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Developing the emotion regulation skills of autistic pupils in educational settings: A systematic literature review

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Abstract

Moderating the intensity and expression of our emotions is necessary for successful engagement in learning. This systematic review explored, "what are schools doing to support autistic children and young people to develop their emotion regulation skills?" Critical analyses considered the inclusiveness of interventions and whether/how autistic pupils were asked about their participation. PsycINFO, Web of Science (Core Collection) and ERIC were searched on 18 July 2022. Eight studies were included, incorporating 419 autistic pupils, aged three to 17, from at least 955 schools in the USA, Australia and France. A narrative synthesis was used to provide an overview of the literature. Seven different approaches to emotion regulation were utilised, and only one was used in the school prior to the research. Forty out of 419 autistic pupils were asked for their views of the intervention they received. There is a lack of research considering school-led approaches to embedding emotion regulation skill development in everyday school practices and a lack of involvement of autistic pupil's views about emotion-regulation interventions. More research is needed to enable educational professionals to provide evidence-informed support for autistic pupils to develop their emotion regulation skills.

KEYWORDS
autism, education, emotion regulation, inclusion, voice

Key Points

- Emotion regulation is foundational for learning and included in the Primary school curriculum in England.
- Autistic children can experience difficulties with emotion regulation, which can impact on their learning, and so we systematically searched the international literature to find examples of school-based studies that could inform how best to support them.
- Eight studies from three countries discussed seven different approaches with varying outcomes, and only one focused on emotion regulation strategies that were already embedded in the school curriculum. Two studies took an inclusive approach (making the interventions available for all pupils).
- More research is needed to understand and document what schools are doing to support the emotion regulation of pupils in ways that move beyond specific (time-limited) and targeted interventions.

INTRODUCTION

Understanding emotions and being able to influence how and when they are expressed is known as emotion regulation (Gross, 1998, p.271). In the classroom, emotion regulation has been defined by Boekaerts (2011) as a pupil's capacity to maintain their energy for learning whilst modifying emotions that interfere with the pursuit of their learning goals. If a pupil is unable to influence the intensity and duration of their emotions then this can negatively impact their learning and social functioning (Boekaerts, 2011). Autistic people experience differences related to social communication, sensory sensitivities, repetitive behaviours and intense interests (American Psychiatric Association, 2013). Although emotion regulation is not referred to within the diagnostic criteria for autism, research has indicated that this is an area of difficulty for many autistic people (Cai et al., 2018; Cibralic et al., 2019; Conner et al., 2021; Mazefsky et al., 2012) and that, for some individuals, these difficulties can result in increased social and behavioural difficulties over time (Berkovits et al., 2017).

Consequently, emotion regulation and the strategies that may be employed to support pupils with this, is an important topic worthy of further investigation. In England, the National Curriculum from the Department for Education requires schools to support pupils to develop their understanding and self-management of emotions. Specifically, by the end of primary school at age 11, children are expected to be aware of the "scale of emotions that all humans experience in relation to different experiences and situations" and be able to "judge whether what they are feeling and how they are behaving is appropriate and proportionate" (Department for Education, 2019, p.32). To meet the demands of the National Curriculum, it is therefore important that education settings in England are implementing effective support. However, there is no current research available that provides a clear picture of what schools are doing to support the development of autistic pupils' emotion regulation skills; this systematic literature review aims to address this gap in the literature.

There are resources available to support autistic pupils in the development of emotion regulation skills as researchers (often in the United States of America) have designed targeted programmes. For example, The Zones of Regulation Curriculum ('The Zones'; Kuypers, 2011) was designed for neurodivergent learners to develop their emotion regulation skills alongside executive functioning and sensory integration skills. The zones can be delivered on an individual, group, or whole-class basis. Another example is the SCERTS Model, which focuses on the development of social communication, emotional regulation and transactional support and was designed specifically for autistic people and those with related disabilities to be embedded within everyday classroom activities (Prizant et al., 2006). Aside from these targeted programmes, support can be provided through day-to-day interactions. For example, Boekaerts (2011) outlined how teachers can support efficient emotion regulation through having predictable daily routines, encouraging pupils to talk about their emotions, modelling how they manage emotions and responding to pupils' emotion regulation strategies in an accepting and supportive manner. These methods and programmes such as The Zones and SCERTS, can be used with all pupils.

Being able to apply these programmes or models to all children aligns with the national and international push for inclusive education since the publication and agreement of the Salamanca Statement (UNESCO, 1994, p.3). This states that, inter alia, "those with special educational needs must have access to regular schools which should accommodate them within a child-centred pedagogy capable of meeting these needs" and that "… education systems should be designed and educational programmes implemented to take into account the wide diversity of these characteristics and needs". We recognise that the definition of what constitutes inclusive education is contentious and varied (Florian, 2014). For example, Schuelka (2018) described inclusive education as when all pupils, neurodivergent and neurotypical, are taught together in a mainstream classroom most of the time. However, others (e.g. Goodall, 2020) have argued that inclusive education is much more than *where* children go to school and is, at its core, about a sense of belonging that can be achieved in a range of settings. Notwithstanding these debates, good practice guidance for the education of autistic pupils is clear that all schools should work towards taking an individualised and strengths-based approach to educating autistic pupils (Guldberg et al., 2019). However, research into what makes an effective school-based socio-emotional intervention has been inconclusive thus far due to the variety of delivery methods (Hassani & Schwab, 2021). Consequently, little is known about what kinds of approaches have been applied in the development and application of approaches to emotion regulation and how inclusive or not these may be, and so this is the focus of this literature review.

In focusing on inclusive practices in our interpretation of the literature, this systematic review is anchored in a specific theoretical framework and, therefore, moves beyond a simple description of the findings of research. An inclusive approach to education aligns with the social model of disability, which highlights that whilst physical, sensory, intellectual, or psychological differences can result in functional limitations or impairments, these should only be considered a disability if society fails to provide the necessary adaptions to address them (Oliver, 2013). The social model, therefore, centres barriers to inclusion as context-based rather than within the individual, meaning it is a school's responsibility to adapt their environment and teaching practices to

ensure all children have access to the same opportunities i.e. that approaches are universal rather than targeted at individual children (Hegarty, 1991). This contrasts with the medical model of disability, which has dominated the discourse around autism in both research and practice (Pellicano & den Houting, 2022; Robertson, 2010). This model outlines that people are disabled because of their impairments or differences and therefore seeks to 'fix' the difference that is located within the individual. This framing of disability or difference has resulted in a deficit-focused narrative around autism as the difficulties are located within autistic people and the onus is on them to change to fit into their environment rather than the other way around (Dinishak, 2016; Milton, 2014; Pellicano & den Houting, 2022). Consequently, interventions aligned to the medical model tend to be targeted at individual children to address their assumed 'deficits' in specific skills or understanding.

Increasingly, autistic advocates and their allies are opposing the medical model perspective of autism, due to the resulting dehumanisation and stigmatisation of autistic people (e.g. Botha et al., 2021; Kapp, 2019). Instead, the social model has given rise to the neurodiversity movement which advocates for the acceptance and valuing of human diversity, particularly for individuals whose brains develop differently (i.e. neurodivergent people), in a similar way to society's acceptance that people have differing genders, races, religion, ethnicities and sexual orientations (Nicolaidis, 2012). The neurodiversity movement (see Milton, 2020, for a brief history) also emphasises the importance of the voices and lived experiences of autistic people for informing practice, related research and research questions (Gillespie-Lynch et al., 2017; McLaren, 2014). Importantly, there is strong recognition also that assumptions of homogeneity based on diagnostic labels should be avoided and that any approaches to support learning should be based on an understanding of individual strengths, preferences and needs (e.g. Milton, 2014). Consequently, it is important for reviews of literature to understand the ways in which (in this case) autistic children and young people's views were included in the research and able to influence decisions made.

In particular, the view that autistic people should change and conform to neurotypical behaviours is being challenged, as interventions with this focus (alongside cure-oriented organisations, policies and research) are creating and maintaining stigma towards autistic people and therefore sustaining marginalisation from society (Gillespie-Lynch et al., 2017). Camarata (2022) argued that researchers would benefit from guidance on how to ethically research interventions for autistic people, whilst maintaining a position of promoting societal acceptance of diversity. Furthermore, the voices of autistic pupils are rarely heard or sought when making decisions about the interventions they engage in, making this a key area for development within research and practice

(Hassani & Schwab, 2021). As Zilli et al. (2020) identify, the involvement of autistic pupils in decision-making at school is an important indicator of inclusive practice, and so this review will also examine whether / how autistic pupils were asked about their participation in the studies identified.

Accordingly, the primary research question addressed in this systematic literature review was: What are schools doing to support autistic children and young people to develop their emotion regulation skills? Additional secondary questions were:

a. How inclusive are the approaches being used to support emotion regulation in schools?
b. In what ways are autistic pupil's views heard or sought when making decisions or giving feedback about the interventions they engage in?

METHODS

This systematic literature review applied the ten-stage process described by Boland et al. (2017): (1) planning the review, (2) performing scoping searches, identifying the review question and writing a protocol, (3) literature searching, (4) screening titles and abstracts, (5) obtaining papers, (6) selecting full-text papers, (7) data extraction, (8) quality assessment, (9) analysis and synthesis, (10) writing up, editing and disseminating. In stage two, the scoping searches explored how schools support emotion regulation development using four search engines: 'Delphis' (accessible via the University of Southampton library), 'Google Scholar', EThOS and Dissertation and Theses Global (PROQUEST). The search was then narrowed to focus on autistic children and young people, and the resulting specific systematic literature research question was developed using the SPICE framework (Booth, 2006), which informed the search strategy.

Search strategy

Table 1 shows the search strategy and the inclusion and exclusion criteria. Three databases relevant to psychology and education research were selected: PsycINFO, Web of Science (Core Collection) and ERIC (Education Resources Information Centre). The search strategy was reviewed and then adjusted to suit each database (Table 2).

The literature search was conducted on 24 August 2021 and repeated on 23 March 2022 and 18 July 2022. No restrictions were applied regarding publication date, geographical origin, or peer review. The language of publication was restricted to English only. Books, literature reviews and book or article reviews were excluded. The Preferred Reporting Items for Systematic Reviews

TABLE 1 Systematic search strategy.

SPICE framework	Question element	Search strategy	Inclusion criteria	Exclusion criteria
Search with AND				
Setting	Education settings	school* OR nurser* OR kindergarten OR class*	The study must take place within an education setting (i.e. nursery or school).	Studies were conducted within a home or community context. Studies conducted outside of an education setting (e.g. they are transported to a venue outside school). Studies were conducted outside mandatory school hours (e.g. before or after school clubs).
Population	Children and young people (up to 19)	child* OR "young person*" OR "young people*" OR adolescen* OR teen*	Children and young people (up to and including age 19).	Individuals were aged 20 and over. Note: no studies were excluded due to this criterion.
	Autistic	Autis* OR "autism spectrum disorder*" OR "autism spectrum condition*" OR Asperger* OR ASD OR ASC	Autism diagnosis.	
Intervention	Any	interven* OR program* OR curricul* OR pedagog* OR train*	Any adaptation to practice (e.g. changes to pedagogy, the curriculum, or the environment) or targeted support (e.g. implementation of an intervention or programme, or training). No restriction on who deliverers/implements the adaptation/support (e.g. school staff or external professionals).	Adaptations or support exclusively aim to develop the adults' emotion regulation skills.
Comparison				
Evaluation	Emotion regulation skills	"emotion* regulat*" OR "emotion* coping" OR "emotion* dysregulat*"	Must explicitly state that developing the child/young person's emotional regulation skills is part of the aim.	

TABLE 2 Full systematic search strategy for each database.

Database	Interface	Search strategy
PsychInfo	EBSCO	(TI (school* OR nurser* OR kindergarten OR class*) OR AB (school* OR nurser* OR kindergarten OR class*) OR DE (schools OR classrooms)) AND (TI (child* OR "young person*" OR "young people*" OR adolescen* OR teen*) OR AB (child* OR "young person*" OR "young people*" OR adolescen* OR teen*) OR DE (Students)) AND (TI (Autis* OR "autism spectrum disorder*" OR "autism spectrum condition*" OR Asperger* OR ASD OR ASC) OR AB (Autis* OR "autism spectrum disorder*" OR "autism spectrum condition*" OR Asperger* OR ASD OR ASC) OR DE ("Autism Spectrum Disorders")) AND (TI (interven* OR program* OR curricul* OR pedagog* OR train*) OR AB (interven* OR program* OR curricul* OR pedagog* OR train*) OR DE ("school based intervention" OR curriculum)) AND (TI ("emotion* regulat*" OR "emotion* coping" OR "emotion* dysregulat*") OR AB ("emotion* regulat*" OR "emotion* coping" OR "emotion* dysregulat*") OR DE ("Emotional Regulation"))
ERIC	ProQuest	(ti(school* OR nurser* OR kindergarten OR class*) OR ab(school* OR nurser* OR kindergarten OR class*) OR mainsubject("Preschool Education")) AND (ti(child* OR "young person*" OR "young people*" OR adolescen* OR teen*) OR ab(child* OR "young person*" OR "young people*" OR adolescen* OR teen*) OR mainsubject("Late Adolescents" OR "Early Adolescents" OR Adolescents OR Children OR Youth)) AND (ti(Autis* OR "autism spectrum disorder*" OR "autism spectrum condition*" OR Asperger* OR ASD OR ASC) OR ab(Autis* OR "autism spectrum disorder*" OR "autism spectrum condition*" OR Asperger* OR ASD OR ASC) OR mainsubject("Autism Spectrum Disorders")) AND (ti(interven* OR program* OR curricul* OR pedagog* OR train*) OR ab(interven* OR program* OR curricul* OR pedagog* OR train*)) AND (ti("emotion* regulat*" OR "emotion* coping" OR "emotion* dysregulat*") OR ab("emotion* regulat*" OR "emotion* coping" OR "emotion* dysregulat*"))
Web of Science	WOS Core	((TI=(school* OR nurser* OR kindergarten OR class*)) OR AB=(school* OR nurser* OR kindergarten OR class*)) AND TI=(child* OR "young person*" OR "young people*" OR adolescen* OR teen*)) OR AB=(child* OR "young person*" OR "young people*" OR adolescen* OR teen*)) AND (TI=(Autis* OR "autism spectrum disorder*" OR "autism spectrum condition*" OR Asperger* OR ASD OR ASC)) OR AB=(Autis* OR "autism spectrum disorder*" OR "autism spectrum condition*" OR Asperger* OR ASD OR ASC) AND TI=(interven* OR program* OR curricul* OR pedagog* OR train*)) OR AB=(interven* OR program* OR curricul* OR pedagog* OR train*)) AND TI=("emotion* regulat*" OR "emotion* coping" OR "emotion* dysregulat*")) OR AB=("emotion* regulat*" OR "emotion* coping" OR "emotion* dysregulat*"))

and Meta-Analyses (PRISMA; Page et al., 2021) process, shown in Figure 1, was used to filter the identified records. The rationale for excluding papers during full-text screening is shown in Table 3.

Eight reports were identified for inclusion in this review. A second researcher independently replicated the literature search, abstract/title screening, removal of duplicates and full-text screening; they obtained the same eight reports.

Quality assessment

Of the eight reports, six were papers published in peer-reviewed journals (Beaumont et al., 2015; Einfeld et al., 2018; Fage et al., 2019; Mackay et al., 2017; Morgan et al., 2018; Parent et al., 2016), and two were unpublished doctoral theses (Lee, 2020; Pierman, 2020). The published papers were quality assessed using the Quality Assessment with Diverse Studies (QuADS) tool (Harrison et al., 2021) as this enabled the comparison of studies using qualitative and/or quantitative methods. Overall, the published studies were deemed to be of at least good quality. All were rated highly for their use of appropriate study designs and data collection tools relating to the research questions. However, four (excluding

Fage et al., 2019 and Parent et al., 2016) scored low on providing evidence that research stakeholders were considered in the research design or conduct (QuADS question 12); the participating autistic pupils were considered the main stakeholders as they were the recipients of the interventions. As the QuADS was developed for peer-reviewed papers, doctoral theses were quality assessed using the National Institute for Health and Care Excellence (2014) checklist for grey literature, and both were deemed to be of high quality. See Tables 4 and 5 for quality assessment data.

To strengthen the reliability of the review, a peer researcher extracted data from and quality assessed all eight papers. In the QuADS, the paper is scored from zero to three for each of the 13 questions. When the outcomes were compared, there were differences in around half of the individual question scores. Items with a difference of two points or more were resolved through discussion. Considering the consistency across questions, the most variation occurred on question one (theoretical or conceptual underpinning to the research) and question 12 (evidence that the research stakeholders have been considered in research design or conduct). The main reviewer (first author) individually reviewed the items where there was one point of difference. For the theses, all differences were compared, and
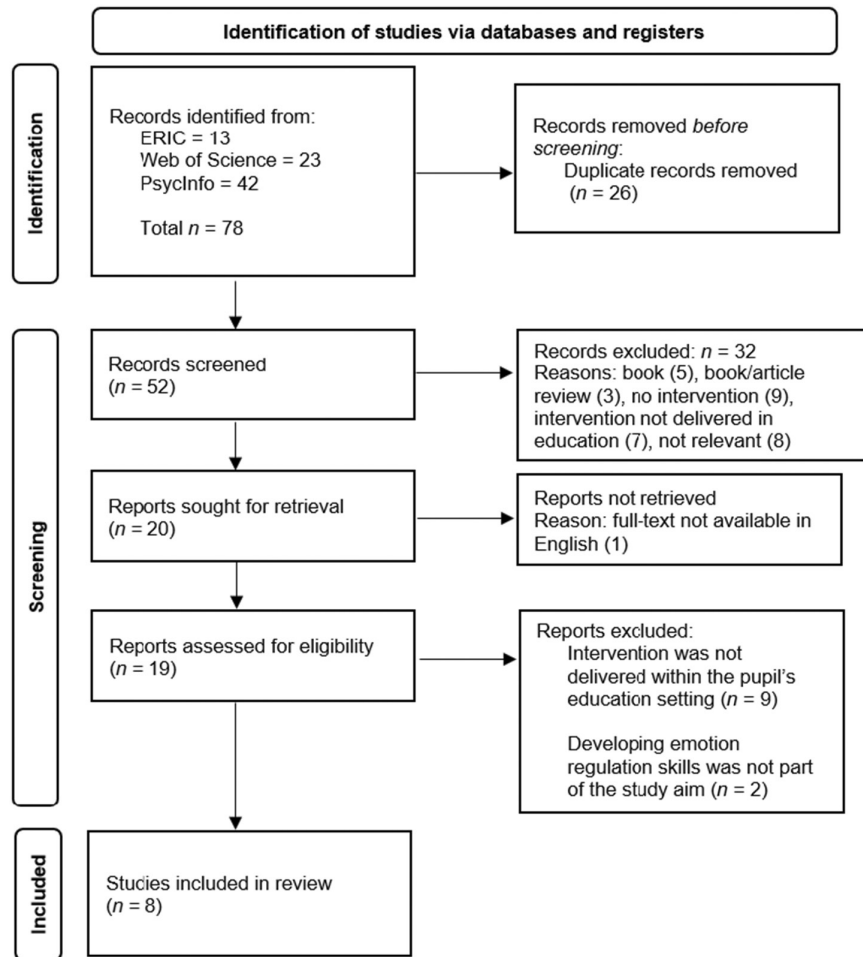
FIGURE 1   PRISMA flow diagram (Page et al., 2021).

they were related to oversights by the reviewers, likely due to the length of the reports. Overall, the conclusion was made that the findings for each study were credible due to suitably rigorous designs and methodologies and that they all warranted inclusion within this literature review.

Synthesis

A narrative synthesis was used to provide an overview of the identified literature on the approaches schools have used to support autistic pupils to develop their emotion regulation skills. The focus of the present review was not to draw conclusions about the effectiveness of specific interventions (see Granville, 2020 for a review on this topic) though summaries of outcomes are provided as part of the narrative. Instead, this analysis provides a summary of findings of the reports and then discusses the approaches taken through a conceptual lens of inclusive education practices, based on two main indicators: (1) was the adaptation to practice applied universal i.e. available for all children in the class? (Schuelka, 2018), and (2) was there individualisation for each pupil? (Guldberg

et al., 2019). Additionally, whether/how autistic pupils were included in decision-making and evaluation of their own participation is identified and discussed.

RESULTS

Table 6 provides the key characteristics of the eight included reports. Four studies were conducted in the USA (Lee, 2020; Morgan et al., 2018; Parent et al., 2016; Pierman, 2020), three in Australia (Beaumont et al., 2015; Einfeld et al., 2018; Mackay et al., 2017) and one in France (Fage et al., 2019). They involved at least 95 different schools, though Fage et al. (2019) and Mackay et al. (2017) did not specify how many schools were involved. The type of school was varied, including mainstream schools, inclusion classrooms (i.e. a mainstream classroom for pupils with and without learning differences), satellite classes (i.e. a classroom in a mainstream school, run by a special school) and a private therapeutic school. A total of 419 autistic pupils participated. Between studies, this ranged from two autistic pupils (Parent et al., 2016) to 197 pupils (Morgan et al., 2018). The age range was 3- to 17-years-old. Seven

TABLE 3 Summary of reports excluded at full-text screening.

Citation	Rationale for exclusion
Fujii et al. (2013)	Not conducted in the pupil's education setting: "with sessions taking place at a university clinic or an associated autism community clinic" (p.29).
Hample et al. (2020)	Developing emotion regulation skills were not part of the study's aim. Exclusion discussed and agreed with peer reviewer.
Hassenfeldt et al. (2015)	Not conducted in the pupil's education setting: the approach is intended to enable generalisation "outside of the clinic" (p.84).
Jesionowicz (2016)	Not conducted in the pupil's education setting: "the sessions were conducted in a room at a local community centre" (p.64).
Kurtz (2018)	Not conducted in the pupil's education setting: the intervention was delivered in a "designated office space" within the "Social Learning Centre" (p.35).
Macoun et al. (2021)	Developing emotion regulation skills were not part of the study's aim. Exclusion discussed and agreed with peer reviewer.
Marzouki et al. (2022)	Not conducted in the pupil's education setting: the intervention was delivered "at a local indoor swimming pool" (p.6).
Phung (2018)	Not conducted in the pupil's education setting: participants were required to go "to the university testing space" (p.36).
Stickney (2010)	Not conducted in the pupil's education setting: sessions were conducted at "Central Kentucky Riding for Hope", a nationally accredited riding centre (p.30).
Wood et al. (2009)	The intervention included "16 weekly sessions", however, "two meetings [were] scheduled at the child's school" (p.1610), indicating that the majority of the intervention was not conducted in the pupil's education setting.
Wood et al. (2014)	Not conducted in the pupil's education setting: sessions took place "at a university clinic or an associated autism community clinic" (p.2267).

studies reported participants' sex: 334 were male and 56 were female; Fage et al. (2019) did not provide this information.

Summary of findings

What are schools doing to support autistic children and young people to develop their emotion regulation skills?

Due to the diversity of the interventions and the assessment tools applied across the eight studies, no consistent conclusions can be drawn about the types of approaches schools were using to support the emotion regulation skills of pupils. The Secret Agent Society was the focus of two studies; Beaumont et al. (2015) used it with pupils aged seven to 12, while Einfeld et al. (2018) had an age range of eight to 14. Both reported that pupils demonstrated a significantly greater knowledge of emotion regulation strategies after receiving the programme. In Beaumont et al. (2015), teachers reported a significant improvement in emotion and social regulation skills, whereas parent scores were not significantly increased. Notably, for the teacher-reported measures, where the pupil's class teacher was unable to complete the measures (22% of pupils), these were completed by the intervention facilitator. The opposite findings occurred in Einfeld et al. (2018); teacher measures reported no change in emotion and social regulation skills, whereas parents reported a significant improvement. In this study, as the pupil's teachers were also the intervention facilitator, teaching aides completed the teacher measures. Despite the variation in findings between studies immediately after the intervention, parents and teachers reported a significant improvement in both studies at follow-up (6 weeks and 12 months later, respectively).

Lee's (2020) study utilised a mindfulness-based intervention, delivered on an individual basis, with two pupils aged 7 and 9. Researcher's quantitative observations indicated a decline in undesired behaviours in the classroom, indicating that following the intervention, the pupils had improved their emotion regulation skills. Similarly, after two pupils aged 12 and 16 followed a cognitive-behavioural therapy-based intervention, also delivered on an individual basis, Parent et al. (2016) reported that researchers' quantitative observations indicated a decline in undesired behaviours in the classroom, thereby suggesting an improvement in pupil's emotion regulation skills.

To evaluate the effectiveness of the SCERTS model with pupils aged four to eight, Morgan et al. (2018) also used researcher qualitative observational methods, but conversely reported no significant difference in emotion regulation between pre- and post-intervention. The SCERTS model was designed to be embedded into everyday educational activities, meaning that with practice, trained school staff were able to implement the approach for up to 25 h per week. A combination of multiple staff using the approach for most of the school day across the academic year provided

TABLE 4 Quality assessment of published journal articles using the Quality Assessment with Diverse Studies (QuADS) tool (Harrison et al., 2021).

Study	1. Theoretical or conceptual underpinning	2. Statement of research aim/s	3. Research setting and target population	4. Study design is appropriate	5. Appropriate sampling	6. Rationale for choice of data collection tools
Beaumont et al. (2015)	3	3	2	3	2	3
Einfeld et al. (2018)	3	3	3	3	2	2
Fage et al. (2019)	3	3	2	3	2	3
Mackay et al. (2017)	3	3	2	3	2	3
Morgan et al. (2018)	3	3	3	3	3	3
Parent et al. (2016)	2	3	3	3	2	0

numerous opportunities for pupils to develop and generalise their skills over time. Also based within the classroom, although only for 1 h per week, Fage et al. (2019) explored the impact of pupils aged 12–17 using an emotion-regulation application on a tablet. After 3 months, pupils demonstrated a significantly better emotional vocabulary.

After engaging in the Resourceful Adolescent Program – Autism Spectrum Disorder (RAP-A-ASD; Mackay et al., 2017), the 10- to 13-year-old pupils self-reported a significant change in their behaviour; however, this change was also reported by the control group. Parental report measures indicated the pupils demonstrated significantly better emotion coping skills after the intervention, but this change was not reported by school staff; neither parents nor teachers noted a change in the pupils' behaviour. Analysis of interviews with participants combined with written responses from parents and teachers reported positive outcomes, suggesting the RAP-A-ASD intervention had supported the development of emotion regulation skills, such as coping with and managing emotions.

Dance to Learn (Pierman, 2020) was the only intervention already embedded in the participating school's curriculum, whereas all other interventions were introduced specifically for the research studies. Dance classes were delivered once per week, over 10 weeks, to whole classes including both neurotypical and neurodivergent pupils. Partnership working between school staff and the ballet company enabled individual support to be offered to pupils as required. Pupils in the study were aged three to five. No significant statistical change in emotion regulation development was reported on the parent or teacher survey after the Dance to Learn programme. However, Pierman (2020) collectively analysed the researchers' qualitative observations and interviews with the classroom teachers and dance teachers and reported themes indicated that following the implementation of the Dance to Learn programme, the pupils' successful socio-emotional behaviours had increased and they were better able to control responses to strong emotions.

How inclusive are the approaches being used to support emotion regulation in schools?

Was the adaptation to practice applied universal?

Morgan et al. (2018) and Pierman (2020) utilised universal interventions, which were delivered to whole classes, inclusive of autistic and non-autistic pupils. Five studies used targeted interventions, delivered only to pupils with an autism diagnosis (which was an inclusion criterion for recruitment across all studies aside from Lee (2020), which also included pupils presenting with characteristics representative of autism, although they have not been included in this review). These targeted interventions were delivered to autistic pupils outside the classroom in a group (Beaumont et al., 2015; Einfeld et al., 2018) or on an individual basis (Lee, 2020; Mackay et al., 2017; Parent et al., 2016). Fage et al.'s (2019) emotion-regulation application was a targeted intervention, used on a tablet within the classroom with the support of an adult.

Was there individualisation for each pupil?

Of the six targeted interventions, all were either manualised or followed a set session structure. However, three studies specified that the intervention content was individualised for each pupil (Fage et al., 2019; Lee, 2020; Parent et al., 2016).

In what ways are autistic pupils' views heard or sought when making decisions or giving feedback about the interventions they engage in?

In all but one study (Morgan et al., 2018), feedback from autistic pupils was sought about the intervention. In four studies, this feedback was focused on tasks or self-report measures to determine if the pupils' knowledge and skills had developed (Beaumont et al., 2015; Einfeld et al., 2018; Fage et al., 2019; Mackay et al., 2017). Four studies, involving a total of 40 autistic pupils, moved beyond assessing intervention efficacy to seek the pupils' views regarding the delivery, feasibility and acceptability of the interventions. This was achieved using either

7. Format and content of data collection tool	8. Description of the data collection procedure	9. Recruitment data provided	10. Justification for the analytic method selected	11. The method of analysis	12. Research stakeholders considered	13. Strengths and limitations
3	3	2	2	3	1	2
3	3	2	2	3	1	2
3	3	1	2	3	3	2
3	2	3	2	3	1	3
3	3	3	2	3	2	2
3	2	0	0	2	3	2

pupil interviews (Parent et al., 2016; Pierman, 2020) or a pupil questionnaire (Lee, 2020; Mackay et al., 2017). In Parent et al.'s (2016) interviews, pupils reported positive outcomes. Similarly, pupils rated the intervention highly for fairness, importance and enjoyment on Lee's (2020) rating scale.

Only in one study did the researchers mention involving the pupils during the recruitment phase; Fage et al. (2019) noted that assent was obtained from the pupils; however, no further details were provided about this. None of the studies mention if or how they informed pupils about the nature and purpose of the intervention or the research. In all studies, participants were selected for inclusion by school staff and/or parents/carers, and parents/carers gave consent for their child to participate in the study.

DISCUSSION

This review aimed to explore what approaches have been used in schools to support autistic pupils to develop their emotion regulation skills, with a particular focus on considering how inclusive these approaches were and the ways in which autistic pupils were involved in decision-making or providing feedback about the interventions. Eight papers met the inclusion criteria, and they presented seven different adaptations to practice, all of which were specific interventions. From a methodological standpoint, the included studies were of good quality, indicating that their findings and conclusions were reliable.

Only one intervention (Dance to Learn; Pierman, 2020) out of eight was already embedded in the participating school's curriculum, with the other interventions introduced specifically for the research. Therefore, this review was unable to document what approaches schools have been or are using in practice, highlighting a major lack of research that considers school-led approaches to embedding emotion regulation skill development in everyday practices. However, this is unlikely to be because schools are not providing this support, but rather due to the well-known disconnect between educational research and

practice (Parsons et al., 2013). An in-depth discussion of this disconnect is beyond the scope of this paper but is well covered elsewhere (e.g. Guldberg, 2017) including discussion about the challenges that arise when aiming to undertake educational research that impacts on practice and the different conceptions of evidence about 'what works' (e.g. Thomas, 2012). Central to strengthening the relationship between research and practice is the valuing of different perspectives and forms of knowledge, including from education professionals and autistic children (Parsons et al., 2022). Close collaboration is needed between research and practice to enable the voices of typically marginalised groups to contribute to building the evidence base (Parsons, 2021) and address longstanding epistemic injustice (Catala et al., 2021). This includes taking more participatory approaches to research that strengthens the roles of autistic people within research teams (e.g. den Houting et al., 2021), while also recognising that participation in research is a continuum and not everyone wants to participate in the same way (e.g. Parsons et al., 2020).

How inclusive are the approaches being used?

Reflecting upon how inclusive the approaches to supporting emotion regulation were within this research enables consideration of how future research can seek to increase autistic pupils' inclusion in the classroom. Researchers primarily utilised targeted interventions as opposed to universal approaches that are inclusive of the whole class, such as adaptations to teaching practices, teaching content, or the learning environment (Boekaerts, 2011; Boekaerts & Pekrun, 2015). Six out of eight interventions involved an adult working with autistic pupils on an individual or small group basis to support the autistic pupils to change their behaviour. This is similar to Olsson and Nilholm's (2022) findings from their overview of 80 literature reviews focusing on the education of autistic pupils, in which most reviews centred the autistic pupils as the agents of change (i.e. *they* needed to learn new skills and change *their* behaviour). When approaches aiming to change

TABLE 5 Quality assessment of theses using the National Institute for Health and Care Excellence's (2014) checklist for grey literature.

		Lee (2020)	Pierman (2020)
Individual author	Associated with a reputable organisation?	Yes	Yes
	Professional qualifications or considerable experience?	Yes	Yes
	Produced/published other work (grey/black) in the field?	Yes	Yes
	Recognised expert, identified in other sources?	No	No
	Cited by others? (use Google Scholar as a quick check)	No	No
	Higher degree student under 'expert' supervision?	Yes	Yes
	Detailed reference list or bibliography?	Yes	Yes
Accuracy	Does the item have a clearly stated aim or brief?	Yes	Yes
	Does the item meet its aims?	Yes	Yes
	Does the item have a stated methodology?	Yes	Yes
	Has the item been peer-reviewed?	N/a	N/a
	Has the item been edited by a reputable authority?	N/a	N/a
	Is the item supported by authoritative, documented references or credible sources?	Yes	Yes
	Is the item representative of work in the field?	Yes	Yes
	If no, is it a valid counterbalance?	N/a	N/a
	Is any data collection explicit and appropriate for the research?	Yes	Yes
	If the item is secondary material (e.g. a policy brief of a technical report), does it provide an accurate, unbiased interpretation or analysis of the original document?	N/a	N/a
Coverage	Are any limits to the item clearly stated?	Yes	Yes
Objectivity	Is the author's standpoint clear?	Yes	Yes
	Does the work seem to be balanced in presentation?	Yes	Partly
Date	Does the item have a clearly stated date related to the content?	Yes	Yes
	If no date is given, but can be accurately ascertained, is there a valid reason for its absence?	N/a	N/a
	Has key contemporary material been included in the bibliography?	Yes	Yes
Significance	Is the item meaningful (i.e. does it incorporate feasibility, utility and relevance)?	Yes	Yes
	Does it add context?	Yes	Yes
	Does it enrich or add something unique to the research?	Yes	Yes
	Does it strengthen or refute a current position?	Yes	Yes
	Would the research area be lesser without it?	Yes	Yes
	Is it integral, representative, typical?	Yes	Yes
	Does it have impact (in the sense of influencing the work or behaviour of others)?	Yes	Yes
Comments (where the response was no, unclear, or partly)			Possible bias due to the authors' previous involvement in the programme.

the individual are used in isolation they can reinforce a deficit-focused, medical model view of autism as this implies a continued desire for autistic people to behave in a neurotypical way rather than accepting natural human variation (Mitchell & Snyder, 2015). However, taking a personalised approach to interventions by considering the individual's strengths, difficulties and context, alongside their views regarding the skills they want to develop, enables a more inclusive use of targeted intervention approaches (Lord et al., 2022; Milton, 2014).

As an alternative to targeted interventions, two interventions were delivered universally within a whole-class context. First, within the SCERTS Model (Morgan et al., 2018), all school staff working with participating children were invited to the training, and as the model was applied to the classroom setting rather than with targeted individuals, all pupils had access to the approach. Second, the Dance to Learn programme (Pierman, 2020) was delivered to whole classes, which enabled all children to benefit from the approach and to consolidate or develop their skills. Compared to the other studies,

these approaches reported in Morgan et al. (2018) and Pierman (2020) offer a more inclusive way to develop emotion regulation skills, as whole-class interventions enable opportunities for all pupils to develop their knowledge and skills, not just those who have been identified as requiring additional support (Harlacher et al., 2006).

There is an apparent tension between taking universal approaches to implementing classroom strategies and the kind of individualisation to approaches discussed here. However, the two ideas are not incompatible since the former rests on an assumption that strategies for learning should be available for all children, regardless of labels that may accompany them, while the latter simply recognises that, in being available for all, there may be individual differences in how strategies are applied, exemplified, or worked upon, and that taking an autism lens on what those differences may be is important (Ravet, 2011). This is what Ravet (2011, p.678) calls an 'integrative' approach to inclusion, which places an emphasis on teacher training for mainstream (inclusive) teachers such that "…other children in mainstream classrooms could benefit from the principles and strategies associated with good autism practice without any danger of conflating the needs of children on the spectrum with those who are not".

Importantly, the neurodiversity moment does not reject the notion that interventions can be beneficial for autistic people. Ne'eman (2021) argued that interventions that lead to the reduction of harmful behaviours (i.e. self-injury) or personal distress are helpful, whereas interventions aiming to suppress autistic traits so that the individual appears non-autistic are unethical and likely harmful. However, across the studies, there was limited contemplation of whether the particular approach would benefit or be appropriate for each individual, and instead, assumptions were apparently made about relevance of the intervention based on diagnostic labels only. More careful and considered alignment is needed between the strengths and support needs of individual pupils and the kinds of educational interventions and approaches being implemented (Guldberg et al., 2019).

In what ways are autistic pupils' views heard or sought when making decisions or giving feedback about the interventions they engage in?

Beyond seeking pupil assent to participate in the study (Fage et al., 2019), there was little consideration for ensuring whether autistic pupils were making an informed decision about wanting to engage in developing emotion regulation skills in the way being offered at that time. Overall, the level of participation of autistic pupils in decision-making or evaluation of the research, beyond being recipients of the interventions, was limited. Half of the studies (Beaumont et al., 2015; Einfeld et al., 2018; Fage et al., 2019; Mackay et al., 2017) included the pupils

in assessing the development of their knowledge and skills via tasks or self-report measures; however, this is a passive role within the research process and does not provide pupils the opportunity to share their opinions about the interventions received or indeed to help inform and shape any interventions in the first place. Across all studies, only 40 of 419 pupils were asked for their views regarding the intervention they had received; therefore, overall judgements regarding the acceptability of the interventions seemed to be primarily based on data provided by adult stakeholders (i.e. parents, teachers and researchers).

Four studies successfully demonstrated that there are ways to seek autistic pupils' views of interventions within research. Parent et al. (2016) utilised pupil interviews to explore social validity (i.e. self-advocacy skills, participation in school, community and family activities), while Pierman (2020) used informal interviews to develop their understanding of the programme's significance to the children and the learning that was taking place. Pupil questionnaires, consisting of Likert-type questions were used by Lee (2020) to evaluate the level of acceptance of the intervention and by Mackay et al. (2017) to measure participant satisfaction with the programme. As the intended recipients of the interventions, autistic pupils' voices should be included in informing the development of interventions in line with the more participatory approaches to research noted above (e.g. den Houting et al., 2021). Researchers need to be mindful that more creative methods may be required to ensure all pupils can share their views in a way that is accessible and comfortable for them (e.g. minimising language demands) (Ellis, 2017; Lewis-Dagnell et al., 2023). It is often assumed that autistic people find self-reflection difficult and that other people are better able to judge what is best for them, but this is an unjustified assumption that hinders the development of autistic individuals' autonomy (Späth & Jongsma, 2020). Therefore, the responsibility lies with researchers to enable the active participation of autistic people through creative methods and approaches so that their voices can be heard and these dominant views can be challenged (Ashby, 2011; Moyse, 2021; Parsons et al., 2021).

Emotion regulation: Conceptual and methodological challenges

There were several conceptual and methodological challenges to navigate in this review. From the included papers, researchers had not sought to develop emotion regulation skills in isolation but rather as one part of a broader intervention to develop other skills (e.g. social skills, behaviour). This is logical, as emotion regulation is closely interlinked with self-regulation (e.g. Kuypers, 2011) and socio-emotional development (e.g. Prizant et al., 2006). Nevertheless, this overlap in

TABLE 6 Overview of included studies and their key characteristics.

Study	Study design	# Autistic participants	Age	School setting	Adaptation	Existing practice?
Beaumont et al. (2015)	Non-randomised control trial with six-week follow-up	69	7–12	Mainstream schools	Secret Agent Society social skills program: A multimedia, manualised CBT-based programme	No
Einfeld et al. (2018)	Non-randomised waitlist-control trial with 12-month follow up	84	8–14	15 specialist primary and high school satellite classes	Secret Agent Society social skills program: A multimedia, manualised CBT-based programme	No
Fage et al. (2019)	Participatory cross-syndrome comparisons	29	12–17	Special-education classrooms in mainstream secondary schools	Tablet-based application. Pupils identify their emotion and intensity, then access a co-regulation strategy	No
(Lee, 2020)	ABAB single case	2	7 and 9	General education inclusion classroom	Mindfulness-based intervention	No
Mackay et al. (2017)	Mixed methods randomised control trial	29	10–13	Not specified	Resourceful Adolescent Program – Autism Spectrum Disorder (RAP-A-ASD): strength-focused resilience intervention	No
Morgan et al. (2018)	Cluster randomised trial	197	4–8	60 general education and special education schools	Classroom Social, Communication, Emotion Regulation, and Transactional Support (SCERTS) Intervention (CSI).	No
Parent et al. (2016)	Single subject, nonconcurrent multiple baseline	2	12 and 16	Private therapeutic school	Intervention using Cognitive Behavioural Therapy and behaviour-analytic techniques.	No
Pierman (2020)	Mixed methods comparative case study	7	3–5	3 inclusion classrooms	Dance to Learn: dance lessons promoting motor, cognitive and social–emotional development.	Yes

constructs has likely contributed to the ongoing lack of conceptual clarity in the literature around emotion regulation as an identifiable construct and how it can be developed and appropriately measured (Cai et al., 2018).

Across the eight studies, a variety of assessment methods for emotion regulation were utilised, including activities with pupils, questionnaires (pupil, parent and teacher) and observations. A strength of these studies is that six (75%) used more than one measure of emotion regulation, and five studies (62.5%) used more than one informant (i.e. self-report and informant report). Due to the multidimensional nature of emotion regulation, using several measures completed by multiple informants is recommended as best practice (Weiss et al., 2014). This also suggests methodological progress within emotion regulation studies, as Weiss et al. (2014) found only 50% of studies in their literature review used more than one measure, and only 25% used more than one informant to measure the emotion regulation skills of autistic individuals.

However, the questionnaires chosen to assess emotion regulation skills were not designed to measure emotion regulation exclusively, with the relevant questions often being embedded within a measure capturing multiple constructs (e.g. social skills). Existing measures for assessing autistic people's emotion regulation skills, for example, the Emotion Dysregulation Inventory (Mazefsky et al., 2018), were available at the time some of the studies were conducted and yet were not used. Ne'eman (2021) recognised how challenging it is to develop outcome measures when a disability, such as autism, is defined by behaviour and describes how this has often led to measures focusing on the reduction of diagnostic traits. To address this fundamental weakness, Ne'eman (2021) has called for the revision of existing outcome measures or the development of new ones, and recommends that this process includes autistic people and consideration of the neurodiversity perspective.

Delivery	Implemented by	Training	Emotion regulation construct measured	Indicators of inclusive practice: Universal adaptation? Individualised adaptation?	Were autistic pupils included in evaluating the intervention: 1. Efficacy? 2. Acceptability?
Weekly group (*n*=3) 10×90 min or 20×45 min	A member of school staff	Yes	Parent and teacher-rated emotion regulation and social skills Pupil knowledge of emotion regulation strategies	No No	1. Yes 2. No
Weekly group 9×90 min	Teachers	Yes	Parent and teaching aide-rated emotion regulation and social skills Pupil knowledge of emotion regulation strategies	1. No 2. No	1. Yes 2. No
Available 1 h per week 3 months	School staff	Yes	Pupil's emotional word fluency and emotional awareness	1. No 2. Yes	1. Yes 2. No
Daily, individual 5–7 min (25–28 sessions)	Researcher	No	Researcher observations of behaviour in the classroom	1. No 2. Yes	1. No 2. Yes
Weekly, individual 11×50 min	Post-graduate psychology student	Yes	Parent and teacher-rated behaviour and coping self-efficacy	1. No 2. No	1. Yes 2. Yes
Integrated into the curriculum	School staff	Yes	Researcher observations of emotion regulation	1. Yes 2. N/a	1. No 2. No
Weekly, individual 13×15–20 min	Researchers	Yes	Teacher and researcher observations of aggression and use of coping skills	1. No 2. Yes	1. No 2. Yes
Whole class	Ballet company	Yes	Parent, teacher and researcher ratings and observations of socio-emotional behaviours	1. Yes 2. N/a	1. No 2. Yes

Strengths, limitations and future research

The robustness of this review was strengthened in several ways. Peer review was utilised for the literature search, screening, data extraction and quality assessment processes, and advice was sought from more experienced others during supervision and through a University of Southampton librarian. The inclusion of grey literature enabled consideration of the most recently available research, which may not yet have been published (Hoffecker, 2021). Also, the protocol was pre-registered on Open Science Framework to aid transparency (https://osf.io/gc32z/).

However, the remit of this review may be limited due to the terms used within the search strategy. 'Emotion regulation' was the core concept to be explored; however, this term is often encompassed within 'self-regulation' (e.g. Kuypers, 2011), and therefore relevant literature may have been missed. This decision was made for good reasons, however, as 'self-regulation'

was too broad for this review, as it typically incorporates other constructs (e.g. executive functioning, sensory integration), thereby potentially diluting or confusing any findings that are specific to emotion regulation.

As England's Department for Education encourages education professionals to practice in an evidence-informed way (Coldwell et al., 2017), and as emotional development is a mandatory part of the National Curriculum, research regarding how schools can support autistic pupils to develop these skills is much needed. To address the identified gap between research and practice, a helpful starting point for future research would be to explore the practices that schools already have in place. This should focus not only on specific interventions but in line with the social model of disability, should consider what adaptations to the environment and/or teaching practices are being made.

Research must be conducted collaboratively, as when "best practices" are developed by researchers alone,

they can be inaccessible to school staff due to limited time, resources and training (Kasari & Smith, 2013). Furthermore, when researchers conduct education research in isolation, this overlooks the knowledge and expertise of education professionals and autistic people (Parsons, 2021; Parsons et al., 2022). As Guldberg (2017) outlines, to be most fruitful, educational research needs to respect practitioner knowledge as equal to researcher knowledge, and this needs to be combined with the views of autistic people and their families. The authors of this review are neurotypical allies of the autistic community; however, the review would be strengthened by the inclusion of autistic researchers on the research team. Keates (2022, p.2) states that "it is vital to engage autistic people in _their_ needs", and this must be done in a way that is accessible and agreeable to each autistic individual, as already noted above regarding the need to move to more participatory research approaches.

Implications for practice

While acknowledging the above limitations of the review, there are nevertheless some insightful implications for practice that can be drawn. First, education practitioners (e.g. teachers, special educational needs and disabilities coordinators, educational psychologists) should consider autistic children and young people's individual strengths and areas for development when deciding which interventions may benefit them, as not all autistic people require additional support to develop emotion regulation skills. Ideally, pupils should be involved in identifying what skills they would like to develop. Second, when making decisions about how to support emotion regulation development within a school setting, the pros and cons for using a universal versus targeted approach should be carefully considered in relation to the context and individuals within it.

It is also good practice to involve pupils in regularly reviewing interventions and adaptations that are in place to support them (e.g. changes to teaching practices or the environment). This should include exploring their thoughts about whether it is helping them develop their skills and their feelings towards the approach (e.g. enjoyment, motivation). For specific interventions, pupil views on organisational factors such as group size, location, timing and session structure should be sought as much as possible. Finally, researchers need to continue to develop and use creative methods to involve autistic children and young people in research.

CONCLUSIONS

This review aimed to explore what approaches have been used in schools to support autistic pupils to develop their emotion regulation skills. However, very little research was identified that focused on emotion regulation within everyday school practices. This lack of evidence is a barrier to education professionals being able to provide evidence-informed support for autistic pupils to develop their emotion regulation skills. This review has identified that there is a need for greater prioritisation of autistic pupils' voices, both in the development of interventions and within evaluation of the research process. On-going consideration about how interventions can provide opportunities for skill development while accepting neurodiversity is important. Future research would benefit from research-practice partnerships to develop the evidence base in a way that is more impactful for autistic pupils and education professionals (Nicolaidis et al., 2019; Parsons & Kasari, 2013; Parsons & Kovshoff, 2019).

CONFLICT OF INTEREST STATEMENT
The authors declare no conflicts of interest.

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