interventions, there is not that much empirical evidence into their effectiveness and they are not targeting emotional dysregulation or aggression.

Hence, this research undertakes to do a systematic review. This will help us determine systematically the current state of evidence on crisis interventions (which may be helpful to caregivers), as well as identify knowledge gaps in the literature (Schlosser, 2006).

Chapter 2: Method

Study design

This study is a systematic review. A systematic review collects and critically analyses existing literature in order to draw some conclusion about the state of evidence in that field (Abbas, Raza, & Ejaz, 2008). This review will evaluate the current state of evidence on the use of crisis interventions with children. In order to limit systematic error (bias) and ensure reliability, systematic reviews adhere to strict methods (Schlosser, 2006). Hence, a co-reviewer was appointed to simultaneously examine the research articles. Furthermore, this study aimed to follow the guidelines set out in the Cochrane Handbook for systematic reviews (Higgins & Green, 2011).

Search Strategy

With regards to the inclusion and exclusion criteria, the following factors were considered:

- Is it peer-reviewed? Grey literature was excluded due to the lack of guidelines and standards when searching for grey literature, which may thus introduce bias into the review (Saleh, Ratajeski, & Bertolet, 2014).
- Is it in English or Afrikaans? The study only looked at English and Afrikaans papers as these are the languages the reviewers are proficient in.
- Are the participants' age 21 and under? If not, are they parents, teachers or other caregivers?
- Does it present or review evidence on at least one positive discipline intervention?
- Was the child/children aggressive or dysregulated when the skill was used?
- Is it distinguishable whether the intervention was used appropriately or punitively? In other words, the interventions used do not punish or harm the child as a consequence of emotional dysregulation but they effectively manage the behaviour through guidance and containment. The review was therefore limited to those studies where the aim of the technique studied is to make the child feel safe and help them return to a state where they can function.
- Does it present or review any child or caregiver outcomes?

A table of search terms (Table 1) was formulated to use when searching for journal articles. The list was carefully drawn up to ensure that it was exhaustive by using other keywords such as de-escalation, containment, and emotional regulation, which are synonymous with crisis interventions. The search terms were tested to see if they yielded relevant results. Modified Cochrane data extraction templates (Appendix A) were used to gather information about the studies. These were piloted, using the search terms and 3 articles to fill in the templates. Part of data extraction included listing relevant references to other articles and then pursuing these articles to include in the review. There was no limit set on the years of the article because of the dearth of relevant articles in this area. Thus relevant references to other articles were pursued until there were none left.

The following databases were searched:

Academic Search Premier
Africa-Wide Information
CINAHL
Communication and Mass Media Complete
ERIC
Health Source: Nursing/Academic Edition
Humanities International Complete
MasterFILE Premier
MEDLINE
PsycARTICLES
PsycINFO
SocINDEX with Full Text
Teacher Reference Center

The two reviewers began searching for articles by screening for relevant titles. Thereafter, we screened the abstracts independently and used the inclusion/exclusion checklist (Appendix B) to decide which ones were relevant to keep. All inclusion and exclusion decisions were documented and are reported in the review. Full text articles were then sought for the articles that the reviewers decided upon and those articles which were unclear, and again the inclusion and exclusion criteria were used to assess these. Then finally the reviewers met to agree on a final list of studies to be included for review. Disagreements were resolved through a discussion between the two reviewers and Catherine Ward until a consensus was reached. A Preferred Reporting Items for Systematic Reviews and Meta-

Analyses (PRISMA) (Moher, Liberati, Tetzlaff, & Altman, 2009) flow chart was drawn up to document the number of included and excluded studies at different stages of the systematic review with reasons for these decisions (see Figure 1).

The systematic review included both single studies and reviews with the aim of being exhaustive. The quality of the reviews was assessed using the "Assessing the Methodological Quality of Systematic Reviews" (AMSTAR) checklist (Appendix C) (Shea et al., 2007). And for the single studies, the "risk of bias" section of the data extraction template was used (Appendix B).

Ethical considerations

Given the secondary nature of systematic reviews, there is the tendency to think that they are exempt from ethics. However, Vergnes, Marchal-Sixou, Nabet, Maret, and Hamel (2010) argue that there are some ethical matters to consider when doing systematic reviews. The most obvious issue is that systematic reviews may contain studies with ethical shortcomings (Vergnes et al., 2010). However, given the modern advances in ethics, the risk of including unethical studies was diminished. Furthermore, systematic reviews are also prone to conflicts of interests (Vergnes et al., 2010). Despite the rigorous methods involved in maintaining the quality of systematic reviews, they are still subject to subjectivity and conflicts of interests. However, in this study, this potential source of bias was minimized by the fact that there were two reviewers and all decisions were recorded, and therefore open to public scrutiny. There was also no inherent conflict of interest as I am not affiliated with any program. During the review, attention was paid to conflicts of interest of authors of the studies included and regular meetings with my supervisor; co-reviewer and I were held in order to resolve issues with regards to this. The data was stored in a password protected computer.

Significance of the study

This study illuminated the available evidence for crisis interventions that work. These skills will support parents and caregivers to identify effective skills to use with emotionally dysregulated and aggressive children, and will also identify the state of the science in this area.

Table 1. Table of Search Terms

No.	Search terms
1	SU (“crisis intervention” AND (“parent*” OR “famil*” OR “classroom*” OR “school*” OR “child*” OR “adolescen*” OR “teen*” OR “youth” OR “student*”) AND (“effect*” OR “evidence”))
2	“life space crisis intervention” AND (“parent*” OR “famil*” OR “classroom*” OR “school*” OR “child*” OR “adolescen*” OR “teen*” OR “youth” OR “student*”) AND (“effect*” OR “evidence”)
3	“containment” AND “aggressi*” AND (“parent*” OR “famil*” OR “classroom*” OR “school*” OR “child*” OR “adolescen*” OR “teen*” OR “youth” OR “student*”) AND (“effect*” OR “evidence”)
4	“tantrums” AND (“parent*” OR “famil*” OR “classroom*” OR “school*” OR “child*” OR “adolescen*” OR “teen*” OR “youth” OR “student*”) AND (“effect*” OR “evidence”)
5	“de-escalation” AND (“skill*”OR “strategy*” OR “technique*” OR “practice*”) AND (“parent*” OR “famil*” OR “classroom*” OR “school*” OR “child*” OR “adolescen*” OR “teen*” OR “youth” OR “student*”) AND (“effect*” OR “evidence”)
6	(“de-escalation” AND (“review” OR “meta-analysis”)) NOT (“microbial*” OR “antibiotic*” OR “antimicrobial*” OR “virus” OR “carcinoma” OR “cancer” OR “fungal” OR “disease”)
7	SU ((“emotion*” OR affect”) AND “*regulation”) AND (“parent*” OR “famil*” OR “classroom*” OR “school*” OR “child*” OR “adolescen*” OR “teen*” OR “youth” OR “student*”) AND (“review” OR “meta-analysis”)
8	“emotion regulation” AND “crisis intervention” AND (“parent*” OR “famil*” OR “classroom*” OR “school*” OR “child*” OR “adolescen*” OR “teen*” OR “youth” OR “student*”) AND (“effect*” OR “evidence”)
9	“crisis intervention” AND “violen*” AND (“parent*” OR “famil*” OR “classroom*” OR “school*” OR “child*” OR “adolescen*” OR “teen*” OR “youth” OR “student*”) AND (“effect*” OR “evidence”)
10	“dysregulat*” AND “crisis intervention” AND (“parent*” OR “famil*” OR “classroom*” OR “school*” OR “child*” OR “adolescen*” OR “teen*” OR “youth” OR “student*”) AND (“effect*” OR “evidence”)
11	“crisis intervention” AND “south africa” AND (“parent*” OR “famil*” OR “classroom*” OR “school*” OR “child*” OR “adolescen*” OR “teen*” OR “youth” OR “student*” OR “juvenile*”)

Chapter 3: Results

The initial search identified 3,104 titles which were screened and identified to proceed to the next level. Some articles were also removed if they were duplicates. The second level of of screening included 2,241 abstracts. Upon examination, 269 abstracts were identified to be appropriate for inclusion. Thereafter, the full texts of these abstracts were sourced and screened for further eligibility and only 59 appeared to fulfil the inclusion criteria. Using the modified Cochrane data extraction templates, data from the 59 articles were extracted and 11 studies were further excluded (see Figure 1).

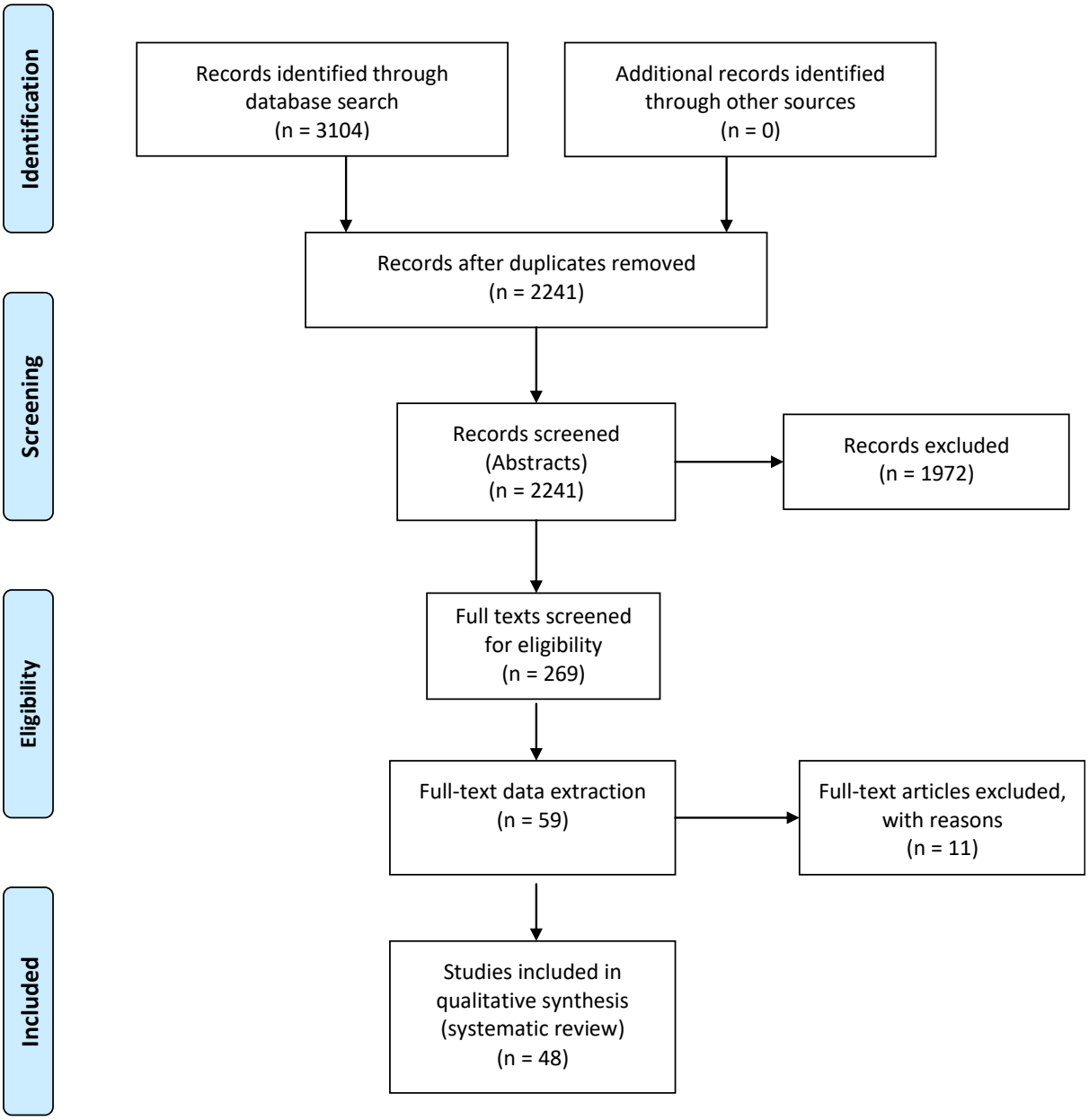

Figure 1. PRISMA flow diagram.

Excluded studies

Eleven studies were excluded during the appraisal of the full text articles. These were excluded for the following reasons:

- The study sample consisted of adults (Garriga et al., 2016; Price & Baker, 2012; Roberton, Daffern, Thomas, & Martin, 2012; Smit & Liebenberg-Siebrits, 2001).
- The intervention was not used when the child was emotionally dysregulated (Crone & Mehta, 2016; Schneider, Cavell, & Hughes, 2003).
- The study did not give clear intervention components and/or outcomes (Daniels, Mandleco, & Luthy, 2012; Eisbach et al., 2014; Goorix, D'Oosterlinck, Spriet, Freado, & Broekaert, 2012; Muralidharan & Fenton, 2006; Newman, Fagan, & Webb, 2014).

Included studies

Forty-eight studies were included in the review - two reviews and 46 single studies. These will be described below, specifically with regards to the participant characteristics, study design and the type of intervention. Two tables that summarize this are provided (Appendices D and E), as well as two tables that summarize the skills assessed in the studies (Table 2 and 3), which are typically found in the behaviour management literature.

Participant characteristics. In total, there were 1,517 child participants across the studies. There were two studies that did not mention sample size (Jambunathan & Bellaire, 1996; Kalogjera, Bedi, Watson, & Meyer, 1989) and two that used adult participants who were school teachers (Forthun & McCombie, 2011; Forthun et al., 2006). The latter studies were evaluating the effectiveness of an LSCI training program for teachers and student disciplinary referrals. The rest of the studies used children as their participants, with parents, teachers, and hospital staff involved in carrying out the intervention depending on the setting. The age range of the children in the studies was 18 months - 21 years old (although technically those over 18 years old are not children, the papers did not disaggregate by age and did include children, thus they were included in the review). There were two studies that did not mention the ages of the children in their sample (Kalogjera et al., 1989; Ryan et al., 2007). The studies took place in a variety of settings: schools, psychiatric hospitals, homes and laboratory settings. The participants were diagnosed with a range of disorders including autism, developmental disabilities, emotional and behavioural difficulties, Down syndrome

and cerebral palsy. Most of the children were neurotypical (n=1,201), who were involved in the studies because they had emotion regulation problems. I have not made a distinction between interventions used with neurotypical vs neuro-atypical children because there is considerable overlap - there is no difference in the kind of interventions used with the different groups.

Table 2. Skills assessed in the studies used to prevent dysregulation.

Skill	Description	Example
Prescribing the tantrum	A paradoxical intervention. Parent and child decide on a specific place and time when child can have a tantrum.	Making it a game. Practising tantrums during a time suitable for both mother and child, and seeing how loud she can be.
Positive Reinforcement	The use of attention, praise, tokens, the child's preferred food items or toys to increase an acceptable behaviour. Used during moments when the child was exhibiting acceptable behaviour.	Giving Mary a hug after she packs up her toys.
Non-contingent Reinforcement	Using positive reinforcement at fixed or variable schedules independent of whether the child performs the good behaviour. However, this does not include reinforcing undesirable behaviours.	Giving your child access to their phone after school every day.
Differential reinforcement of other behaviour	Providing reinforcement for all other positive behaviours other than the undesirable target behaviour. The aim is to reduce the target behaviour by paying attention or giving praise to the child when they are not engaging in the targeted negative behaviour.	Giving praise when a child does something good. For example, homework.
Differential reinforcement of Alternative Behaviour	Providing reinforcement for a specific desired behaviour (e.g. task engagement) whose performance will likely decrease the occurrence of an undesired behaviour (talking	Giving John a good behaviour star, when he is seated quietly in class doing his schoolwork. As this will reduce his tendency to talk in class.

	in class).	
Functional Communication Training (FCT)	A variation of DRA where the child is taught to communicate their wishes instead of using a problem behaviour to try to get what they want	Teaching the child to ask for what they want instead of throwing a tantrum
Differential Negative Reinforcement of Other Behaviour	When a stimulus is removed for the occurrence of desirable behaviour	The children are given a break in between tasks, in order to reduce escape behaviour such as tantrums or aggression during a task.

Table 3. Skills assessed in the studies used in the moment when a child is dysregulated.

Skill	Description	Example
Timeout	The adult takes or sends a child to a designated time-out space for a short time, usually 1 minute per year of age. For use when a child is out of control, aggressive or aggressive and dysregulated. Time-out can also be initiated by the child.	A 6 year old child is sent to his room for 6 minutes after throwing his toy and screaming. At the end of the timeout when he is calm, he can then play with his sister.
Drain-off	Allowing the child to cathart in a contained environment. Using validation to affirm the child's feelings, that they are normal and that you understand why they might be feeling a certain way.	If a child is flooded with emotion and screams: "This place sucks, I hate it here", a validating response would be to affirm what the feeling the child might be feeling: "It must be difficult for you to be away from your family right now".
Timeline	The child tells an adult their story of what happened step by step as this will help them recollect their thoughts.	After drain-off, sitting down with a child and listening to them as they re-tell their side of the story.
Punishment/Extinction	Removing the stimulus that reinforced the behaviour	A caregiver withdraws attention during a tantrum

Response Blocking	Involves physically blocking the child from hitting another person, or blocking them from escaping a task.	When John is about to hit his friend, physically blocking him with your hand.

The study is organized by skill because the aim is to understand what skills are available, how are they used and their effectiveness. It is also important to understand the target behaviours, age groups and other skills used in conjunction with the skills.

Study design

Reviews. Two reviews were included in the study. The first one (Delaney, 2006) reviewed the evidence base on the reduction of restraint use in child and adolescent psychiatric inpatient treatment. The quality of the review was weak as it scored 3/9 on the AMSTAR checklist. The second review (Matson, 2009) is a selective review on behavioural treatments for aggression and tantrums in children with Autism Spectrum Disorder. The quality of this review was also weak as it scored 2/9 on the AMSTAR checklist.

Case studies. Twelve case studies were included. The case study approach involves describing the pattern of interaction with the intervention using observation techniques (Nock, Michel, & Photos, 2007). It is valuable as it provides immense detail about the potential events or sources of influence on behaviour which may lead to generation of some hypothesis about the causes and development of new interventions (Kazdin, 1980). However, the limitations of case studies are that alternative explanations could account for why the person is behaving in such a way and why the intervention has worked. It is also largely subjective; the information used as data is primarily the clinician's judgement and interpretation. Finally, case studies are also limited as one cannot generalize beyond the individual.

Single-Subject Design. Nock et al. (2007) argue that the single-subject design is different from the case study approach because the baseline and intervention phases are clearly delineated, and the study incorporates controlled variation techniques, which make it possible to examine the causal relationship between the intervention and outcome. There were seven studies that utilized an ABAB design or a variation thereof with individual participants, where there is a baseline and an intervention phase. The removal of an

intervention during an ABAB design may pose potential problems, for example it could be unethical to remove an intervention if it was successful in reducing aggression. Thus, most of the studies (n = 32) used a multiple baseline across subjects and settings design. Kazdin (1982) explains that the multiple baseline across subjects design gathers baseline data for a particular behaviour performed by two or more people. Then the intervention is applied to one participant at a time whilst baseline conditions are continued for the other participants. The effect of the intervention is seen when there is a change in a person's performance once the intervention is introduced and not before. This design is useful when the target behaviour is the same for all participants, for example in a classroom or psychiatric ward. Kazdin (1982) explains that the multiple baseline across settings design, on the other hand, refers to baseline data collected in multiple situations. This is useful when the behaviour needs to be changed in more than one setting. The advantages of the multiple baseline design are that it does not rely on withdrawing treatment to show that the behaviour change is a result of the intervention. It also has practical and clinical benefits because if the intervention is effective then it is extended to other people or settings. The gradual application is useful when parents, teachers and hospital staff have to learn how to apply the intervention. A limitation is that scientifically it is not as strong as a withdrawal design in showing experimental control.

Quasi-experimental group design. There were only two studies that employed a quasi-experimental design, with a one-group pre-test and post-test. The benefit of this is that if there is an improvement in behaviour from pre-test to post-test, because it is a group study (the behaviour is studied across individuals), then there is more confidence than with a case study that the difference may be attributed to the intervention (Thompson & Panacek, 2006). However, because there is no control group the validity of the studies is weak as the difference could be due to extraneous variables (Knapp, 2016).

Interventions/Skills

Prescribing the tantrum. This is a paradoxical intervention where the target behaviour that is being treated is encouraged. Paradoxical techniques have been used since the early days of psychotherapy; however Adler (1914) is said to be the first person to have used them in modern psychotherapy (Weeks & L'Abate, 1982). In Adlerian psychotherapy, this is theoretically viewed as the therapist accepting or "going with" the person's resistance (Weeks & L'Abate, 1982). Two studies (Amatea, 1988; Zarske, 1982) each examined a 5-year-old child with severe tantrums, and used prescribing the tantrum as an intervention, i.e.

telling the child that he or she could have a tantrum at a specific time. In Amatea (1988) the therapist framed it as a game because the child has a 'talent' to have such big and loud tantrums - louder than her older sister and baby cousin. The therapist then suggested that the mother and the child decide on the time and place to 'practice' tantrums when they are alone. Emphasis was placed on practising the tantrums even when the child did not feel like it and if she did have a tantrum outside of the time they set, she would be reminded to wait to get home to have her tantrum at the time and place agreed. The intervention dramatically reduced the tantrums in the home and school setting. These results were observed at a 3-week follow up as well. Similarly in Zarske (1982) a specific time and place for tantrums was agreed upon and the caregiver was to encourage these tantrums. Both studies reported that the tantrums were eliminated by 2-month follow-up.

Timeout. Timeout has been the focus of behavioural research for 5 decades now and has been used for a range of behaviours. It is a widely known and used discipline technique, but has been somewhat controversial in more recent literature. This is partly because it has been used in a punitive sense, and also because there have not been clear guidelines/parameters on its use; nonetheless, it is considered an evidence-based skill (Drayton et al., 2014).

A number of studies (Beal & Delaney, 2005; Bostow & Bailey, 1969; Bunyan, 1987; Luiselli, Myles, & Littman-Quinn, 1983; Paisey, Fox, Curran, Hooper, & Whitney, 1991; Pendergrass, 1972; Repp & Deitz, 1974; Rhymer, Evans-Hampton, McCurdy, & Watson, 2002; Ryan et al., 2007; Schreiner, Crafton, & Sevin, 2004; Solnick, Rincover, & Peterson, 1977) used timeout in the way in which it was originally developed, where positive reinforcement is removed for a period of time (Kazdin, 2001). During this time the child is denied access to the positive reinforcers usually available in that environment. For example, a child is sent to a separate room when they are being aggressive for a set amount of time and they are prohibited from playing with toys. This is a behaviour modification technique developed in the 1960s and used by behaviour analysts as a punishment procedure whereby positive stimuli are withdrawn contingent on misbehaviour (Kazdin, 2001). In these studies, the target behaviours were severe tantrums, physical aggression, inconsolable crying, self-injury and property destruction. Timeout was used with 95 participants, aged 18 months to 17 years old, in the home, school and institution settings. The duration of the timeout was any time between 15 seconds to 5 minutes, in line with the research that states that brief timeouts are more effective. The child was released from the timeout when they had calmed down.

Parents were instructed to use timeout only in a broader context. Prior to using timeout for the first time, there was a preparation period, where expectations and consequences of behaviour (including timeout) were explained to the child. In using timeout, parents were instructed to explain to the children that they were leaving them in timeout for a few minutes until they had calmed down and were also told to ignore grumbling and screaming. In addition, even if timeout had just been used, bedtime rituals of story reading (and similar routines) and child-led play were to be maintained.

In other studies, a chair timeout (where the child is held in a seated position or told to sit quietly) was also used (Bowman, Hardesty, & Mendres-Smith, 2013; Luiselli & Murbach, 2002; Luiselli, Suskin, & Slocumb, 1984; Marcus, Swanson, & Vollmer, 2001). This is otherwise called inclusion timeout (Ryan et al., 2007) or time-in (Solnick et al., 1977), as the child and caregiver remain in the same room but the child is removed from his/her current activity and told to sit quietly for a while. This demonstrated positive results in most of the studies, particularly when used with other skills such as functional communication training (FCT) – which involves replacing difficult behaviour with more appropriate communication to communicate needs and wants; praise, where approval or admiration of a behaviour is expressed with the aim that it will increase that behaviour; differential reinforcement of other behaviour (DRO), i.e., reinforcing every positive behaviour other than the negative behaviour; differential negative reinforcement, for example giving a child a break in order to increase desirable behaviour (task engagement); physical blocking, for example when a child tries to hit another child; and extinction where reinforcement for a previously reinforced behaviour is discontinued. Similarly, (Luiselli et al., 1983) found that reinforcement for appropriate behaviour alone, i.e. being non-aggressive, was ineffective but there was a dramatic reduction when timeout was introduced and this was evident at a 4-month follow-up, although there was no generalization across settings. In most studies, timeout was especially effective when many reinforcers were available in the setting, so that timeout from these reinforcing activities was particularly unpleasant (Kazdin, 2001). However, in one study (Amatea, 1988), timeout alone did not work. Amatea (1988) argues that trying to control the child's behaviour did not work because trying to eliminate the undesirable behaviour does not teach what the desirable behaviours are. In other words, there was no positive reinforcement for the desired behaviours: the parents used scolding, explaining what was expected, and insisting on compliance. Here, timeout was used to punish the child when they have misbehaved. However, this does not fix the problem or help the child understand why they are wrong, or what to do instead. Thus, it is clear that in order for timeout to work,

it must be used alongside other skills such as positive reinforcement, as seen in the other studies, and when used in isolation, it becomes punitive for the child and they do not learn the appropriate behaviours.

Further, Nelsen (2011) argues that timeout should be used as a 'cooling off period'- when the child is emotionally dysregulated and needs space and time to calm down, as does the parent when they are feeling overwhelmed by a stressful situation, which in turn is modelling a positive behaviour for the child. The parent allows the child to create or decide on their own timeout area, an area that will help them feel better so they can do better (Nelsen, 2011). Following timeout when the child is more regulated, the parent and child can work on a solution or make amends. This approach is distinct from the punitive tradition of timeout, and it is more in line with the mindfulness tradition of teaching emotion regulation (Linehan, 2014). It also follows from Amatea (1988) study that teaching the positive behaviour is important.

Life Space Crisis Interventions. Life Space Crisis Interventions (LSCI) is a program for adults who work with children that emerged in the United States (Long et al., 2001). It is a crisis intervention strategy that addresses conflict while at the same time intending to address, broadly, the emotional, developmental and social needs of youth. Thus, instead of punishing or dismissing the child for being emotionally dysregulated, the adult learns ways of communicating with the child to understand the origin of the conflict as well as to turn it into a moment of growth and learning (Soenen et al., 2014; Whitson & Chambers, 2014). An earlier version of LSCI called 'Life Space Interviewing' was used by DeMagistris and Imber (1980) and the emphasis in this early version was placed on staying with the feelings of the child in supporting them through a crisis. The study reported positive results in dealing with conflicts, and students' relationships and interactions with teachers were also noted to have improved with this intervention. LSCI, as a whole programme, goes well beyond the moment of dysregulation, and has broader goals that include changing the youth's behaviour, fostering self-confidence, diminishing anxiety, and improving children's understanding of their own feelings and behaviour as well as those of other people (Soenen et al., 2014). The training program comprises acknowledging the child's feelings, using affirming and listening skills to understand their point of view, and helping the child re-integrate back to their 'life space' - for example, school (Soenen et al., 2014).

The first two steps of an LSCI intervention particularly focus on the moment of emotional dysregulation, and are therefore pertinent to this review. The first one is *drain off*

which allows the child to cathart in a contained environment; the second step is *timeline*, and allows the child to collect his/her thoughts and tell his/her version of the conflict situation (D'Oosterlinck, Broekaert, & Denoo, 2006; D'Oosterlinck et al., 2008; Dawson, 2003; Forthun & McCombie, 2011; Forthun et al., 2006; Forthun, McCombie, & Payne, 2009; Grskovic & Coetze, 2005; Soenen, Goethals, Spriet, D'Oosterlinck, & Broekaert, 2009; Soenen et al., 2014; Tomita, 2014). In drain off, the adult uses validation to affirm the child's feelings, that they are normal and that they can understand why they may be feeling a certain way. For example, if a child is flooded with emotion and screams: "This place sucks, I hate it here", a validating response would be to affirm what the feeling the child might be feeling: "It must be difficult for you to be away from your family right now". During the timeline stage the child tells an adult their story of what happened step by step as this will help them recollect their thoughts. There were 1,158 children and youth in the LSCI studies in total, aged 6-21 years old; and the studies were conducted in schools and institutions. The LSCI intervention focuses primarily on children with emotional and behavioural disorders, thus the target outcomes were physical and verbal aggression, delinquent behaviour, student misbehaviour and disciplinary referrals.

The results suggest that the LSCI strategy of talking with children and youth (drain off and timeline) in a crisis helps reduce negative thoughts and painful feelings (D'Oosterlinck et al., 2006). The intervention also resulted in less conflict in the institution from 196 incidents reported in the 12 months long pre-test to 137 incidents reported in the post-test over a 12 month period (Tomita, 2014). It had a positive effect on aggression and hostility, and consequently there were fewer crisis incidents, suspensions and more transfers to less restrictive environments after LSCI (Dawson, 2003).

Two studies examined the effects of training school personnel in LSCI. Forthun et al. (2006) trained 37 teachers from a middle and high school in the DuBois area school district, Pennsylvania. Findings of the study show that disciplinary referrals for major class disturbance and failure to follow instructions declined. As indicated by the focus group responses, there was more trust between students and staff; students were more open and began to see teachers as safe to talk to; and they accepted more responsibility for problems and expressed gratitude towards teachers for listening and helping in crisis situations. The follow up phase of this study (Forthun et al., 2009) found that, after the training, teachers saw little need to refer children outside of the classroom for intervention. In the second study, Forthun and McCombie (2011) trained 112 school teachers in a rural district in the United States. The results were such that while both groups (trained LSCI teachers and untrained

teachers) reported positive outcomes as a result of interventions with students in crisis (70% of the time), there were fewer referrals - only 20% of the time compared with 40% of the time for the comparison group. Positive relationships were created - teachers noted that the students were willing to talk to them and open up about their feelings. The students were better able to manage their anger; they were respectful to others and accepted responsibility.

Other skills used with LSCI interventions included timeout, and token economies, which is a system used to increase positive behaviour and reduce inappropriate behaviour. The children receive tokens immediately after the good behaviour which they can keep and exchange later for a desired object or privilege.

Positive reinforcement of desired behaviours. The use of attention, praise, tokens, the child's preferred food items or toys to increase an acceptable behaviour – positive reinforcement - was reported to be successful in all of the studies and it was used with other skills such as preparation, ritual and routines, timeout, extinction, FCT, DRO, DRA, instruction, modelling, physical guidance to comply, response blocking, escape extinction, choice making and negative reinforcement (Bostow & Bailey, 1969; Bunyan, 1987; Harding et al., 2001; Iwata, Pace, Kalsher, Cowdery, & Cataldo, 1990; Luiselli, 1990; Moore, Tervo, McComas, Rivard, & Symons, 2009; Repp & Karsh, 1994; Rhymer et al., 2002). Altogether, however, positive reinforcement was specifically studied only with 15 participants, which is very small compared to the samples for the skills in the other studies, although it seems to be a key ingredient in positive discipline. The age range was 18 months to 16 years old and it was predominantly used in the home, school and institution settings. The undesirable target behaviours in these studies were defiance, property destruction, physical aggression, tantrums, self-injury and stereotypy. Positive reinforcement was used during moments when the child was exhibiting acceptable behaviour and the results of the studies indicate that there was a reduction in problem behaviour. Of all the studies in this review, only Rhymer et al. (2002) specifically looked at treatment integrity (the extent to which an intervention has been implemented as it was planned). The results indicated that the 75% and 100% treatment integrity conditions were the most effective for reducing problem behaviour.

Non-contingent reinforcement, which is a variation of positive reinforcement but involves using positive reinforcement at fixed or variable schedules independent of whether the child performs the good behaviour, was also reported to be effective (Marcus et al., 2001; Vollmer et al., 1998). However, this does not include reinforcing undesirable behaviours. For example, a caregiver can provide a child with attention, so that they do not seek it using

inappropriate behaviours. Across the two studies, this technique was used with 6 children, 3-16 years old, and in the home, school and laboratory settings. The target behaviours were severe tantrums and aggression. The findings of the studies indicate that there were improvements in behaviour as a result of non-contingent reinforcement. Furthermore, in Vollmer et al. (1998) results showed that using fixed time schedules (providing reinforcement at set times independent of behaviour) was generally more effective than extinction schedules, which refers to withholding reinforcers that had previously been presented contingent on problem behaviour, for example giving a child attention during a tantrum.

Differential reinforcement of other behaviour (DRO) pertains to providing reinforcement for all other positive behaviours other than the undesirable target behaviour. The aim is to reduce the target behaviour by paying attention or giving praise to the child when they are not engaging in the targeted negative behaviour, for example talking in class (Bowman et al., 2013; Carr, Newsom, & Binkoff, 1980; Luiselli, 1990; Luiselli et al., 1984; Marcus et al., 2001; Paisey et al., 1991; Repp & Deitz, 1974; Repp & Karsh, 1994; Wilder, Liyu, Atwell, Pritchard, & Weinstein, 2006). DRO was used with 19 children, 34 months old to 14 years old, in a variety of settings such as the home, school, institution and laboratory. The target behaviours were inconsolable crying, tantrums, aggression, property destruction, stereotypy and self-injury. The findings of the studies show that there was a reduction in problem behaviour when DRO was used with other skills such as chair timeout, extinction, FCT, immobilization timeout, blocking, least-to-most prompting, token reinforcement, and differential reinforcement of alternative behaviour (DRA), which involves providing reinforcement for a specific desired behaviour (e.g. task engagement) whose performance will likely decrease the occurrence of an undesired behaviour (talking in class). However, Paisey et al. (1991) found that the results were not maintained at follow-up despite formal training and consistency by the parents.

Functional communication training (FCT) is a variation of DRA where the child is taught to communicate their wishes instead of using a problem behaviour to try to get what they want: for example, teaching the child to ask for what they want instead of throwing a tantrum (Bowman et al., 2013; Luiselli, Kane, Treml, & Young, 2000; Marcus & Vollmer, 1995; Moore et al., 2009; Vollmer, Northup, Ringdahl, LeBlanc, & Chauvin, 1996). FCT was used with 9 children, 18 months old to 16 years old, in the home, school and institutional settings. The target behaviours were severe aggression and tantrums, property destruction and noncompliance. FCT is also called replacement behaviour for challenging behaviours, i.e., teaching the child a non-aggressive way to respond or to escape a task (Carr et al., 1980).

This was used with two boys, 9 and 14 years old, who had been diagnosed with intellectual disability and autistic features, to treat severe aggression in an institution. The results suggested that aggression can sometimes be used as an escape, i.e. the child might act in an aggressive manner because they want to avoid a task, and thus making the task more interesting will lessen the likelihood of the aggression.

Negative reinforcement. Differential negative reinforcement of other behaviour (DNRO) refers to when a stimulus is removed for the occurrence of desirable behaviour (Marcus et al., 2001; Marcus & Vollmer, 1995; Roberts, Mace, & Daggett, 1995). For example, the children were given a break in between tasks, in order to reduce escape the burden of consecutive tasks, in order to reduce behaviour such as tantrums or aggression during a task. These studies were conducted in the home, school and institution settings, with six participants, 3-5 years old. The target behaviours were tantrums, aggression, property disruption, and self-injury. The results indicated a reduction in problem behaviour.

Punishment. In these studies, punishment refers to removing the stimulus that reinforced the behaviour, for example, a caregiver withdraws attention during a tantrum (Bowman et al., 2013; Bunyan, 1987; Carr et al., 1980; Harding et al., 2001; Iwata et al., 1990; Matson, 2009; Paisey et al., 1991; Repp & Karsh, 1994; Tunnicliffe, Woodcock, Bull, Oliver, & Penhallow, 2014; Vollmer et al., 1998; Wilder et al., 2006; Williams, 1959). It is synonymous with extinction. Altogether there were 28 participants in these studies, 21 months to 16 years old. The studies were conducted in a variety of settings, such as the home, school, institution and the laboratory. The results suggest that the punishment technique was successful at reducing and eliminating inappropriate behaviour, with the exception of two studies: Tunnicliffe et al. (2014) where the findings were ambiguous as participants were unable to judge which intervention in particular was effective as they used a variety of skills; and Paisey et al. (1991) where the results were not maintained at follow up.

Response blocking. Response blocking (which involves physically blocking the child from hitting another person, or blocking them from escaping a task) was also investigated in a number of studies (Horner, Day, Sprague, O'Brien, & Heathfield, 1991; Iwata et al., 1990; Marcus et al., 2001; Paisey et al., 1991; Repp & Deitz, 1974). There were 16 participants altogether in these studies, 3-16 years old, in the home, school, laboratory and institution settings. The target behaviours were self-injury, severe aggression, tantrums and property destruction. These were reported to be reduced when response blocking was used with other

skills mentioned above such as timeout, DRA, non-contingent reinforcement, differential negative reinforcement, DRO, praise, and other skills such as modelling, response cost (which is a form of negative punishment where reinforcement is removed in order to decrease the target behaviour, for example taking away the child's cell phone for a period of time), and guided compliance which refers to a procedure where the child is progressively given a prompt in order to comply such as giving them a warning and then physically showing them how to do something.

De-escalation techniques. Giving clear instructions, for example, "go to your room and take 5 deep breaths" and emphasizing positive instructions to help de-escalate a situation (for instance, "remember your goal is to stop hitting and go on pass this weekend") was effective in reducing the use of mechanical restraint and locked seclusion (Schreiner et al., 2004). This was used with 23 adolescents aged 13-17 years old with developmental delays and severe psychiatric disturbances, in an institutional setting. The target behaviour was aggression.

Kalogjera et al. (1989) was also successful in reducing restraint and seclusion rates with adolescents in an institutional setting targeting aggression. They used a four-step technique where the staff first communicated to the adolescent early on that they were losing control (stage 1 & 2), and stated the behaviour that demonstrated the loss of control, for example "you are threatening". During this stage, the adolescent was moved to a quiet area where they would be able to calm down. If they did not respond to the verbal instructions, the adolescent was made aware that they had lost control (stage 3 & 4) as well as of their problem behaviour, for example, "you hit Mary". Throughout the crisis, the staff assured the adolescent that they were willing to help them regain control. Once the adolescent had done so, they are made aware of the specific behaviours they did to regain control as a means of positive reinforcement.

There were other studies that used more preventative de-escalation techniques. These techniques aimed to help the child to calm down and regulate their emotions. Skills such as showing empathy, being supportive and active listening seemed to put a halt to a situation before it turned into a crisis (Beal & Delaney, 2005; Delaney, 2006; Jambunathan & Bellaire, 1996; Kalogjera et al., 1989). More practical de-escalation techniques such as building self-efficacy, practising controlling one's rage, escorting the patient to a safer or quiet area and answering the patient's questions were used and helped reduce physical restraint and seclusion rates in psychiatric inpatient settings (Beal & Delaney, 2005; Jambunathan &

Bellaire, 1996; Kalogjera et al., 1989). Jonikas, Cook, Rosen, Alexander, and Kim (2004) used a unique approach by asking patients at intake what their stress triggers are and what would help them to de-escalate and the nurses would use this when a crisis occurred. This also proved to be successful at reducing restraint rates. These skills are feasible for parents, teachers and caregivers to implement.

The role of a Functional Analysis

The majority of the studies did a functional analysis before implementing the skills in order to understand the function of the behaviour. A functional analysis is a technique to identify factors that maintain behaviour, in order to understand the function of the behaviour (Bowman et al., 2013). For example, a child could be misbehaving in order to escape a task or to get attention from the caregiver, and those different reasons for the same behaviour require different interventions. This has several implications for the findings of this review. This means that many of the interventions were not implemented organically in the moment. The caregivers had spent time with the children; they knew them and had some understanding of their behaviour. This makes it more complex for caregivers working in an acute hospital setting who might not have prior knowledge of the child. This highlights the need for effective de-escalation techniques with an evidence base that can be used without a functional analysis in order to reduce the inappropriate use of restraint and seclusion. Additionally, it means that before implementing the skills, parents, teachers, and caregivers should ideally learn how to conduct a functional analysis. One could argue that this would be time-consuming and impractical resource-wise. However, at the core of it, a functional analysis is about reflecting on the meaning of the behaviour and understanding its function. Thus caregivers have to experiment, and see what works and does not work.

In summary, a number of crisis interventions have been identified during a systematic search for interventions with emotionally dysregulated children. The interventions that were found were delineated into these broad categories: positive reinforcement, negative reinforcement, punishment, timeout, prescribing the tantrum behaviour, response blocking, de-escalation techniques and the LSCI skills of drain off and timeline. It is apparent that some interventions were not in the moment of dysregulation and are more about preventing the problem behaviour, teaching prosocial behaviour and ultimately self-regulation. These skills could not be excluded from the study as they are integral to positive discipline and teaching self-regulation. Moreover, as emphasized above, timeout, for example, cannot be used in isolation without positive reinforcement of desired behaviours. Thus these skills were

included to give caregivers a toolbox of skills they could use 'in the moment of dysregulation' and ones they could use more preventatively in order to encourage self-regulation. The former would be interventions such as the LSCI skills of drain off and timeline; timeout; response blocking; and de-escalation techniques. The latter are interventions such as positive reinforcement; FCT and paradoxical interventions. These interventions were used to target behaviours such as aggression, tantrums, property destruction and defiance. They were used in conjunction with other positive discipline skills such as choice making, modelling, and ritual and routines, as well as preparation.

It is important to have an enriching environment and positive relationship with the child in order to increase desirable behaviour and decrease undesirable behaviour. It is in this context that, when timeout or extinction is used for example, it will be effective. Furthermore, consistency between behaviour and consequences is imperative because that is how children will learn what is expected of them.

The LSCI skills of drain off and timeline presented a departure from the behavioural perspective and offered a new and empathic way to de-escalate a crisis moment. The findings from the studies are mostly positive and factors that may have influenced this such as conducting a functional analysis and the use of other positive skills in conjunction need to be considered. The interventions were used in a variety of settings across all age groups with a range of disorders. In some of the studies, some of the skills did not work unless they were used in a particular way. The reasons for this are important to consider and have implications for practice. For example, timeout alone does not work if it is used as punishment for the child and there is no positive reinforcement to teach appropriate behaviour (Amatea, 1988); it is better to use fixed time schedules than extinction schedules, such as withholding attention during a tantrum (Vollmer et al., 1998); DRO and punishment findings were not maintained at follow up (Paisey et al., 1991); and findings were ambiguous for punishment (Tunnicliffe et al., 2014).

Chapter 4: Discussion and Conclusion

Emotion dysregulation, such as aggression, property destruction and tantrums, is a major concern for caregivers. Children who have emotional and behavioural difficulties experience poor social and academic outcomes (Jahromi et al., 2013), and even typically developing children need assistance to develop the capacity for emotion regulation. The parents and teachers of emotionally dysregulated children also experience stress and high burnout rates and find it difficult to control such difficult behaviour (Winsper & Wolke, 2014). Effective approaches to manage emotionally dysregulated children are necessary in order to avoid inappropriate restraints, seclusion, injuries, physical and emotional abuse as well as the negative social and academic impact. The purpose of this review was to examine the evidence base for interventions for emotionally dysregulated children in a variety of contexts and to provide caregivers with a toolbox of the skills that work and those that do not work. A discussion of the quality of the studies and a contextual background to the interventions will now be provided.

The design of the studies was mostly single-subject design studies, which although it has some validity in the sense that some of the variables are controlled, is still a weaker design than an experimental design with a control group, making it difficult for the result to be generalized to a larger population. However, while the case study may be a weaker design, in some cases it may be the only one feasible as the numbers of children that meet criteria are small. What is noteworthy is that the number of single-subject designs and case studies on timeout (a skill that is widely used and recognized), was high. Furthermore, the number of participants for timeout and positive reinforcement was lower than expected, when compared to LSCI and other skills, which brings into question the validity of the skill given its popularity. However, while the evidence base may appear weak from this set of single case studies, they have been shown to be essential components in effective parenting programmes, and likely have validity there (e.g. Kaminski, 2008). Furthermore, positive reinforcement is key in establishing a positive relationship with the child and maintaining discipline (Nelsen, Nelsen, & Ainge, 2016). With regards to the reviews included, the quality was substandard according to the AMSTAR guidelines as they did not adhere to the requirements for a systematic review. This indicates the lack of a strong evidence base for the interventions mentioned above.

Only one of the studies looked at treatment integrity (Rhymer et al., 2002), which is the extent an intervention is implemented the way it was intended. This was an important

component in any intervention as one cannot draw conclusions about the effect of an independent variable on a dependent variable without knowing that the treatment has been implemented accurately and consistently. According to Rhymer et al. (2002), because of the lack of studies reporting on treatment integrity, the degree of how much treatment integrity is needed in order to effect behaviour change is unknown, and there are few instances where these skills are implemented with 100% integrity, even though behaviour change still occurs. This is especially more likely in a disruptive classroom context where the teacher is expected to implement the intervention consistently and accurately but it may be difficult to do so. Furthermore, this possibly explains the mixed findings for interventions such as DRA and punishment where some studies found it to be effective and others found it to be ineffective.

The studies also used a skill in conjunction with another skill. This makes it difficult to delineate the effectiveness of a specific discrete skill because there are many other factors involved, and the question of whether a particular skill can work on its own remains unanswered. However, the use of different skills also enhances the caregiver's toolbox, and makes for an even better intervention, for example the use of positive reinforcement with timeout. It is also more true to real life.

Finally, many of the skills were from a behaviourist perspective with the exception of the LSCI skills. The behavioural approach emphasizes behaviour, how to increase positive behaviour and decrease unwanted behaviours. It does not take into consideration emotion and the relationship between the child, caregivers and the environment. In addition to this, is the misconception that Applied Behaviour Analysis (ABA) is punishment based, where it is thought to use aversive procedures to reduce unwanted behaviour (Boutot & Hume, 2012). Although this is true of older studies of ABA, the studies chosen for the review used punishment in a non-violent way in order to decrease the occurrence of a specific behaviour. Furthermore, Boutot and Hume (2012) argue that this is a major misconception of ABA, and has evolved over the years, there is less emphasis on consequences and more on less intrusive strategies first. A limitation of ABA procedures is the time required for training of parents, teachers and caregivers in order to be applied correctly, which is not feasible for parents and caregivers.

Another limitation of this review is that there were studies on programs which have been shown to be effective (Collins & Fetch, 2012), however, because the specific skills used were not delineated, they had to be rejected from the review (e.g. Sugai & Horner, 2002; Webster-Stratton, 2001). This limits the amount of information available to caregivers. Although there are many studies on de-escalation skills, there is no empirical evidence for

them, especially for children as can be seen in this review. There is a need for experimental studies that determine the effectiveness of de-escalation skills. However, this form of seeking evidence is not always appropriate and the case study approach could be the only one feasible, for example two children may be having tantrums for different reasons and thus will need different interventions. Nonetheless the weight of the evidence for some of the skills may be sufficient if we consider the Bradford Hill criteria for evidence such as strength; consistency; specificity; temporality; biological gradient; plausibility; coherence; experiment; and analogy (Hill, 2015). The criteria apply for a skill such as positive reinforcement, where there are many studies that report its efficacy.

Implications for practice

The interventions included in this research are well-known skills that have been used in practice by parents, teachers and caregivers. The review provides an overview of their evidence base and how they have been used in helping dysregulated children. This guide is recommended to caregivers as it provides them with a 'toolbox' of interventions they can use. It is important to consider the factors that have been discussed above such as a doing a functional analysis before, fostering a positive relationship with the child, and using a skill in conjunction with other skills. Of particular importance, is that the caregiver fosters a positive relationship with the child by remaining warm, empathic and responsive, whilst setting boundaries and limits with the child. As we have seen in the studies, positive reinforcement with children is fundamental to using any of these skills. The child needs to feel supported in order to trust the adult.

Implications for research

There is sufficient evidence in this review to establish that these interventions may be effective. However, this is not definite due to the quality of majority of the studies and reviews. There were many single-subject design studies and a lack of randomized controlled studies which is the gold standard for evaluation (Rossi, Lipsey, & Freeman, 2018). However, the results from the studies that we have already point in the right direction (Hill, 2015). An important focus for future research should be on the components of well-known programs - what is effective and not, for example, see (Kaminski, 2008; Leijten et al., 2019). Such studies assist in detecting the 'active ingredients' of programmes (Embry, 2008).

A notable bias in the literature is that research on interventions for emotion dysregulation has almost exclusively been conducted in Western societies, particularly in the USA, which has a very particular culture and discipline practices. This is problematic as emotion dysregulation is a global phenomenon. It would be useful to know whether any differences exist in effective interventions used in other regions, thus more research in low-resourced settings, and across cultures, is needed. The influence of cultural values and contextual constraints on human experiences such as parenting practices cannot be overlooked, for example; a survey on childrearing practices showed that Caucasian American mothers scored higher on sensitivity, consistency, non-restrictiveness, nurturance and rule setting than immigrants in that context (Kelley & Tseng, 1992).

Despite the weaknesses in the literature and the inevitable limitations of a systematic review such as new research being done all the time (Shojania et al., 2007), this review is the first that could be identified in this area. It is clear that there is a wide range of skills for caregivers to use when helping their children learn emotion regulation. All of the skills worked when used appropriately. While the field needs development, the existing literature shows promise and gives us direction with regards to future research on this phenomenon.

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Appendix A and B

Data collection form

Notes on using data extraction form:

- Be consistent in the order and style you use to describe the information for each report.
- Record any missing information as unclear or not described, to make it clear that the information was not found in the study report(s), not that you forgot to extract it.

Discipline Skill	
Review citation	
Study citation	
Abstract:	

General Information

Date form completed *(dd/mm/yyyy)*	
Name of person extracting data	
Study funding source	
Possible conflicts of interest *(for study authors)*	

Notes:

Study or review eligibility

Study Characteristics	Eligibility criteria	Eligibility criteria met? Yes No Unclear	Location in text (e.g. pg/fig/table) and optional comments
Type of study	Is it peer reviewed?		
Language	Is it in English or Afrikaans?		
Participants	Are participants children age 18 and under and / or their caregivers (i.e. parents, teachers or other caregivers)?		
Types of intervention	Does it present or review evidence on at least one positive discipline intervention?		
	If “No”, does it present a theoretical argument for at least one positive discipline intervention?		
Distinction between positive and punitive use of skill.	Is it distinguishable whether the intervention was used appropriately or punitively?		
Types of outcome measures	Does it present or review any child or caregiver outcomes?		

INCLUDE	EXCLUDE
Reason for exclusion	
Notes:	

DO NOT PROCEED IF STUDY EXCLUDED FROM REVIEW

Characteristics of included studies / reviews

Methods

	Descriptions as stated in report/paper	Location in text (e.g. pg/fig/table) and optional comments
Aim of study *(e.g. efficacy, equivalence pragmatic)*		
Design		

Notes:

Skill

	Descriptions as stated in report/paper	Location in text (e.g. pg/fig/table) and optional comments
When in relation to the target behaviour was the relevant intervention or skill used?	Before (preventative) During (at the time) After (restorative)	
Details of how the skill was used		
Other skills used with the skill		

Notes:

Participants

	Description *Include comparative information for each intervention or comparison condition (e.g. did one group not receive the treatment or did both but under different circumstances etc) if available*	Location in text (e.g. pg/fig/table) and optional comments
Population description (*include country)*		
Setting *(including location and social context)*	Home Institution School Laboratory Other	
Age		
Sex	Male Female Both	
Race/ethnicity		
Socio Economic Status		

Kind and severity of behaviour problem/s		
How this was assessed e.g. instruments used / any behavioural exclusion criteria for participants		
Co-morbidities *(e.g. ADD)*		
Were the children dysregulated when the intervention / skill was used?	Yes No Unclear	
Other relevant socio-demographics		
Subgroups measured		
Subgroups reported		
Notes:		

Outcomes

Copy and paste table for each outcome.

Outcome 1

	Description as stated in report/paper	Location in text (e.g. pg/fig/table) and optional comments
Child outcomes		
Caregiver outcomes		
Group outcomes *(e.g. class or family)*		
Comparative findings *(e.g. shorter time-outs have better results than long ones / there is less recidivism with restorative justice approaches than punitive approaches)*		
Notes:		

For studies use the following, for reviews skip to AMSTAR checklist p15 below.

Risk of Bias assessment

(See Handbook Chapter 8.)

Domain	Risk of bias Low Hig h Unclear	Support for judgement *(include direct quotes where available with explanatory comments)*	Location in text (e.g. pg/fig/table) and optional comments
Random sequence generation *(selection bias)*			
Allocation concealment *(selection bias)*			
Blinding of participants and personnel *(performance bias)*		Outcome group: All/	
(if separate judgement by outcome(s) required)		Outcome group:	
Blinding of outcome assessment *(detection bias)*		Outcome group: All/	
(if separate judgement by outcome(s) required)		Outcome group:	
Incomplete outcome data *(attrition bias)*		Outcome group: All/	
(if separate judgement by outcome(s) required)		Outcome group:	

Selective outcome reporting? *(reporting bias)*			
Other bias			
Notes:			

Data and analysis

	Description as stated in report/paper	Location in text (e.g. pg/fig/table) and optional comments
1. Outcome name		
2. Time points measured *(specify whether from start or end of intervention)*		
3. Time points reported		
4. Outcome definition *(with diagnostic criteria if relevant and note whether the outcome is desirable or undesirable if this is not obvious)*		

	Description as stated in report/paper		Location in text (e.g. pg/fig/table) and optional comments
5. Is outcome/tool validated?	*Yes/No/Unclear*		
6. Notes:			

1. Results

Copy and paste the appropriate table for each outcome, including

	Description as stated in report/paper	Location in text (e.g. pg/fig/table) and optional comments
Child outcomes		
Caregiver outcomes		
Group outcomes *(e.g. class or family)*		
Comparative findings *(e.g. shorter time-outs have better results than long ones / there is less recidivism with restorative justice approaches than punitive approaches)*		

Notes:

additional tables for each time point and subgroup as required.

For randomised or non-randomised trial - Dichotomous outcome

	Description as stated in report/paper				Location in text (e.g. pg/fig/table) and optional comments
7. Comparison					
8. Outcome					
9. Subgroup					
10. Time point *(specify whether from start or end of intervention)*					
11. Results *Note whether:*	**Intervention**		**Comparison**		
	No. events	No. participants	No. events	No. participants	

	Description as stated in report/paper				Location in text (e.g. pg/fig/table) and optional comments
post-intervention OR *change from baseline* *And whether* *Adjusted OR* *Unadjusted*					
12. Baseline data	**Intervention**		**Comparison**		
	No. events	No. participants	No. events	No. participants	
13. No. missing participants and reasons					
14. No. participants moved from other group and reasons					
15. Any other results reported					
16. Notes:					

For randomised or non-randomised trial - Continuous outcome

	Description as stated in report/paper	Location in text (e.g. pg/fig/table) and optional comments
17. Comparison		

	Description as stated in report/paper						Location in text (e.g. pg/fig/table) and optional comments
18. Outcome							
2. Subgroup							
20. Time point *(specify whether from start or end of intervention)*							
21. Post-intervention or change from baseline?							
22. Results *Note whether:* *post-intervention OR* *change from baseline* *And whether* *Adjusted OR* *Unadjusted*	**Intervention**			**Comparison**			
	Mean	SD (or other variance)	No. participants	Mean	SD (or other variance)	No. participants	
23. Baseline data	**Intervention**			**Comparison**			
	Mean	SD (or other variance)	No. participants	Mean	SD (or other variance)	No. participants	
24. No. missing participants and reasons							

	Description as stated in report/paper		Location in text (e.g. pg/fig/table) and optional comments
25. No. participants moved from other group and reasons			
26. Any other results reported			
27. Notes:			

For randomised or non-randomised trial - Other outcome

	Description as stated in report/paper				Location in text (e.g. pg/fig/table) and optional comments
28. Comparison					
3. Outcome					
30. Subgroup					
31. Time point *(specify whether from start or end of intervention)*					
32. Type of outcome					
33. Results	Intervention result	SD (or other variance)	Control result	SD (or other variance)	
	Overall results		SE (or other variance)		

	Description as stated in report/paper		Location in text (e.g. pg/fig/table) and optional comments
34. No. participant	Intervention	Control	
35. No. missing participants and reasons			
36. No. participants moved from other group and reasons			
37. Any other results reported			
38. Notes:			

For controlled before-after study

	Description as stated in report/paper	
4. Comparison		
40. Outcome		
41. Subgroup		
42. Timepoint *(specify whether from start or end of*		

<table>
<tr><td></td><td colspan="4">Description as stated in report/paper</td><td></td></tr>
<tr><td>intervention)</td><td colspan="4"></td><td></td></tr>
<tr><td>43. Post-intervention or change from baseline?</td><td colspan="4"></td><td></td></tr>
<tr><td rowspan="5">44. Results</td><td>Intervention result</td><td>SD (or other variance)</td><td>Control result</td><td>SD (or other variance)</td><td rowspan="5"></td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="2">Overall results</td><td colspan="2">SE (or other variance)</td></tr>
<tr><td colspan="2"></td><td colspan="2"></td></tr>
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<tr><td rowspan="2">45. No. participants</td><td colspan="2">Intervention</td><td colspan="2">Control</td><td rowspan="2"></td></tr>
<tr><td colspan="2"></td><td colspan="2"></td></tr>
<tr><td>46. No. missing participants and reasons</td><td colspan="2"></td><td colspan="2"></td><td></td></tr>
<tr><td>47. No. participants moved from other group and reasons</td><td colspan="2"></td><td colspan="2"></td><td></td></tr>
<tr><td>48. Any other results reported</td><td colspan="4"></td><td></td></tr>
<tr><td colspan="6">5. Notes:</td></tr>
</table>

For interrupted time series, repeated measures or reversal design study

	Description as stated in report/paper		Location in text (e.g. pg/fig/table) and optional comments
50. Comparison			
51. Outcome			
52. Subgroup			
53. Length of timepoints measured *(e.g. days, months)*			
Total period measured			
54. No. participants measured			
55. No. missing participants and reasons			
56. **No. timepoints measured**	**57. Pre-intervention**	**58. Post-intervention**	
59. Mean value *(with variance measure)*			
60. **Difference in means (post – pre)**			
61. Percent relative change			

	Description as stated in report/paper	Location in text (e.g. pg/fig/table) and optional comments
62. Result reported by authors *(with variance measure)*		
63. Notes:		

Applicability

Does the study directly address the review question? ***(any issues of partial or indirect applicability)***	Yes No Unclear
Notes:	

Other information

	Description as stated in paper	Location in text (e.g. pg/fig/table) and optional

		comments
Key conclusions of study authors		
References to other relevant studies *Tick / mark each reference if found and added to list for screening.*		
Correspondence required for further study information *(from whom, what and when)*		
Further study information requested *(from whom, what and when)*		
Correspondence received *(from whom, what and when)*		
Notes:		

Appendix C

AMSTAR Checklist for reviews

1. Was an 'a priori' design provided?
The research question and inclusion criteria should be established before the conduct of the review.

Note: Need to refer to a protocol, ethics approval, or pre-determined/a priori published research objectives to score a "yes." Yes No Can't N/A

answer

2. Was there duplicate study selection and data extraction?
There should be at least two independent data extractors and a consensus procedure for disagreements should be in place.

Note: 2 people do study selection, 2 people do data extraction, consensus process or one person checks the other's work. Yes No Can't N/A

answer

3. Was a comprehensive literature search performed?
At least two electronic sources should be searched. The report must include years and databases used (e.g., Central, EMBASE, and MEDLINE). Key words and/or MESH terms must be stated and where feasible the search strategy should be provided. All searches should be supplemented by consulting current contents, reviews, textbooks, specialized registers, or experts in the particular field of study, and by reviewing the references in the studies found.

Note: If at least 2 sources + one supplementary strategy used, select "yes" (Cochrane register/Central counts as 2 sources; a grey literature search counts as supplementary). Yes No Can't N/A

answer

4. Was the status of publication (i.e. grey literature) used as an inclusion criterion?
The authors should state that they searched for reports regardless of their publication type. The authors should state whether or not they excluded any reports (from the systematic review), based on their publication status, language etc.

Note: If review indicates that there was a search for "grey literature" or "unpublished literature," indicate "yes." SINGLE database, dissertations, conference proceedings, and trial registries are all considered grey for this purpose. If searching a source that contains both grey and non-grey, must specify that they were searching for grey/unpublished lit. Yes No Can't N/A

answer

5. Was a list of studies (included and excluded) provided?
A list of included and excluded studies should be provided.

Note: Acceptable if the excluded studies are referenced. If there is an electronic link to the list but the link is dead, select "no." Yes No Can't N/A

answer

6. Were the characteristics of the included studies provided?
In an aggregated form such as a table, data from the original studies should be provided on the participants, interventions and outcomes. The ranges of characteristics in all the studies analyzed e.g., age, race, sex, relevant socioeconomic data, disease status, duration, severity, or other diseases should be reported.

Note: Acceptable if not in table format as long as they are described as above. Yes No Can't N/A

answer

7. Was the scientific quality of the included studies assessed and documented?
'A priori' methods of assessment should be provided (e.g., for effectiveness studies if the author(s) chose to include only randomized, double-blind, placebo controlled studies, or allocation concealment as inclusion criteria); for other types of studies alternative items will be relevant.

Note: Can include use of a quality scoring tool or checklist, e.g., Jadad scale, risk of bias, sensitivity analysis, etc., or a description of quality items, with some kind of result for EACH study ("low" or "high" is fine, as long as it is clear which studies scored "low" and which scored "high"; a summary score/range for all studies is not acceptable). Yes No Can't N/A

answer

8. Was the scientific quality of the included studies used appropriately in formulating conclusions?
The results of the methodological rigor and scientific quality should be considered in the analysis and the conclusions of the review, and explicitly stated in formulating recommendations.

Note: Might say something such as "the results should be interpreted with caution due to poor quality of included studies." Cannot score "yes" for this question if scored "no" for question 7. Yes No Can't N/A

answer

9. Were the methods used to combine the findings of studies appropriate?
For the pooled results, a test should be done to ensure the studies were combinable, to assess their homogeneity (i.e., Chi-squared test for homogeneity, I2). If heterogeneity exists a random effects model should be used and/or the clinical appropriateness of combining should be taken into consideration (i.e., is it sensible to combine?).

Note: Indicate "yes" if they mention or describe heterogeneity, i.e., if they explain that they cannot pool because of heterogeneity/variability between interventions. Yes No Can't N/A

answer

10. Was the likelihood of publication bias assessed?
An assessment of publication bias should include a combination of graphical aids (e.g., funnel plot, other available tests) and/or statistical tests (e.g., Egger regression test, Hedges-Olken).

Note: If no test values or funnel plot included, score "no". Score "yes" if mentions that publication bias could not be assessed because there were fewer than 10 included studies. Yes No Can't N/A

answer

11. Was the conflict of interest included?
Potential sources of support should be clearly acknowledged in both the systematic review and the included studies.

Note: To get a "yes," must indicate source of funding or support for the systematic review AND for each of the included studies. Yes No Can't N/A

answer

Applicability

Does the review directly address this review's question? *(any issues of partial or indirect applicability)*	Yes No Unclear
Notes:	

Appendix D. Table of Skills – Single Studies

Study	Study design & Setting	Participant characteristics	Target behaviour	Skill	Findings	Other skills used.
Amatea, E. S. (1988).	Case study in home & school	Girl age 5	Severe tantrums.	• Prescribing the tantrum behaviour.	The functional analysis results showed that trying to control the participant's behaviour only made it worse. At follow up there was a dramatic disappearance of tantrums.	
Beal, D., & Delaney, K. R. (2005).	Case study in institution	9 y/o boy with Bipolar Disorder.	Extreme mood lability, aggression, and impulsivity.	• Encouraged attention shifting. • Introduced incentives. • Building self-efficacy - Remind him that he had controlled his rage in the past week and could do it again. • Timeout.	Something worked for the participant but it is not clear whether it was the relationship with staff, the discharge of a loud patient or the interventions.	
Bostow, D. E., & Bailey, J. B. (1969).	Single subject ABAB design (reversal) in institution.	7 y/o boy.	Aggression and property destruction.	• Brief timeout. • Positive reinforcement.	The frequency of problem behaviours was reduced to near-zero level in less than a week.	

Study	Study design & Setting	Participant characteristics	Target behaviour	Skill	Findings	Other skills used.
Bowman, L. G., Hardesty, S. L., & Mendres-Smith, A. E. (2013).	Case study in institution	14 y/o boy with Intellectual Disability.	Inconsolable crying, aggression, and property destruction.	• Chair timeout • Functional Communication Training • Differential reinforcement of other behaviour • Extinction	The functional analysis results show that aggression and disruption was maintained by social consequences, including access to tangible items, attention (vocal and physical), and escape from demands. With the intervention, there was a 98% reduction in aggression and disruption.	
Bunyan, A. (1987).	Case study in home setting	4 y/o boy with Conduct Disorder.	Defiance, property destruction, and physical aggression.	• Timeout. • Extincton • Positive reinforcement	Overall there was a decrease in problem behaviour, he was sleeping 8 hours a night and showing more prosocial behavior. However, the skills need to be used consciously, consistently and systematically.	Preparation - Explaining the expectations and consequences of behaviour. Ritual & routine - Bedtime rituals of story reading, things happening in a certain order every night. Timein - Child led play everyday, including praise and encouragement and touch.

Study	Study design & Setting	Participant characteristics	Target behaviour	Skill	Findings	Other skills used.
Carr, E. G., Newsom, C. D., & Binkoff, J. A. (1980).	Multiple baseline across settings design in institution.	Two boys, 9 and 14 years old, with intellectual disability and autistic features.	Severe aggression	• Differential reinforcement. • Replacement behaviour.	The results suggested that aggression can sometimes function as an escape response.	
DeMagistris, R. J., & Imber, S. C. (1980).	Experimental group (n=6) and control group (n=2) design.	8 students, 12-15 years old, in a residential centre for emotionally handicapped adolescent boys.	Off-task behaviour and aggression.	• Drain-off and send child to a cool off area. • Supporting the child during great stress.	The results support the use of the interview technique. Relationships between students and teachers improved and maladaptive behaviour decreased.	
D'Oosterlinck, F., Broekaert, E., & Denoo, I. (2006).	Case study in institution	Youth in residential care facilities serving emotionally and/or behaviourally disturbed students. 15-17 years old. Male & Female. N=17	Verbal and physical aggression.	• LSCI. Drain-off & Timeline.	The LSCI strategy of talking with children and youth in a crisis helps to reduce their destructive and painful thoughts and feelings.	Central issue, insight, new tools, transfer of learning
D'Oosterlinck, F., Goethals, I., Broekaert, E., Schuyten, G., & De Maeyer, J. (2008).	Quasi-experimental. Pretest and posttest control group design in institution.	517 Children and youth of special schools living in residential facilities in Belgium. 9-19 years old, male & female, Caucasian. Students with EBD.	Severe externalizing behaviour - aggression, hostility, and behavioral problems.	• LSCI. Drain-off & Timeline.	The LSCI intervention had a positive effect on direct aggression and hostility of students with behavioral problems in special schools with residential care.	

Study	Study design & Setting	Participant characteristics	Target behaviour	Skill	Findings	Other skills used.
Forthun, L. F., & McCombie, J. W. (2011).	Post-test only comparison group design	112 teachers in a rural district school in the United States.	To evaluate the impact of crisis intervention training/ implementation on the cognitive, emotional and behavioural responses of educators to student misbehaviour.	• LSCI. Drain-off & Timeline.	While both groups reported positive outcomes as a result of interventions with students in crisis (70% of the time), there were less referrals (only 20% of the time compared with 40% of the time for the comparison group). Positive relationships were created. Trust was created between the students and teachers. Previously disruptive students were able to control their temper, get along better with peers, be more respectful towards others and accept responsibility.	
Forthun, L. F., McCombie, J. W., & Freado, M. (2006).	Pretest-posttest one group design in school setting.	School personnel from a middle and high school, Pennsylvania. Male & female, n=37.	Student misbehaviour and disciplinary referrals.	• LSCI. Drain-off & Timeline.	Disciplinary referrals for major class disturbance and failure to follow instructions declined. There was more trust between students and staff. Students were more open and began to see teachers as “safe”. Students accepted more responsibility for problems and expressed gratitude towards teachers for listening and helping in crisis situations.	

Study	Study design & Setting	Participant characteristics	Target behaviour	Skill	Findings	Other skills used.
Forthun, L. F., McCombie, J. W., & Payne, C. (2009).	Pretest-posttest one group design with follow-up in school setting.	School personnel from a middle and high school, Pennsylvania. Male & female, n=37.	Student misbehaviour and disciplinary referrals.	• LSCI. Drain-off & Timeline.	Teachers saw little need to refer children outside of the classroom for intervention.	
Grskovic, J. A., & Coetze, H. (2005).	Multiple baseline across subjects design in school setting.	4 learners, intellectually disabled, Germany, 13-16 years old, male & female.	Externalizing behaviour and aggression.	• LSCI. Drain-off & Timeline.	LSCI was effective in reducing the disruptive behaviour of the students and the results were maintained.	Token economy
Harding, J. W., Wacker, D. P., Berg, W. K., Barretto, A., Winborn, L., & Gardner, A. (2001).	ABA reversal design for Mandy BAB reversal design for Kim in home setting.	Two girls, two years old, diagnosed with Soto syndrome and developmenmtal delays, and the other with pervasive developmental disorder and moderate mental retardation.	Tantrums, aggression, property destruction & self-injury.	• Positive reinforcement. • Extinction	Functional analysis results show that mild negative behaviors usually precede more severe problem behaviors. Attending to mild behaviors prevents escalation to more severe behaviors (They were looking specifically at attention maintained behaviors).	

Study	Study design & Setting	Participant characteristics	Target behaviour	Skill	Findings	Other skills used.
Horner, R. H., Day, H. M., Sprague, J. R., O'Brien, M., & Heathfield, L. T. (1991).	A-B-A-B-C-B-C-D-E within-subject reversal design replicated across each of the 3 participants in home setting.	3 children, 12-14 years old, intellectually disabled.	Aggression and self-injurious behaviour.	• Increasing guidance e.g. from verbal to physical prompts to complete the task. • Praise • Response blocking		
Iwata, B. A., Pace, G. M., Kalsher, M. J., Cowdery, G. E., & Cataldo, M. F. (1990).	Multiple baseline across subjects design for six participants and multiple baseline across settings design for one participant in laboratory setting.	7 children and adolescents with developmental delays and self-injurious behaviour, 4-16 years old, male and female.	Self-injurious behaviour.	• Positive reinforcement. • Negative reinforcement • Praise • Modelling • Physical guidance to comply • Response blocking • Escape extinction	The results show that the treatment was successful in eliminating self-injurious behaviour.	

Study	Study design & Setting	Participant characteristics	Target behaviour	Skill	Findings	Other skills used.
Jambunathan, J., & Bellaire, K. (1996).	Descriptive correlational research design, using observational methods in institution.	Local state-run psychiatric facility in east central Wisconsin providing treatment for both civil and forensic patients whom were involuntary committed. 6-70 years old, male & female.	Aggression.	• Setting limits. • Being empathic, answering the patients questions, active listening. • Escorting patient to a safer area. • Opportunity to deescalate.	Use of techniques reported to be effective in resolving crisis without the use of seclusion and restraint in 84.2% of the incidents.	
Jonikas, J. A., Cook, J. A., Rosen, C., Laris, A., & Kim, J. B. (2004).	One group pretest and posttest design in institution setting.	227 Adolescents, 12-17 years old in a psychiatric unit of a university hospital, male and female.	Aggression	• Interviewing patients at intake to determine their stress triggers and personal de-escalation techniques- during the crisis use the patient's preferred interventions. If it doesn't work review with them after and change the plan with their input and agreement.	The adolescent unit experienced a 48% decrease in restraint rate one quarter after training occurred and a 98% decrease two quarters after the training. The rate remained low throughout the final two quarters of the year.	

Study	Study design & Setting	Participant characteristics	Target behaviour	Skill	Findings	Other skills used.
Kalogjera, I. J., Bedi, A., Watson, W. N., & Meyer, A. D. (1989).	One group pretest and posttest study in institution setting.	3 Adolescent psychiatric inpatient units at a large Midwestern community mental health complex.	Aggression	• Early stage- remove adolescent to a quieter and safer area. • Verbal direction- Communicate to the adolescent early on that he/she is losing control. • Communicating the effect of the adolescent's behaviour on others. • Assuring the adolescent that you can help them regain control. If they do, then point out the specific behaviours that helped them as a means of positive reinforcement.	The results were statistically significant. The number of episodes of seclusion and restraints dropped by 64%. The number of patients requiring restraints and seclusion dropped by 39%.	
Luiselli, J. K. (1990).	Case study with follow up/ AB design in institution	13 year old girl, sensory impaired with severe assaultive behaviour in residential treatment.	Aggression.	• Token reinforcement. • Positive reinforcement • Differential reinforcement of other behaviour • Response blocking	There was a clinically significant change in behaviour associated with the introduction of the treatment.	
Luiselli, J. K., Kane, A., Treml, T., & Young, N. (2000).	Multiple baseline across subjects design in institution	Two adolescents boys, 14 and 16 years old in a residential school for children with developmental disabilities.	Severe aggression.	• Functional communication training. • Praise	Aggressive behaviour decreased, although it was not completely eliminated.	

Study	Study design & Setting	Participant characteristics	Target behaviour	Skill	Findings	Other skills used.
Luiselli, J. K., Myles, E., & Littman-Quinn, J. (1983).	Multiple baseline design across settings design. (Two target behaviours and two treatment settings) in institution and school setting	15 year old boy, multihandicapped with rubella.	Severe aggression and destructive behaviours.	• Isolation timeout.	Results indicated that with reinforcement, target responses persisted at high rates but were rapidly eliminated when time-out was introduced and remained absent at a 4 month follow-up. However, highly specific treatment effects were observed, with no generalization occurring across responses or settings.	
Luiselli, J. K., Suskin, L., & Slocumb, P. R. (1984).	Multiple baseline across subjects design in school setting.	Two handicapped children. The girl is “autistic-like” and behaviourally disturbed. The boy had a diagnosis of moderate-severe mental retardation. 7 years old.	Tantrums & aggression.	• Immobilization timeout. • Differential reinforcement of other behaviour.	For both children, immobilization timeout proved to be more effective when compared to DRO alone.	

Study	Study design & Setting	Participant characteristics	Target behaviour	Skill	Findings	Other skills used.
Marcus, B. A., & Vollmer, T. R. (1995).	ABAC design in school setting	Five year old girl with Down syndrome, language delays and speech articulation difficulties.	Disruption and noncompliance.	• Functional communication training. • Differential negative reinforcement	Both differential negative reinforcement for communication and compliance significantly reduced rates of disruption. However, compliance rarely occurred during differential reinforcement for communication.	
Marcus, B. A., Swanson, V., & Vollmer, T. R. (2001)	Multiple baseline across subjects design in home and school setting.	Four children diagnosed with developmental and speech delays, 3-5 years old, male & female.	Tantrums & aggression.	• Differential negative reinforcement. • Differential reinforcement of alternative behaviour plus noncontingent reinforcement. • Brief timeout. Blocking- physically blocking escape.	Improvements in parent behaviour were correlated with improvements in child behaviour.	

Study	Study design & Setting	Participant characteristics	Target behaviour	Skill	Findings	Other skills used.
Moore, T. R., Tervo, R. C., McComas, J. J., Rivard, P. F., & Symons, F. J. (2009).	Longitudinal descriptive case study in school setting.	12 year old boy diagnosed with cerebral palsy, spastic quadriplegia, and global developmental delays.	Property destruction & aggression.	• Functional communcation training. • Positive reinforcement • Negative reinforcement	A targeted function-based behavioral treatment based on the results of the functional analysis was shown to reduce problem behavior in the presence of partially-effective medication.	Choice making
Paisey, T. J., Fox, S., Curran, C., Hooper, K., & Whitney, R. (1991).	Case study in home setting	11 year old girl diagnosed with Autism.	Severe aggression, tantrums, property destruction, and stereotypy.	• Differential reinforcement of other behaviour with escape-extinction. • Physical blocking • Timeout	Control was established, however despite parental consistency, systematic training, and fading of support system, the results were not maintained at follow-up.	Differential reinforcement of other behaviour with publicly posted good behaviour rules. Physical management training and redirection to relaxation.
Pendergrass, V. E. (1972).	AB design. Participant watching when another is in timeout. School setting.	Two boys, 8 and 9 years old with severe mental retardation.	High-rate misbehaviour.	• Brief isolation timeout.	The misbehaviour of the two children was suppressed with the introduction of isolation timeout.	
Repp, A. C., & Deitz, S. M. (1974).	ABAB design in institution setting.	Four children, 8- 13 years old at the Georigia Retardation Centre, Atlanta, Georgia. Male and female.	Aggression and self-injurious behaviour.	• Differential reinforcement of other behaviour. • Rewards • Response cost	The DRO procedure combined with the other techniques proved to be manageable for the teacher and successful in reducing the inappropriate behaviour.	

Study	Study design & Setting	Participant characteristics	Target behaviour	Skill	Findings	Other skills used.
Repp, A. C., & Karsh, K. G. (1994).	Multiple baseline across subjects design in school setting.	Two female students, 7-9 years old, diagnosed with severe mental retardation, Down syndrome, and mild cerebral palsy.	Tantrum, aggression & stereotypy.	• Extinction. • Positive reinforcement • Differential reinforcement of alternative behaviour	Results of the functional assessments showed that the function of the behavior was to gain attention (positive reinforcement) rather than to avoid or escape demands (negative reinforcement); demand conditions apparently served a discriminative function for the availability of attention. There was a substantial reduction in tantrums for both participants.	
Rhymer, K. N., Evans-Hampton, T. N., McCurdy, M., & Watson, T. S. (2002).	Multiple baseline across settings design in school. (Alternating treatment design with regards to treatment integrity).	18 month old girl, neurotypical	Aggression	• Instruction - Telling her "no hitting" • Timeout • Functional communication training • Positive reinforcement	The 75% and 100% treatment integrity conditions were the most effective for decreasing aggressive behaviour.	

Study	Study design & Setting	Participant characteristics	Target behaviour	Skill	Findings	Other skills used.
Roberts, M. L., Mace, F. C., & Daggett, J. A. (1995)	Case study in institution	Four year old girl with severe mental retardation.	Self-injurious behaviour.	• Differential negative reinforcement of alternative behaviour. • Differential reinforcement of other behaviour.	Both DNRA and DNRO reduced self-injury and increased independent performance of two tasks (tooth brushing and bathing); however, improvement on both measures was greater with the DNRA intervention.	
Ryan, J. B., Peterson, R., Tetreault, G., & Hagen, E. V. (2007).	Exploratory pretest and posttest design with one school.	42 at-risk children in special school, grade K-12, majority males and Caucasian.	Physical aggression and property destruction.	• Inclusion & Exclusion timeout.	There was a large reduction in the use of restraint and seclusion timeout compared to the previous year.	Restraint, seclusion timeout, and problem solving.
Schreiner, G. M., Crafton, C. G., & Sevin, J. A. (2004).	One group pretest and posttest design in institution setting.	Adolescents in an in-patient unit diagnosed with a developmental disorder and a DSM IV Axis I diagnosis. 13-17 years old, male & female, n=23.	Aggression.	• Giving instructions in a neutral tone and emphasizing positive instructions, for example ‘‘remember, your goal is to stop hitting and to go on pass this weekend’’. • Timeout • Verbal de-escalation with concrete steps.	The total number of restraint and seclusion episodes decreased by 38% during the intervention phase of the project and not only led to the staff being less involved in the monitoring of patients in restraint/seclusion, but also enhanced patient-staff interactions.	Locked seclusion & full restraint. Group discussion & group contingencies. Delivery of minor negative reinforcement consequences.

Study	Study design & Setting	Participant characteristics	Target behaviour	Skill	Findings	Other skills used.
Soenen, B., Goethals, I., Spriet, E., D'Oosterlinck, F., & Broekaert, E. (2009).	Case study in school	70 children with emotional & behavioural disorders, in a special school and home. 12-21 years old, male.	Aggression, delinquent behaviour and poor social skills.	• LSCI. Drain-off & Timeline.	Target group remained stable, but LSCI & the level system proved to be effective in dealing with conflicts in the community and the school	Level system/ token economy
Soenen, B., Volckaert, A., D'Oosterlinck, F., & Broekaert, E. (2014).	One group pretest and posttest design in school setting.	403 youth with emotional and behavioural disorders attending a Flemish centre offering residential care and special education, 6-19 years old, male & female.	Problem behaviour such as aggression and delinquent behaviour.	• LSCI. Drain-off & Timeline.	The results showed an increase in time spent in the program and academic achievement, and a decrease in youths' anxiety, indicating that the implementation of LSCI contributes constructively to the treatment of children and adolescents with EBD.	
Solnick, J. V., Rincover, A., & Peterson, C. R. (1977).	ABAB with the girl and multiple baseline design with the boy in school setting.	Six year old autistic girl and 16 years old mentally retarded boy.	Tantrums, self-injury and spitting	• Timeout. • Timein.		
Tomita, M. (2014).	One group pretest and posttest design in institution setting.	Youth residents in a re-education centre. They are being criminally sentenced by the court with this education measure. 14-20 years old, n= 56, male.	Physical and verbal aggression.	• LSCI. Drain-off & Timeline.	During the pretest, 196 conflicts were registered. After 12 months of implementation, only 137 conflicts were registered. This shows a significant decrease of conflicts reported by staff members.	

Study	Study design & Setting	Participant characteristics	Target behaviour	Skill	Findings	Other skills used.
Tunnicliffe, P., Woodcock, K., Bull, L., Oliver, C., & Penhallow, J. (2014).	Case study via telephonic interviews	7 Children with Prader-Willi Syndrome, 9-16 years old, male & female.	Temper outbursts with regards to changes in routines.	• Discussion • Ignore • Negotiation • Distraction	Although questions on the effectiveness of these strategies were asked, it was often difficult for respondents to judge the relative success of different strategies as many carers had a multiple strategy approach and would respond differently depending on the behaviours seen or the setting for the behaviours.	Consequences
Vollmer, T. R., Northup, J., Ringdahl, J. E., LeBlanc, L. A., & Chauvin, T. M. (1996).	Case study in home and laboratory setting	Three preschool aged boys with language delays, 2-4 years old.	Severe tantrums - crying, screaming, kicking or throwing items in the room.	• Functional Communication Training with prompting & differential reinforcement.	Identification of the functional properties of tantrums allowed for selection of replacement behaviours, which may be useful for children with communication delays.	

Study	Study design & Setting	Participant characteristics	Target behaviour	Skill		Findings	Other skills used.
Vollmer, T. R., Progar, P. R., Lalli, J. S., Van Camp, C. M., Sierp, B. J., Wright, C. S., . . . Eisenschink, K. J. (1998).	Observational case study in laboratory	Two males who presented with moderate mental retardation. 6 and 16 years old.	Property destruction, self-injury, tantrums and aggression.	•	Extinction. • Non-contingent reinforcement/Fixed schedules.	Results showed that fixed time schedules were more effective than extinction schedules in reducing problem behavior. FT schedules may be used in situations when extinction-induced phenomena are problematic.	
Wilder, D. A., Liyu, C., Atwell, J., Pritchard, J., & Weinstein, P. (2006).	Case study in laboratory	Two neurotypical preschool children, 34 months and 40 months old. Male & female.	Tantrums and aggression.	•	Extinction. • Differential reinforcement of other behaviour (least to most prompting, praise and reward).	Although advance notice of an upcoming transition was ineffective, differential reinforcement of other behavior plus extinction reduced tantrums for both participants.	Advance notice/ preparation.

Study	Study design & Setting	Participant characteristics	Target behaviour	Skill	Findings	Other skills used.
Williams, C. D. (1959).	Case study in home setting	21 months old boy who was seriously ill for the first 18months of his life. His health then improved considerably and now demanded the special care and attention that had been given to him when he was sick.	Tantrums	• Extinction.	When the reinforcement (attention) was removed, extinction of the tantrum behaviour then occurred.	
Zarske, J. A. (1982).	Case study in home setting	Five year old boy with cerebral palsy but of average intelligence.	Tantrums	• Prescribing the tantrum behaviour. • Positive reinforcement	Dramatic reduction in the occurrence of tantrums in the first few weeks of the intervention. At follow-up there was a total absence of tantrums.	

Appendix E. Table of Results – Reviews

Study	Study design	Amstar score	Participant characteristics	Target behaviour	Skill	Findings	Other skills used
Delaney, K. R. (2006).	Review	3/11	Child and adolescent psychiatric inpatients mainly in the US.	Aggression	• Positive interaction - being non-threatening, non-coercive, and helping the child achieve control. Non-threatening body language and calm voice. • Empathy	There was a reduction in restraint and seclusion use.	Choice making and problem solving.
Matson, J. (2009).	Selective review	2/11	Children with autism, 6-15 years old, male & female.	Tantrums, property destruction, aggression and self-injury.	• Physical blocking • Extinction • Functional Communication Training • Timeout • Non-contingent reinforcement.	There was a significant reduction of target behaviors. Positive reinforcement was often not enough on its own. The desired results were only achieved once extinction or blocking were added.	Baby steps/graduated exposure- the children are gradually exposed to longer and longer time periods without reinforcement to raise their tolerance for disliked requests.