Responding to challenging behaviour with Children aged 2-5 years in Early Childhood Education and Care settings
Acknowledgments

This report was prepared for Evidence for Learning (E4L) by Dr Sally Staton and Professor Karen Thorpe, Queensland Brain Institute, The University of Queensland.

Lead authors: Staton, S., Coles, L., Houen, S., and Thorpe, K.
Co-authors: Seale, B., Mecklenburgh, N., Van Halen, and O. Panthi, N.,

E4L is a national, independent, not-for-profit organisation that is dedicated to helping busy educators increase learning for children, by improving the quality, availability, and use of evidence. E4L's Early Childhood Education Toolkit identifies building self-regulation skills as one of the three highest impact, low cost approaches in this global summary of the research evidence. In response to requests from the sector and following COVID-19, E4L has commissioned this review to help educators identify and use evidence-based approaches for responding to challenging behaviours encountered in their daily practice.

Evidence for Learning (E4L) would like to thank the researchers and educators who provided input to this report.

Copyright

This evaluation report is licensed under a Creative Commons license as outlined below. Permission may be granted for derivatives, please contact Evidence for Learning for more information.

This work is licensed under a Creative Commons Attribution-non-commercial-No Derivatives 4.0 International License.

How to Cite this Report

Contents

Executive Summary .......................................................................................................................................... 4
Summary of Research Evidence ..................................................................................................................... 4
References .................................................................................................................................................... 7
Databases searched ........................................................................................................................................... 7
Search Terms ..................................................................................................................................................... 7
Systematic Review Preliminary Report .......................................................................................................... 8
Methods .............................................................................................................................................................. 8
Search Strategy .................................................................................................................................................. 8
Inclusion and Exclusion Criteria ......................................................................................................................... 8
Study Selection ................................................................................................................................................... 8
Quality Assessment ............................................................................................................................................ 8
Results .............................................................................................................................................................. 10
Table 1. Summary of study characteristics, strategies and description .............................................................. 11
Quality of Evidence ........................................................................................................................................... 17
Discussion ........................................................................................................................................................ 17
Strategies for responding to challenging behaviours ....................................................................................... 17
Conclusion ........................................................................................................................................................ 23
References ....................................................................................................................................................... 24
Appendices ..................................................................................................................................................... 28
Appendix 1. Systematic Review Protocol ......................................................................................................... 28
Appendix 2. Systematic Review Detailed Search Terms ................................................................................... 32
Appendix 3. CASP Qualitative Research Critical Appraisal Checklist .............................................................. 34
Appendix 4. Cochrane Risk of Bias Assessment Tool (Randomised Studies: ROB-2) ....................................... 35
Appendix 4. Cochrane Risk of Bias Assessment Tool (Non-randomised studies: ROBINS-I) ........................ 36
Executive Summary

Children’s experiences in the early years lay the foundation for long-term behavioural and emotional regulation (Rivenbark, Odgers, Caspi, Harrington, Hogan, Houts, Poulton, & Moffitt, 2018; Richmond-Rakerd, Caspi, Ambler, d’Arbeloff, de Bruine, Elliott, Harrington, Hogan, Houts, Ireland, & Keenan, 2021). The quality of social interactions across early childhood serve to shape neural architecture and establish a child’s ability to understand other’s perspective, to self-regulate emotions and to find solutions when presented with a challenge. The first social interactions occur within the family context (Belsky, Caspi, Moffitt, & Poulton, 2020), but for most children in the years prior to school the Early Childhood Education and Care (ECEC) context plays a critical role. ECEC environments present a child’s first formal, group-based social experience outside the family. In this context the increased number and diversity of interactions with peers and adults, alongside the encounter with new behavioural expectations of the group context, present a range of learning opportunities and challenges. Some children do not adapt readily to these challenges and, in turn, present a challenge to educators (Houts, Caspi, Pianta, Arseneault, & Moffitt, 2010).

Challenging behaviours are broadly defined as those that reflect a misalignment between behaviours that are expected and observed. Common challenges experienced by educators in ECEC settings include children not following directions or rules, disrupting, or distracting others, having negative interactions with peers, exhibiting aggressive behaviours, withdrawing from peers, and expressing intense emotions (Garrity, Longstreth, Linder, & Potter, 2019; Pihlaja, Sarlin and Ristikari, 2015). Such challenges emerge for a range of reasons that can reflect individual, social, environmental, and contextual factors, or a combination of these. These challenges matter. In the short-term, challenging behaviours can reduce a child’s opportunities for learning, redirect educator resources and impact on the learning experiences of other children within an ECEC setting. In the longer-term, evidence shows that children with unresolved challenging behaviours are more likely to experience poorer educational engagement, peer difficulties and anti-social behaviours (Tremblay, 2012).

Challenging behaviours have been identified by ECEC educators as the key practice related challenge that impacts on their daily work and one for which educators seek support (Thorpe, Panthi, Houen, Horwood, & Staton, 2022). Yet, to date the synthesis of evidence on strategies to support ECEC educators in responding to challenging behaviours is missing and forms the focus of this review. The summary below presents current research evidence on effective strategies for responding to challenging behaviours with young children aged 2-5 years in ECEC. This review specifically focuses on common, low to mid-level behaviours that can be de-escalated or redirected within the room by an educator, and or educator team (teacher and assistant), applying foundational behaviour management techniques and teaching strategies.

Summary of research evidence

The current research provides evidence of a range of strategies that can be used by early childhood educators to respond to challenging behaviours in ECEC.

This review identified 34 studies that fit the inclusion criteria. Across the studies identified, there was large variation in the quality of evidence presented, so we cannot be definitive about the effectiveness of the strategies presented. It is important to acknowledge that these studies review strategies within a specific context and are not intended to be formulas for practice. The strategies reviewed should be considered as tools to support educators in improving the quality of interactions with children in specific contexts. Further resources (‘tip sheets’) to support educators in applying these strategies are available on the Evidence for Learning website.

The available research evidence suggests that setting the scene by establishing and maintaining a positive relationship with the child engenders positive change, while supporting the child’s knowledge and skills and providing clear expectations reduces the likelihood of a behavioural challenge. In the moment, specific praise to encourage positive behaviours, and engaging the child/children in the process of problem resolution are
Responding to Challenging Behaviours: Effective Strategies and Ineffective Strategies

There is, however, less evidence that reward systems are effective in ECEC. In resetting after encounter of a challenge event, taking the opportunity to provide instruction beyond the point of conflict provides the child opportunity to learn at a point removed from the emotion of the moment and affords the educator opportunity to reflect on strategies as part of their teaching and planning cycle.

Three key strategies have been identified as important in setting the scene for successful interactions and to avoid or reduce challenging behaviours before they occur. The first strategy involves educators providing time and intentionally building positive interactions with children in ECEC (Driscoll and Planta, 2010; Driscoll, Wang, Mashburn, & Pianta, 2011; Williford, LoCasale-Crouch, Whittaker, DeCoster, Hartz, Carter, Wolcott, & Hatfield, 2017; Alamos, Williford, and LoCasale-Crouch, 2018; LoCasale-Crouch, Williford, Whittaker, DeCoster, & Alamos, 2018; and Levine and Ducharme 2012). Short, one-on-one child-led play session of between 7-15 minutes can support relationship building and has been shown to have immediate, and some enduring effects on the interactional quality between educators and children. These studies also identify that how educators interact with children during these sessions is important, with high engagement a critical element for enacting change (LoCasale-Crouch et al. 2018; Alamos et al., 2018).

The second strategy involves educators providing children with emotional stability in care and interactions quality (Choi, Horm, Jeon, & Ryu, 2019; Zinsser, Bailey, Curby, Denham, & Bassett, 2013). This evidence is limited but indicates that changes in educators across time in ECEC are associated with an increased frequency of challenging behaviours (Choi et al., 2019). Stability in the emotional support provided by educators can help overcome the challenges associated with educator changes (Choi et al., 2019), while inconsistency of emotional support, even when generally positive, may increase aggression and negative emotions (Zinsser et al., 2013).

Thirdly, a range of strategies work to build children’s knowledge and skills to effectively engage in positive interactions with others and their environments. These strategies employ a variety of stimuli comprising video, photographs, stories and in the moment experiences to support instructional strategies. In doing so, educators provided children knowledge to understand emotions and feeling of themselves and others (e.g., Brazelli, Grazzani, and Pepe, 2021); strategies for engaging in positive interactions with peers (Girard, Girolametto, Weitzman, & Greenberg, 2011; McCoy, Morrison, Barnett, Kalra, & Donovan, 2017; Green, Drysdale, Boelema, Smart, van der Meer, Achmadi, Prior, O’Reilly, Didden, & Lancioni, 2013); and, strategies to enable children to generate their own solutions to challenging situations (Drogan and Kern, 2014).

The literature also identifies strategies that can support educators to respond to challenging behaviours in the moment in which they occur. Three main strategies were identified in the research evidence which focused on successfully directing and re-directing negative behaviours, reinforcing positive behaviours, and supporting children to resolve situations of challenge.

**Directing and re-directing negative behaviours**

The verbal and non-verbal approaches an educator uses in delivering instructions to direct or re-direct children can influence children’s behaviour. When educators are more explicit in their instructions and focused on “do” statements (e.g., “pick up the books”), children are more likely to comply (Ndoro, Hanley, Tiger, & Heal, 2006). Conversely, compliance is less likely if instructions are not clear or focused on what educators do not want students to do (i.e., “don’t” instructions; e.g. “don’t leave the books on the ground”).

Calling a child’s name followed by a required response (such as to look or stop their current activity) have been shown to be effective in inciting children’s compliance with directions (Beaulieu, Hanley, & Robertson et al., 2012). Children were less likely to follow instructions if they neither stopped nor looked at their educator after a name-call and educator-instruction. However, children are equally likely to comply regardless of whether they responded with action (stop) or vision (look) or both, suggesting any response indicating paying attention is sufficient.
Other strategies focused on using non-verbal actions, through educator-child touch, have been shown to soften or reduce the need for disciplining talk or to successfully control and direct children toward a desired activity. Sustained touch may be useful in re-orienting children to a desired activity, or to protect children from a potentially dangerous situation, while short touches were useful in directing children’s attention.

Reinforcing positive behaviours

Strategies identified that were aimed at reinforcing or encouraging the use of children’s positive or desired behaviours included the use of praise statements (Hyatt & Filler 2007; Hemmeter et al., 2011; Moffat, 2011; Smith, 2011; Stormont, Smith, and Lewis, 2007) and application of different types of material or activity-based rewards for desired behaviours (Murphy, Theodore, Aloiso, Arie-Edwards, & Hughes, 2007; Ling 2013; Pasqua, Dufrene, LaBrot, Radley, Dart, & Lown, 2021; Reitman, Murphy, Hupp, & O’Callaghan, 2004). Two types of praise statements have been examined as strategies to re-enforce desired behaviours of children in the context of ECEC. General or non-specific praise refers to verbal statements or gestures that indicate approval for desired behaviour, but do not name the specific behaviour being praised (e.g., “good job”). Behaviour specific praise (also known as descriptive and specific-behavioural praise) are verbal statements that indicate approval and name the specific behaviour being praised (e.g., “thanks for putting away your books”). The findings for praise are generally based on small studies with high risk of bias. However, available evidence suggests that behaviour-specific praise statements are more effective for increasing pro-social behaviour and decreasing anti-social behaviour than general praise statements.

In contrast to praise statements that occur directly following a desired behaviour, rewarding typically includes both a pre-correction stage, in which children are provided clear instructions on the expectations for behaviour and contingent reward for compliance, and a re-enforcement stage in which children receive a verbal and/or non-verbal reward upon compliance. Strategies for rewarding children can be focused on individual children (Pasqua et al. 2021; Reitman et al. 2004) or at the group level (Murphy et al. 2007; Ling and Barnett, 2013). However, the current evidence of the efficacy for these approaches in reducing challenging behaviours in ECEC is mixed.

Supporting children to resolve situations of challenge

Educators play an important role in supporting children in ECEC to find solutions to challenging situations and to resolve conflicts. Strategies that can support children in resolving conflict or challenges include those in which (1) children are directly involved in providing solutions for themselves and/or other children, and (2) educators support children to problem solve their own solutions. Studies show that when educators directly invoke a solution to a conflict, children are less likely to adopt the proposed solution compared to when educators supported children to brainstorm a solution to the conflict themselves (Church, Mashford-Scott, & Cohrsen, 2018). In addition, children are less likely to remain in proximity and re-engage in play with each other, and more likely to separate following a conflict an educator intervenes (Roseth, Pellegrini, Dupuis, Bohn, Hickey, Hilk, & Peshkam, 2008). However, reconciliation (Roseth et al. 2008) and co-regulation of emotions (Kelley, 2018) may be facilitated through educators intervening, particularly when educators use of these multiple strategies supported children’s problem-solving skills, self-regulation, and to re-establish calm in the ECEC environment (Silkenbeumer, Schiller, & Kärtner, 2018).

Finally, current research evidence highlights the importance of revisiting and reflecting on challenging situations and responses as a means of resetting the scene for future interactions. While strategies for redirection and reinforcement typically occur during or immediately following a challenging behaviour or event, these times are not always suited to extended discussions regarding the behaviour and its consequences. Strategies that can be used after an incident include engaging children in conversations that explain to children the impact, response and provide positive ways to solve conflicts. Further, creating opportunities to reflect on challenging behaviours can support educators in being responsive to the individual differences in the underlying cause, type, and contexts in which challenging behaviours occur. Collectively, the body of studies indicate that not all strategies work for all children, and different strategies are effective in responding to some, but not all types of challenges presented within the context of ECEC. Reflection on the
type of challenge that is being addressed, the individual context of child and environment and prior responses to application of strategies is therefore likely to be an important consideration for the educator in tailoring the response to suit a child's need within the specific context of the presenting challenge.

References
Please see full list provided on page 24.

Databases searched
- ERIC (via Proquest)
- ProQuest - Education Collection
- PsycINFO & PsycArticles
- Scopus (education and non-clinical population journals only)
- A+ Education

Search terms
(Teacher* OR Educator* OR Carer* OR Staff*) AND (Behav* OR Social* OR Emotion* OR Internal* OR External*) AND (Problem* OR Difficult* OR Challeng* OR Disrupt* OR Aggress* OR conduct OR Tantrum* OR Withdraw* OR Bully*) AND (Intervention* OR Program* OR Strateg* OR Support* OR approach* OR Manage*) AND ("Early Education" OR "Early Years" OR "Child care" OR "Preschool" OR "Early Childhood" OR "Pre-School" OR "Kindergarten" OR "pre-K").
Systematic review preliminary report

Methods

The protocol was developed in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Guidelines (PRISMA; Moher, Liberati, Tetzlaff, & Altman, 2008; Shamseer, Moher, Clarke, Gherzi, Liberati, & Petticrew, 2015) and prospectively registered via PROSPERO (ID#365300). Screening and extraction were undertaken using Covidence, an electronic platform for the management of systematic reviews.

Search strategy

A database search for relevant studies was conducted on 12 September 2022 using the following databases: ERIC (via Proquest), ProQuest - Education Collection, PsycINFO & PsycArticles, Scopus (education and non-clinical population journals only) and A+ Education. The following search terms were used to extract relevant articles: (Teacher* OR Educator* OR Carer* OR Staff*) AND (Behav* OR Social* OR Emotion* OR Internal* OR External*) AND (Problem* OR Difficult* OR Challeng* OR Disrupt* OR Aggress* OR conduct OR Tantrum* OR Withdraw* OR Bully*) AND (Intervention* OR Program* OR Strateg* OR Support* OR approach* OR Manage*) AND ("Early Education" OR "Early Years" OR “Child care” OR "Pre-School" OR “Kindergarten” OR “pre-K”). Relevant papers found in the reference list of extracted articles were also included. A full list of search terms, limiters and number of relevant articles returned for each database can be found in Appendix 2.

Inclusion and exclusion criteria

Only published, peer-reviewed articles that assess strategies to respond to challenging behaviours with children, aged 2-5 years, in Early Childhood Education and Care (ECEC) settings were included. Strategies included those that focus on common, low to mid-level behaviours that can be deescalated or redirected within the room by an educator, and or educator team (teacher and assistant), applying foundational behaviour management techniques and teaching strategies. Accepted study designs included intervention, observational, cross-sectional, and qualitative studies. Studies included were published in English within the last two decades (2000-2022) and were only included if the strategy/strategies identified were implemented directly by an ECEC educator or teacher. Studies excluded were of children in school, children with specific diagnoses or learning difficulties (e.g., children Autistic Spectrum Disorder, or in specialised support programs) and children younger than 2 years.

Study selection

A three-step selection process was conducted using the Covidence platform for systematic reviews. First, the title and abstract of all extracted articles were examined by reviewers to determine whether they met the inclusion criteria. Any ambiguous abstracts were discussed with a second reviewer and decision made by consensus. Second, full text of each identified articles was independently assessed for inclusion. Any concerns regarding inclusion were identified and in consultation with a second study author and a consensus method was applied. The final decision and reasons for exclusion were documented (see Figure 1).

Quality assessment

All included studies were evaluated for risk of bias and quality of evidence. For qualitative studies the Critical Appraisal Skills Programme (CASP) Qualitative Research Critical Appraisal Checklist was applied. The CASP consists of 10 items which assess the validity and appropriateness of the methodology and design, recruitment and collection, researcher relationship, analyses, and findings. Whilst there is currently not consensus regarding the scoring of the CASP, for the current study the following cut-offs for identification of...
‘High’ (≥ 6 items not met), ‘Some concern’ (3-5 items not met) and ‘Low risk’ of bias (0-2 items not met) was applied.

Quantitative studies were assessed via the Cochrane risk of bias assessment tool. Using this measure a study is judged to be ‘Low risk’ of bias if rated as low for all domains ‘Some concerns’ if judged to raise some concerns in at least one domain but not to be at high risk of bias for any domain, and ‘High risk’ of bias if judged to be at high risk of bias in at least one domain or is judged to have some concerns for multiple domains in a way that substantially lowers confidence in the result.

Two reviewers rated all studies based on the relevant Cochrane or CASP tools. Inter-rater agreement was examined, and any disagreements were addressed via a consensus method between the reviewers.
Results

Database search and data extraction

The search results for each stage of the extraction process are illustrated in Figure 1. Of the 5040 records identified, 34 studies were included in the final synthesis. A description of each of the included studies is provided in Table 1.

Figure 1. PRISMA Flow Diagram
<table>
<thead>
<tr>
<th>Author/s</th>
<th>Year</th>
<th>Country</th>
<th>Children (N)</th>
<th>Educators (N)</th>
<th>Description</th>
<th>Evidence</th>
<th>Risk of Bias</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alamos</td>
<td>2018</td>
<td>USA</td>
<td>319</td>
<td>120</td>
<td><strong>Banking time</strong>&lt;br&gt;Time-limited (10–15 min) period during which an educator and child spend one-on-one time together doing a child-led activity. With either: <strong>High engagement</strong> – educator engaged in child’s activity while ensuring that child leads the session (observing/narrating child’s actions). <strong>Low engagement</strong> - the educator is physically present but not engaged in child-led activity <strong>Educator-Led</strong> - educator is engaged in child’s activity but directs session instead of following child’s lead</td>
<td>High engagement banking time led to higher children’s positive engagement with their educator. There was no difference between high-engagement and educator-led banking time in terms of child outcomes. No change in conflict with educators was found.</td>
<td>Some concerns</td>
</tr>
<tr>
<td>Beaulieu</td>
<td>2012</td>
<td>USA</td>
<td>17</td>
<td>2</td>
<td><strong>Name calls</strong>&lt;br&gt;Name calls plus instruction (with child looking, stopping, or ignoring)</td>
<td>Compliance with instruction occurred after name call when the child either looked or stopped. However, both looking and stopping together was not superior to doing one or the other. Compliance with instruction occurred less frequently when children ignored name call.</td>
<td>High</td>
</tr>
<tr>
<td>Benish</td>
<td>2011</td>
<td>USA</td>
<td>3</td>
<td>1</td>
<td><strong>Social Stories</strong>&lt;br&gt;A short, simple story, written from the perspective of the child that delivers instruction on appropriate social behaviours</td>
<td>Positive peer interactions increased following implementation of social stories.</td>
<td>High</td>
</tr>
<tr>
<td>Brazzelli</td>
<td>2021</td>
<td>Italy</td>
<td>142</td>
<td>25</td>
<td><strong>Conversations (story prompted)</strong>&lt;br&gt;Story prompted conversations with children about inner states (e.g., needs and emotions) and pro-social actions</td>
<td>Toddlers who participated in story prompted conversations showed an increase in empathic and pro-social behaviour, helping, sharing, and comforting toward others.</td>
<td>Some concerns</td>
</tr>
<tr>
<td>Carpenter</td>
<td>2002</td>
<td>USA</td>
<td>19</td>
<td>1</td>
<td><strong>Conversations (outside incident)</strong>&lt;br&gt;One-on-one conversation specifically not during time of behavioural aggression aimed at teaching three concepts: 1 - aggression hurts and upsets others; 2 - aggression does not solve problems and causes resentment; 3 - positive ways to solve conflicts (e.g., sharing, taking turns)</td>
<td>Children showed increased pro-social and positive behaviours and some evidence of reduced negative behaviours (e.g., crying, noncompliance), but no change in externalising behaviours.</td>
<td>Some concerns</td>
</tr>
<tr>
<td>Study</td>
<td>Year</td>
<td>Location</td>
<td>Participant N</td>
<td>Methodology</td>
<td>Description</td>
<td>Findings</td>
<td>Notes</td>
</tr>
<tr>
<td>-------</td>
<td>------</td>
<td>----------</td>
<td>---------------</td>
<td>-------------</td>
<td>-------------</td>
<td>----------</td>
<td>-------</td>
</tr>
<tr>
<td>Cekaite</td>
<td>2018</td>
<td>Sweden</td>
<td>35</td>
<td>Affectionate controlling touch</td>
<td>Used by educator when children's conduct is not in accordance with expectations</td>
<td>Affectionate-controlling touch can be used to mildly control and direct child's bodily conduct, attention, and participation toward educational activities or to mitigate the adults' disciplining talk.</td>
<td>Some concerns</td>
</tr>
<tr>
<td>Choi</td>
<td>2019</td>
<td>USA</td>
<td>196</td>
<td>Stability</td>
<td>Consistent educator in ECEC and emotional quality of environment</td>
<td>No educator changes were associated with having fewer behaviour problems and higher social competence. High quality educator-child interactions were associated with higher child engagement and emotional regulation.</td>
<td>Some concern</td>
</tr>
<tr>
<td>Church</td>
<td>2018</td>
<td>AUS</td>
<td>-</td>
<td>Problem Solving</td>
<td>Educator directed: Educator invoked solution to conflict; Educator facilitated: educator supporting children to brainstorm solution to conflict.</td>
<td>Educator directed problem solving led to children not adopting the solution. Educator facilitated problem solving (e.g., prompts) were shown to support children's problem solving.</td>
<td>Some concerns</td>
</tr>
<tr>
<td>Driscoll</td>
<td>2010</td>
<td>USA</td>
<td>116</td>
<td>Banking time</td>
<td>Time-limited (10–15 min) periods during which an educator and a specific child spend one-on-one time together doing a child-led activity.</td>
<td>Banking Time was associated with increased child frustration tolerance, task orientation, and decreased conduct problems.</td>
<td>High</td>
</tr>
<tr>
<td>Driscoll</td>
<td>2011</td>
<td>USA</td>
<td>1,064</td>
<td>Banking time</td>
<td>Time-limited (10–15 min) periods during which an educator and a specific child spend one-on-one time together doing a child-led activity</td>
<td>Banking Time was associated with increased frustration tolerance, task orientation, and decreased conduct problems, but not associated with conflict and social competence.</td>
<td>High</td>
</tr>
<tr>
<td>Drogan</td>
<td>2014</td>
<td>USA</td>
<td>3</td>
<td>Turtle technique</td>
<td>4 steps using the analogy of a turtle: 1 - Stop; 2 - Go Into shell (action); 3: Deep breathe; 4: Calm/Think (about possible solutions)</td>
<td>Turtle technique was associated with reduced negative behaviour (e.g., non-compliance, grabbing toys or peers, physical/verbal outbursts).</td>
<td>High</td>
</tr>
<tr>
<td>Dufrene</td>
<td>2012</td>
<td>USA</td>
<td>8-20 per educator</td>
<td>Specific Praise</td>
<td>Response-dependent, specific, labelled praise statement</td>
<td>Increased use of specific praise and effective instruction delivery was associated with decreased disruptive behaviours of children. However, the specific components were not examined individually.</td>
<td>High</td>
</tr>
<tr>
<td>Name</td>
<td>Year</td>
<td>Country</td>
<td>Study Type</td>
<td>Methodology</td>
<td>Outcomes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>--------------</td>
<td>--------</td>
<td>---------</td>
<td>------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Girard</td>
<td>2011</td>
<td>Canada</td>
<td>68</td>
<td>Three feet of child; 5 - uses descriptive wording in instruction; 6 - waits 5s for child to comply with instruction prior to reissuing instruction; 7 - praises child for compliance.</td>
<td>Facilitated peer play increased pro-social behaviours during small-group interactions. No change in aggressive behaviours was found.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Green</td>
<td>2013</td>
<td>New Zealand</td>
<td>4</td>
<td>Facilitating peer play - Video modelling: Included: 1 - manipulating the environment to create play groups; 2 - redirecting conversation from themselves to other children; 3 - suggesting roles for children; 4 - modelling interactions and then fading participation.</td>
<td>Video modelling was associated with an increase in time spent in positive peer interactions.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hemmeter</td>
<td>2011</td>
<td>USA</td>
<td>79</td>
<td>Descriptive praise: Positive descriptive feedback about child's use of targeted social behaviours. Educator increased use of descriptive praise slightly decreased child challenging behaviour. Children's engagement did not change.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hyatt</td>
<td>2007</td>
<td>USA</td>
<td>24</td>
<td>Praise: Verbal reward for initiating positive interactions with peers or responding positively to peers. Increase use of praise was associated with increased child positive initiations with peers. Changes in negative initiations and positive responses to peers were only seen initially but did not last. There was no change in negative responses to peers.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kelley</td>
<td>2012</td>
<td>South Korea</td>
<td>-</td>
<td>Modelling &amp; mindful language: ‘Thinking aloud’ while solving problems (e.g., “I am having the hardest time with this stapler today. I wonder if Joe can help me?”) Maintaining Physical Proximity to the child to intervene. Use of different strategies were attributed to process of supporting problem solving and re-establishing calm in the ECEC environment. However, the specific components were not used individually but as part of an interaction process.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kim</td>
<td>2012</td>
<td>South Korea</td>
<td>-</td>
<td>Pre-correction: Proactive prompts before occurrence of problem. Reprimand/punishment and pre-correction was associated with higher severity of behavioural problems. No association between</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Responding to Challenging Behaviours

<table>
<thead>
<tr>
<th>Study</th>
<th>Year</th>
<th>Location</th>
<th>Sample Size</th>
<th>Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lau</td>
<td>2019</td>
<td>Singapore</td>
<td>428 32</td>
<td>Re-direction or praise with child behaviour was found.</td>
</tr>
<tr>
<td>Levine</td>
<td>2012</td>
<td>Canada</td>
<td>8 5</td>
<td>Educator-child play was associated with improved rates of compliance.</td>
</tr>
<tr>
<td>Ling</td>
<td>2013</td>
<td>USA</td>
<td>7 2</td>
<td>Interdependent group contingencies were associated with a decrease in disruptions and increase in engagement during circle time.</td>
</tr>
<tr>
<td>LoCasale-Crouch</td>
<td>2018</td>
<td>USA</td>
<td>470 183</td>
<td>During play periods positive banking time was associated with increased positive and decreased negative educator-child interactions while restricted banking time was associated with inconsistent patterns of positive and negative interactions.</td>
</tr>
<tr>
<td>McCoy</td>
<td>2017</td>
<td>USA</td>
<td>3 3</td>
<td>Both video and photo approaches were associated with increased engagement and decreased off-task behaviours. Children showed different preferences for video or</td>
</tr>
</tbody>
</table>

#### Definitions

- **Re-direction**: Verbally guiding children to desired behaviour
- **Reprimand/Punishment**: Negative statement or actions

- **General praise**: Statement or gesture that indicates approval but does not name specific behaviour
- **Behaviour-specific praise**: Statement that indicates approval and names specific behaviour, e.g., “thanks for listening”
- **Explicit reprimand**: Verbal comment or gesture that indicates disapproval of behaviour, e.g., “eyes on me”
- **Harsh reprimand**: A verbal comment or gesture using loud, harsh, sarcastic, or critical tone

- **Educator-child play**: Daily, 5-minute, one-on-one child directed play session with contingent praise, responsiveness; mirroring, creating success opportunities, acquiescence, non-directedness, and no response to problem behaviours unless posing safety risk

- **Interdependent Group Contingencies**: All children are reinforced or not (via random reward card e.g., stickers, stamps, dancing), based on the whole group meeting the criteria.

- **Banking Time**: One-on-one, 7-minute educator-play period. **Positive banking time** - observes child behaviours and expressed emotions, uses narration, labels feelings, focus on educator-child relationship. **Restricted banking time** - limits questioning, uses direct and indirect commands and focuses on teaching skills

- **Video self-modelling**: Child watches video of themself doing desired behaviour, with adult stating the targeted behaviour
- **Activity photos**: Child views photos of themself doing desired behaviour, with adult stating the targeted behaviour
### Responding to Challenging Behaviours

<table>
<thead>
<tr>
<th>Study</th>
<th>Year</th>
<th>Location</th>
<th>Participants</th>
<th>Intervention Description</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moffat</td>
<td>2011</td>
<td>New Zealand</td>
<td>1</td>
<td>Behaviour Specific Praise</td>
<td>Increased use of behaviour specific praise was associated with decreased aggressive and increased pro-social behaviours.</td>
</tr>
<tr>
<td>Murphy</td>
<td>2007</td>
<td>USA</td>
<td>8</td>
<td>Group Mystery Motivators</td>
<td>Group mystery motivators were associated with reduced disruptive behaviour.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>Integral directives</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>Deficient directive</strong></td>
<td>Compliance was highest following an embedded or integral directive prompt. &quot;Do&quot; directives resulted in higher levels of compliance than &quot;don't&quot; directives. Problem behaviour was considerably more likely to occur following a &quot;don't&quot; directive relative to other types of instructions.</td>
</tr>
<tr>
<td>Ndoro</td>
<td>2006</td>
<td>USA</td>
<td>15</td>
<td><strong>Mystery Student</strong></td>
<td><strong>Mystery Student</strong> strategy is associated with increased appropriate behaviour and reduced disruptive behaviour.</td>
</tr>
<tr>
<td>Pasqua</td>
<td>2021</td>
<td>USA</td>
<td>15-20 children per group (3 groups)</td>
<td><strong>Mystery Student</strong> Two students are randomly selected, and their identity kept secret. These students are rewarded at end of session only if they met behavioural criteria.</td>
<td><strong>Mystery Student</strong> strategy is associated with increased appropriate behaviour and reduced disruptive behaviour.</td>
</tr>
<tr>
<td>Reitman</td>
<td>2004</td>
<td>USA</td>
<td>3 (males)</td>
<td><strong>Individual contingency</strong></td>
<td>Both individual and group-based contingencies reduced disruptive and aggressive behaviours of target children. However, no change in oppositional behaviours was found and one child increased in hyperactivity during the study.</td>
</tr>
<tr>
<td>Roseth</td>
<td>2008</td>
<td>USA</td>
<td>91</td>
<td><strong>Educator intervention</strong></td>
<td>Educator intervention was more likely to result in reconciliation following a conflict between children, but also to result in children ceasing playing together.</td>
</tr>
<tr>
<td>Silkenbeumer</td>
<td>2018</td>
<td>Germany</td>
<td>28</td>
<td><strong>Emotion Coaching</strong></td>
<td>Educator co-regulation and emotion coaching was suggested.</td>
</tr>
</tbody>
</table>

**Note:** Child choice is important in application of these approaches.
### Responding to Challenging Behaviours

**Affect mirroring/validation of emotion, verbal labelling of emotion, and exploring/explaining the emotion**

**Co-regulation**

Distraction, providing an alternative view on the situation, soothing, and response modulation (stating rule, instruction, or problem solving)

- to support children's self-regulation behaviours. Educators validated and talked about emotions more often to younger children.

### Smith 2011 USA 3 3

**Pre-corrective statements**

Pre-emptively prompts/specifies desired behaviour

**Behaviour-specific praise**

A verbal comment indicating approval of student behaviour that specifies the behaviour

- Increased pre-corrective and behaviour specific praise was associated with more prosocial behaviour and less aggressive behaviour. However, the strategies were not tested separately.

<table>
<thead>
<tr>
<th>Smith</th>
<th>2011 USA 3 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-corrective statements</td>
<td>Pre-emptively prompts/specifies desired behaviour</td>
</tr>
<tr>
<td>Behaviour-specific praise</td>
<td>A verbal comment indicating approval of student behaviour</td>
</tr>
</tbody>
</table>

### Stormont 2007 USA 25 3

**Pre-correction**

Pre-emptively prompts/specifies desired behaviour

**Specific behavioural praise**

Verbal comments indicating approval of behaviour

- Pre-corrective and specific behavioural praise were associated with reduced negative behaviour in a small group setting. However, the strategies were not tested separately.

<table>
<thead>
<tr>
<th>Stormont 2007 USA 25 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-correction</td>
</tr>
<tr>
<td>Specific behavioural praise</td>
</tr>
</tbody>
</table>

### Williford 2019 USA 470 183

**Banking time**

One-on-one (10-15 minutes) educator-play periods in which educator observes child behaviours and expressed emotions, uses narration, labels feelings, focus on educator-child relationship

- Banking Time was associated with reduced child externalising behaviour.

<table>
<thead>
<tr>
<th>Williford 2019 USA 470 183</th>
</tr>
</thead>
<tbody>
<tr>
<td>Banking time</td>
</tr>
</tbody>
</table>

### Zinsser 2013 USA 277 41

**Stability**

Consistent emotional support and educator stress within the ECEC environment

- Educator stress was associated with reduced child emotional regulation, involvement, positivity, and pro-social behaviours. Stability in emotional support was associated with increased emotional regulation and productivity of children.

<table>
<thead>
<tr>
<th>Zinsser 2013 USA 277 41</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stability</td>
</tr>
</tbody>
</table>

**Note.** aNumber of ECEC centres. bThis study also tested a multi-component program - only comparison between control and praise groups are included.
Quality of evidence

Articles included in this synthesis used quantitative and qualitative research methodologies. Overall, three studies applied qualitative study designs, 25 used non-randomised quantitative studies and six applied randomised control trials. Randomised control trials are generally considered the strongest type of evidence as they can provide indication of the use of a teaching strategy being the cause of a change in children’s behaviour. However, the risk of bias and therefore the extent to which we can be certain that the findings are likely to be true will also vary across each study design.

Across the studies identified, there was large variation in the quality of evidence presented (See Table 1 and Appendix 3, 4 and 5). Using the relevant quality assessments for each study type, one study was identified as low, 16 as of some concern and 17 as high risk of bias. The higher the risk of bias the less certain we can be that the results reported in a study are likely to be true. The results of the quality of evidence assessment were considered in the synthesis and reporting of research findings.

Discussion

Strategies for responding to challenging behaviours

The identified papers provide a range of potential strategies for educators in responding to challenging behaviour in ECEC settings (Table 1). From these papers three themes, focused on the timing of response in relation educator strategy, were identified:

1. Setting the scene: relates to the educator’s actions in pre-emptively setting children’s expectations, developing skills and knowledge, and preparing the environment to respond to potential future challenges.

2. In the moment: relates to how educators respond to challenging behaviours as they occur.

3. Resetting: this less common theme relates to an educator’s action in following up on challenging behaviours after they have occurred.

Each theme and the related strategies are synthesised below. In synthesising the meaning of the findings for practice we take account of the quality of evidence for each strategy and the types of behavioural challenges for which these strategies may be best suited based on current evidence. The identified strategies are not intended as prescriptive (“a recipe for practice”) but as potential tools upon which an educator may draw in their daily practice.

Setting the scene

Evidence for four strategy types that work to avoid or reduce challenging behaviours before they occur were identified.

Strengthening relationships

The bond between children and educators can act as a protective factor for children, functioning to avert the occurrence or escalation of a challenging behaviour. Collectively, strategies that focused on strengthening educator-child relationships show reliable positive effects on the quality of interactions between children and education, but less certain effects on child behaviours. Evidence for effects of this strategy emerge from a cluster of studies focused on the banking time approach (Driscoll and Pianta, 2010; Driscoll et al. 2011; Williford et al. 2017; Alamos, Williford, and LoCasale-Crouch, 2018; LoCasale-Crouch et al. 2018) and a single study using a similar approach (Levine and Ducharme 2012).

Banking time centres around repeated short sessions of 7-15 minutes duration in which the educator and individual child engage in an activity chosen and led by the child. During this time educators are instructed to limit use of questions, commands, or praise, and instead are asked to observe, label, and narrate child-led
actions. Across all five studies of the banking time approach identified in this systematic review significant improvement in educator-child relationships was reported. However, evidence for effective reduction of problem behaviour was only reported in two studies originating from the same research group. Two studies undertaken by Driscoll and colleagues (2010, 2011), both with high risk of bias, found that banking time was associated with educator-reports of increased task orientation and tolerance of frustration and reduced conduct problems. In contrast, two subsequent studies with less risk of bias, while reporting improved educator-child relationship, do not find a reduction in conduct problems (Williford et al., 2017; Alamos et al., 2018).

The effectiveness of banking time has also been shown to be related to fidelity (i.e., how closely the educator applies the banking time strategies as instructed). Two studies have examined how the type of interactions between educators and children during banking time session influences child interactional behaviours. LoCasale-Crouch and colleague’s (2018) demonstrated that positive banking time that was consistent with the original banking time approach in which educators followed the child’s lead and focused on building educator-child relationship produced improved educator-child relationships, but this was not the case for restricted banking time in which interactions were educator-led. Similarly, Alamos et al. (2018) reports that high fidelity banking time was associated with significant gains in children’s positive engagement with the educator. However, this was only the case when comparing child-led sessions in which the educator had low engagement with the child. No difference between child-led sessions with high educator engagement and educator-led session with high educator engagement was found, suggesting that the level of engagement by the educator during banking time is critical in effecting change.

Banking time is reported to have secondary effects in two studies that employed randomised control trials. LoCasale-Crouch and colleague’s (2018) found that positive banking time practices not only increased the frequency of positive educator-child interactions in the structured play task but extended into relationships within the wider ECEC context. Williford and colleagues (2017) examined the transfer of the effects of banking time in the stressful context of transitions and found that there was a generalised reduction in reported externalising behaviour for children participating in banking time.

A similar approach to banking time is reported by Levine and Ducharme (2012) who focused on the educator-child relationship among children who displayed high levels of non-compliance. The strategy entailed the educator engaging in a daily five-minute child-led play activity, one-on-one with their educator. Educators were instructed to allow the child to take the lead and to engage in contingent praise, responsiveness, and mirroring, while avoiding directing the child with instructions that require compliance. Through altering the way educators interacted with children for these very short sessions, increased compliance was demonstrated for each child and was maintained beyond the completion of the study.

**Emotional stability**

Consistency of educator and of educator emotional support was identified by two studies as associated with the frequency of challenging behaviours. Choi et al. (2019) examined the relationship between number of educator changes experienced by children in their first two years in ECEC. They reported that children who experienced no educator changes over two years were rated as having fewer behavioural problems than children who had at least one educator change. Children who experienced fewer changes also had higher social competence compared to children who experienced two or more educator changes. Notably, this study found that the impact of multiple educator changes may be partially attenuated by high-quality educator interaction. Specifically, Choi et al. (2019) found that for children who had two or more educator changes, higher concurrent emotional-behavioural support in ECEC settings predicted lower problem behaviours and higher social competence. Consistent with this finding, Zinsser et al. (2013) showed that emotionally supportive educator interactions were significantly associated with lower levels of problem behaviour in ECEC and identified the importance of consistency of educator behaviour. Inconsistent emotional support, even if positive, on average, was associated with increased child aggression and negative emotion. Educator stress was associated with reduced child emotional regulation, involvement, positivity, and pro-social behaviours.
Both studies have some levels of concern about bias but are consistent in identifying emotional context within interactions in ECEC as salient. They identify a promising systemic focus on staffing, and staff wellbeing, that warrants further investigation.

**Building children’s knowledge and skills**

Educators can also facilitate positive relationships between peers. Educators in ECEC are well placed to provide social and emotional learning opportunities to support positive behaviour and avert conflict. Five studies were identified that specifically focused on educator strategies for providing children with skills and knowledge to promote and enact positive behaviours. These used a variety of stimuli comprising video, photographs, stories and in the moment experiences to support instructional strategies.

The use of visual modelling via video and/or photos was examined in two studies. These had high risk of bias, small sample sizes and reported mixed findings (McCoy et al. 2017; Green et al. 2013). McCoy et al. (2017) directed educators to watch a video or view an activity photo with a child that showed the child engaging in desired behaviours while the educator named the target behaviour. This study showed that both video and photo approaches were associated with increased engagement and decreased off-task behaviours. However, different children showed different preferences and responses for video or activity photos, suggesting that child choice is important in application of these approaches. Green et al. (2013) showed videos of peers successfully initiating play interactions to four target children. Some evidence of an increase in positive social interactions following video viewing were reported, but the results were only consistent for two of the four children observed. The study raises questions about the value of a purely skills-based video strategy and of model children compared with self-focus.

The use of story prompted conversations with children to build knowledge of behaviour and emotions was examined in two studies. While one of these studies (Benish and Bramlett, 2011) had high risk of bias the other (Brazelli, Grazzani, and Pepe, 2021) was more reliable. Benish and Bramlett (2011) tested the use of social stories in a small number of children to support implementation of desired behaviours. Social stories are short, simple sorties, written from the perspective of the child, that delivers instruction on appropriate social behaviours. This small study of three children found that target children who were provided with social stories showed increased positive peer interactions. Brazelli et al. (2021) conducted story book prompted conversations focused on inner states (e.g., needs and emotions) and pro-social actions. This study focused specifically on children aged 2-3 years and found that those who participated in story prompted conversations with their educators showed an increase in empathic and pro-social behaviour, helping, sharing, and comforting toward others whilst in ECEC.

Direct strategies focused on supporting children to understand and regulate their own emotions and behaviour were examined in one small study on three children (Drogan and Kern, 2014) in which they tested the “turtle technique”. The technique comprises four steps: (1) Stop – the child stops behaviour or interaction and holds up palm of hand; (2) Go into Shell – the child puts head down, places hands/arms across chest or holds hands or arms, curls into ball and/or crouches; (3) Deep breath; and (4) Calm/Think. The study reported that implementation of the turtle technique was associated with reduced negative behaviour (e.g., non-compliance, grabbing toys or peers, physical/verbal outbursts). However, interestingly, while children were found to reduce negative behaviours following application of this strategy, children were not actively observed applying the turtle technique steps in practice, suggesting that knowledge of the process, as appose to enactment, may be important in reducing negative behaviours.

One study of strategies focused on strengthening peer relationships showed reliable positive effects (Girard et al. 2011). Girard et al. (2011) asked educators to observe play groups and suggest ways to facilitate more positive peer interactions, such as modelling interactions and altering children’s self-focused conversations to include other children. Significant gains in prosocial behaviour were demonstrated, resulting in more positive play interactions and reduced aggression.
Setting expectations

Setting expectations about desired or acceptable behaviours has been examined through studies of instructions or prompts provided by an educator, termed pre-corrective statements. A total of seven papers examined pre-corrective strategies. However, due to the combination of pre-correction with other reinforcements strategies (see Reinforcing section below), including behavioural specific praise (Smith, Lewis, & Stormont, 2011; Stormont et al. 2007) and contingencies (Ling and Barnett, 2013; Reitman et al. 2004; Murphy et al. 2007; Pasqua et al. 2021), the extent to which the outcomes reported for these studies are due to the use of pre-corrective statements, or the delivery of verbal or physical reinforcement in response to a desired behaviour, cannot be determined from these studies.

In the moment

Four strategy types aimed at supporting children to comply with instructions or directions, engage in positive behaviours, or to stop or reduce challenging behaviours during interactions in ECEC were identified.

Directing and re-directing

Variation in the approaches an educator used in delivering instructions to direct or re-direct children were significantly associated with child behaviour. Studies examined the use of verbal and non-verbal instructional strategies were examined across four studies, of which all but one (Cekaite & Bergnehr; 2018) was identified as high risk of bias. Focusing on the clarity of educator’s verbal instruction, Ndoro et al. (2006) found that children were more compliant when educators were explicit in their instruction regarding the action they wanted completed or terminated. In contrast, compliance was less likely if instructions were not clear or were related to what educators did not want students to do (i.e., “don’t” instructions).

Combining educator instruction with child attention cues, Dufrene and colleagues (2012) evaluated a training method for re-directing children’s disruptive behaviours through use of Effective Instruction Delivery (EID) strategies. EID is a multiple step process in which educators are instructed to (1) solicit eye contact, (2) praise child for eye contact, (3) issues directives, (4) remain within three feet (about a metre) of a child; (5) use descriptive wording in instruction; (6) wait 5 seconds for the child to comply with instruction prior to reissuing instruction, and (7) praise the child for compliance. Dufrene and colleagues (2012) found that increased use of praise and EID was associated with a reduction in children’s disruptive behaviours. However, as the specific components of EID and praise statements were not examined individually whether one or both elements, and what elements if any of the EID approach were associated with behavioural change cannot be determined from this paper. Indeed, in relation to the EID approach of ‘soliciting eye contact’, Beaulieu and colleagues (2012) showed in their study that eye contact was not critical for compliance. This study examined the extent to which children stopping and/or looking at their educator after a name-call increased their likelihood of complying with their educator’s instruction. Children were less likely to follow instructions if they neither stopped nor looked at their educator after name-call and educator-instruction. However, children were as equally likely to comply regardless of whether they responded with action (stop) or vision (look) or both, suggesting any response is sufficient.

The use of non-verbal educator responses was examined by Cekaite and Bergnehr (2018) in their study examining the use of different types of educator-child touch for relationship-building, child comfort and attachment in behaviour management. They found that affectionate controlling touch (e.g., gently placing a hand on a child’s back to direct them) can be used by educators to soften or mitigate disciplining talk or to successfully control and direct children toward a desired activity. Likewise, sustained affectionate controlling touch may be useful in re-orienting children to a desired activity, or to protect children from a potentially dangerous situation. While short affectionate-controlling touches were useful in directing children’s attention.
Reinforcing

Strategies identified that were aimed at reinforcing or encouraging the use of children’s positive or desired behaviours include the use of praise statements and application of different types of material or activity-based rewards for desired behaviours.

Two types of praise statements have been examined as strategies to re-enforce desired behaviours of children in ECEC. General or non-specific praise refers to verbal statements or gestures that indicate approval for desired behaviour, but do not name the specific behaviour being praised (e.g., “good job”). Behaviour specific praise (also known as descriptive and specific-behavioural praise) are verbal statements that indicate approval and name the specific behaviour being praised (e.g., “thanks for putting away your books”). The findings for praise are mixed and primarily based on small sample sizes and of high risk of bias. However available evidence suggests that behaviour-specific praise statements are more effective for increasing pro-social behaviour and decreasing anti-social behaviour than general praise statements.

Two studies examine generalised praise, Hyatt and Filler (2007) instructed educators to provide verbal praise following a positive initiation or response to a peer. Verbal praise was associated with limited long-term improvement to children’s behaviour. While praise was associated with improved positive initiations with peers across time, reduction in negative initiations and positive responses were not sustained. Furthermore, there was no difference in negative responses to peers resulting from the praise intervention either at time of training or at follow up. Lau, Moore, and Anderson (2019) and Kim and Stormont (2012) identified no association between reports of use of praise by educators in ECEC and reported child behaviours.

Four studies examined the use of behavioural specific praise. Hemmeter et al. (2011) reported that three of the four educators in their study indicated notable decreases in children’s challenging behaviour after increasing their use of descriptive praise. Similarly, Moffat (2011) reported that behaviour-specific praise was associated with both increased pro-social behaviour and decreased negative or aggressive behaviours of a single child in ECEC. Two further studies (Smith et al. 2011; Stormont et al. 2007) examined the use of behaviour specific praise in conjunction with pre-corrective statements. While reported outcomes were increased pro-social behaviour and reduced aggression (Smith et al. 2011) and reduced negative behaviour in small group settings (Stormont et al. 2007) the individual effect of descriptive praise is difficult to discern, as pre-corrective and behavioural specific praise strategies were examined together.

Rewarding

Rewards, in contrast to praise statements that occur directly following a desired behaviour, typically include both a pre-correction stage, in which children are provided clear instructions on the expectations for behaviour and contingent reward for compliance, and a re-enforcement stage in which children receive a verbal and/or non-verbal reward upon compliance. The use of material or activity-based rewards and the specific ways in which these approaches are applied have been evaluated across four studies.

Two small studies evaluated the use of interdependent group reward contingency procedures (Murphy et al. 2007; Ling and Barnett, 2013). Interdependent group contingencies are rewards in which all children within a group are responsible for compliance with expectations and receipt of reward is to the group. For both studies, appropriate behaviours were discussed with the group. If each individual student (Murphy et al. 2007) or the group (Ling and Barnett, 2013) displayed fewer than a baseline number of disruptions or problem behaviours, the group ‘as a whole’ were allowed to select a mystery or random reward (e.g., physical rewards such as stickers, or group rewards such as participating in fun games or activities). Results indicated fewer incidents of disruptive behaviour (Murphy et al. 2007) or children’s disengagement (Ling and Barnett, 2013) after implementation of the mystery motivator.

While studies applying group reward contingencies indicated some positive effects, findings for those applying individual contingencies, focused on an individual child, are mixed. Pasqua et al. (2021) implemented a ‘mystery student intervention’ whereby educators openly chose two ‘mystery’ students from the group. If mystery students exhibited at least 60% appropriately engaged behaviour, they would be
publicly revealed and offered a reward. Conversely, if the mystery child did *not* reach the baseline behaviour, the educator would not reveal their identity, but would tell the group that the ‘mystery student’ had not been behaving appropriately. To assess the extent to which this activity improved individual child behaviour, three children with behavioural concerns were identified. Preliminary findings showed that the target students increased appropriately engaged behaviours and reduced disruptive behaviours after implementing the mystery student strategy within the group. Similarly, in a small study Reitman et al. (2004) asked educators to select ‘star’ students at the beginning of a learning session. ‘Stars’ were required to announce rules, together with rewards for compliance. The behaviour of ‘star’ children was monitored, children were provided feedback (e.g., “Good job standing quietly in line” or “you have lost a level for not listening”) and given the opportunity to recover any points lost due to inappropriate behaviour. Three target children from the group were chosen to assess the extent to which this activity improved individual child behaviour. Overall, the study showed that the strategy reduced problem behaviours (e.g., physical aggression or disruptive behaviour) among the study children. Importantly, however, this activity was not successful in reducing oppositional behaviours, and one target child increased in hyperactivity during the intervention. Of note, this study specifically includes a negative reinforcement component where points are removed for non-compliance or negative behaviour.

Negative reinforcement approaches are not supported in current evidence. Indeed, two studies from the current review (Kim and Stormont, 2012; Lau et al. 2019), report that reprimands and/or punishments are associated with increased severity of problem behaviours. However, these studies do not determine if reprimand/punishment leads to increased severity of behavioural problems, or if educators are more likely to use these strategies when the behavioural problems in their ECEC settings are more severe.

**Resolving**

In ECEC settings educators can play an important role in supporting children to find solutions to challenging situations and to resolve conflicts. A range of strategies varying the educator’s intervention in resolution or in emotional regulation have been examined.

Two studies examined variation in the degree of educator intervention in conflict resolution (Roseth et al. 2008; Church, Mashford-Scott, and Cohrssen, 2018). Both examined the effect of educators *directly* implementing a solution, compared with *working with and supporting* children to achieve resolution. Church et al. (2018) found that when educators invoked a solution to a conflict, children were less likely to adopt the proposed solution compared to when educators supported children to brainstorm a solution to the conflict themselves. Roseth et al. (2008) compared child resolution outcomes when educators either did not intervene or intervened *directly* (instructed children to with a solution) or *indirectly* (helping children resolve the conflict). Direct or indirect intervention were not measured separately. Findings suggested that children were less likely to remain in proximity and recommence calm interaction together and more likely to separate post-conflict when an educator intervened. However, reconciliation post-conflict was overall more likely *after* educator intervention.

Interpersonal intervention strategies have also been shown to be important for supporting children’s emotional self-regulation behaviours. Silkenbeumer and colleagues (2018) identified that educators’ co-regulation behaviours and emotion coaching supported children’s behavioural regulation. Similarly, Kelley (2018) observed the use of a broad range of educator intervention strategies aimed at supporting child problem-solving, regulating child behaviour, and maintaining and establishing calm within the ECEC environment. They found that the use of these *multiple* strategies supported children’s problem-solving skills, self-regulation, and ability to re-establish calm in the environment. It is important to note, however, that specific components were not used or tested individually, but were observed as a broad interaction process.

**Resetting**

Following a challenging behaviour, two key strategies with aim of reducing future challenging behaviours have been examined.
Responding to Challenging Behaviours

Revisiting

While strategies for redirection and reinforcement typically occur during or immediately following a challenging behaviour or event, these times are not always suited to extended discussions regarding the behaviour and its consequences. Carpenter and Nangle (2002) in their study focused on aggressive behaviours, instead instructed an educator to undertake delayed one-on-one conversations at a point removed from the time of behavioural aggression. These conversations focused on teaching three concepts: (1) aggression hurts and upsets others, (2) aggression does not solve problems and causes resentment, and (3) positive ways to solve conflicts (e.g., sharing, taking turns). Following these conversations, children showed increased pro-social and positive behaviours and some evidence of reduced negative behaviours (e.g., crying, noncompliance). However, no change in externalising behaviours was found.

Reflecting

While not directly tested in the current evidence, several studies highlight the importance of educators reflecting on and being responsive to individual differences in children’s development (e.g., Silkenbeumer et al. 2018), preferences (e.g., McCoy et al. 2017; Ndoro et al. 2006) and the interactional context (e.g., Roseth et al. 2008; Cekaite and Bergnehr, 2018). Collectively, the body of studies indicate that not all strategies work for all children, and different strategies are effective in responding to some, but not all types of challenges presented within the context of ECEC. Reflection on the type of challenge that is being addressed, the individual context of child and environment and prior responses to application of strategies is therefore likely to be an important consideration.

Conclusion

The current research provides evidence of a range of strategies that can be used by early childhood educators to respond to challenging behaviours with young children aged 2-5 years. It is important to acknowledge that these studies are of varying quality and focus on the efficacy of these strategies within a specific context and in response to a range of different behavioural challenges. These strategies are not intended to be prescriptive but serve as tools to be drawn on by educators to respond to the specific challenges and contexts.

Collectively the results identify some key strategies for ECEC educators that are effective in reducing the occurrence of challenging behaviours, averting re-occurrence, and improving positive behaviours within three points of intervention. In setting the scene establishing a positive relationship with the child and maintaining stable relationships engender positive change while supporting the child’s knowledge and skills and providing clear expectations reduce the likelihood of a behavioural challenge. In the moment, specific praise to encourage positive behaviours, and engaging the child/ children in the process of problem resolution are effective strategies. There is less evidence that reward systems are effective. In resetting after encounter of a challenge event, taking the opportunity to provide instruction beyond the point of conflict provides the child opportunity to learn at a point removed from the emotion of the moment and affords the educator opportunity to reflect on strategies as part of their teaching and planning cycle.

Finally, we note the limits of this study. The current review is limited within the bounds of our inclusion criteria. Thus, strategies to respond to challenging behaviours with younger children (<2 years) are not comprehensively covered. In addition, this review is focused on common, low to mid-level behaviours and therefore may not be applicable in circumstances where children have specific diagnosed conditions. Strategies for responding to challenging behaviours in children with diagnosed conditions should be determined in partnership with health professional, learning support specialists and families.
References

General


Included papers


Appendices

Appendix 1. Systematic Review Protocol

Methods:

To comply with international standards, a full protocol for this systematic review, consistent with Preferred Reporting Items for Systematic Reviews and Meta-Analyses Guidelines (PRISMA) guidelines will be developed. The protocol for this systematic review will be prospectively registered via Prospero.

Population (P) - Types of participants

Inclusion:
- Educators working in ECEC settings including stand-alone kindergartens, long day cares and similar registered service provisions for children 2-5 years.
- Children aged 2-5 years attending ECEC service.
- Participants (educators and children) of all genders, geographical locations, socioeconomic status, or ethnic group.

Exclusion:
- Educators working in environments and services outside of the ECEC setting, including schools, allied health settings and/or behavioural units.
- Children who have entered compulsory schooling, typically aged 5-6 years or above.
- Children below 2 years of age.
- Other allied health or educational specialists (i.e. psychologists, learning support staff, or researchers) or parents/carers.

Intervention (I)

Inclusion:
- Early childhood educator focused programs and strategies aimed at supporting educators in responding to challenging behaviours with young children aged 2-5 years, in ECEC settings.
- Strategies may include both formal (programmatic) approaches and less formal approaches.
- Strategies used within a defined intervention program will only be considered for inclusion where the strategies are (1) clearly described, (2) differentiated from within the broader program and (3) can be reasonably assumed to be the basis of any assessed effect of the program implementation.

Exclusion:
- Strategies and programs developed for children with specific learning of behavioural difficulties, such as attention-deficit/hyperactivity disorder, oppositional defiant disorder, autism spectrum disorder; intellectual disability.
- Strategies and programs focusing on interventions for other areas of teaching practice (e.g. language development, executive functioning), where challenging behaviours are not a component of the intervention.
- Strategies specifically focused on "self-regulation" skills (e.g. executive functioning focused programs), unless the outcome assessed is specifically focused on children’s behaviours (e.g. social
While self-regulation is likely to underpin some aspects of behavioural challenges seen in the ECEC setting, the key focus of this review is specifically on evidence for addressing the behavioural expressions of these challenges. A systematic review of evidence for strategies to support self-regulation is currently being undertaken separately by EEF.

Comparison or control (C)
- Where appropriate, control groups will include, but not limited to, those a) not exposed to a program or strategy (e.g., control group without program exposure; absence of use of strategy), b) active control group where comparison is to exposure to other types of strategies or programs (e.g. positive versus negative reinforcement), c) wait-list control (for specific program implementation).

Outcomes (O) - Types of outcome measures

Inclusion:
- The focus is on common, low to mid-level behaviours that can be deescalated or redirected within the room by an educator, and or educator team (teacher and assistant), and foundational behaviour management techniques and teaching strategies.
- Challenging behaviours: including externalizing (e.g., conduct problems, problems of attention, disruption) and internalising (e.g., peer problems, emotional difficulties) type behaviours.
- Child level outcomes: including decreased quantity (e.g., number, duration) or quality (e.g., intensity, type) of challenging behaviours and/or increased occurrence of pro-social behaviours.
- ECEC level outcomes: including decreased quantity (e.g., number, duration) or quality (e.g., intensity, type) of challenging behaviours and/or increased occurrence of pro-social behaviours.
- Outcomes based on direct observation of interactions (e.g., via in-situ standard observations, direct field notes, video and/or audio recording of interactions), educator report or direct child-assessments within the ECEC setting will be considered.

Exclusion:
- Outcomes based on report measures or assessment outside the ECEC context, i.e. parent report, allied health conducted child assessments.

Types of studies
The following study designs will be included:
- Intervention studies, including randomised and non-randomised control trials and controlled clinical trials.
- Observational studies, including panel, cohort, and case-control studies.
- Cross-sectional studies.
- Case studies.
- Qualitative studies.

Search strategy
All peer-reviewed journal articles published in full-text in English within the last two decades (2000-2022) will be included. This date range has been selected to ensure that strategies identified are more likely to be consistent with contemporary pedagogy.

Searches will be performed using the following data sources:
The following search terms will be used for database search:

Detailed search strategies for each of the databases will be based on the following search strategy for ERIC:

(Teacher* OR Educator* OR Carer* OR Staff*) AND (Behav* OR Social* OR Emotion* OR Internal* OR External*) AND (Problem* OR Difficult* OR Challeng* OR Disrupt* OR Aggress* OR conduct OR Tantrum* OR Withdraw* OR Bully*) AND (Intervention* OR Program* OR Strateg* OR Support* OR approach* OR Manage*) AND ("Early Education" OR "Early Years" OR "Child care" OR "Preschool" OR "Early Childhood" OR "Pre-School" OR "Kindergarten" OR "pre-K")

Limits applied [Peer reviewed, 080: Journal Articles, Language: English, Education level: Early childhood education, Kindergarten, Preschool education, Date limits: 2000 to 2022]

The ERIC strategy will be adapted for other databases, considering the indexing terms and syntax of each database searched.

Data collection and analysis

Selection of studies

Review authors will review the title and abstract of published articles, research papers and findings based on the selection criteria independently. After the title and abstract review, full-text versions of relevant studies will be obtained and each reviewer will examine the details of each to determine if they meet the pre-determined criteria. Reviewers will confer with each other to determine the final list of articles. Disagreement will be resolved via discussion and consensus method, and where necessary with the involvement of additional members of the research team. In the case of a potentially relevant study being excluded, the rationale for this decision will be documented.

Data extraction and management

Data will be extracted from all studies deemed to meet the inclusion criteria for the review and will be entered into a data extraction form.

We will extract data on:

- Publication characteristics (author, title, year of publication, journal name, type [original research, review paper]).
- Study characteristics (country, number of participants, outcome measures, setting [long day care, kindergarten]).
- Study design (randomised or non-randomised control trial, clinical trial, cohort, experimental, quasi-experimental, case-control, cross-sectional, qualitative, case reports).
- Participant characteristics (age range, mean age, ratio male/female, socio-economic status).
- Strategy or program characteristics (format, content, duration).
- Analysis type.
- Outcome variables including negative and positive outcomes related to children, educators, and groups.
- Results and conclusions (what they found and what conclusion could be drawn).

Assessment of risk of bias in included studies

Risk of bias will be assessed by the Cochrane risk of bias assessment tool. Qualitative studies extracted for review will be assessed by the Critical Appraisal Skills Programme (CASP) Qualitative Research Critical Appraisal Checklist. Two reviewers will independently rate a 20% sample of studies based on the relevant Cochrane or CASP tools and inter-rater reliability will be assessed. Any disagreements that arise will be addressed via a consensus method between the two reviewers. If they are unable to come to a mutual conclusion, the matter will be discussed and resolved with another reviewer.

Reporting

Results of the systematic review will be presented in the form of an easily read and understood report and executive summary with summary of strategies tested and indication of the strength of evidence for each. The results will also inform the development of insights and resources to support ECEC educators in responding to challenging behaviours in children 2-5 years.
## Appendix 2. Systematic Review Detailed Search Terms

<table>
<thead>
<tr>
<th>Database Search</th>
<th>Search Term</th>
<th>Number Returned</th>
</tr>
</thead>
<tbody>
<tr>
<td>ERIC (via Proquest)</td>
<td>ab OR su OR ti ((Teacher* OR Educator* OR Carer* OR Staff*) AND (Behav* OR Social* OR Emotion* OR Internal* OR External*) AND (Problem* OR Difficult* OR Challenge* OR Disrupt* OR Aggress* OR conduct OR Tantrum* OR Withdraw* OR Bully*) AND (Intervention* OR Program* OR Strateg* OR Support* OR approach* OR Manage*) AND (&quot;Early Education&quot; OR &quot;Early Years&quot; OR “Child care” OR “Preschool” OR “Early Childhood” OR “Pre-School” OR “Kindergarten” OR “pre-K”))  <strong>Limits applied</strong> - Limited by: Peer reviewed; Document type: 080 Journal Articles, 080: Journal Articles; Language: English; Education level: Early childhood education, Kindergarten, Preschool education; Date Range 2000-2022</td>
<td>880 (downloaded)</td>
</tr>
<tr>
<td>ProQuest - Education Collection</td>
<td>ab OR su OR ti((Teacher* OR Educator* OR Carer* OR Staff*) AND (Behav* OR Social* OR Emotion* OR Internal* OR External*) AND (Problem* OR Difficult* OR Challenge* OR Disrupt* OR Aggress* OR conduct OR Tantrum* OR Withdraw* OR Bully*) AND (Intervention* OR Program* OR Strateg* OR Support* OR approach* OR Manage*) AND (&quot;Early Education&quot; OR &quot;Early Years&quot; OR “Child care” OR “Preschool” OR “Early Childhood” OR “Pre-School” OR “Kindergarten” OR “pre-K”)) <strong>Limits applied</strong> - Limited by: Peer reviewed; Date: From 2000 to 2022; Source type: Scholarly Journals; Document type: Article; Language: English; Narrowed by: Database: Education Collection; Document type: Article; Subject: preschool children; early childhood education; preschool teachers; kindergarten; child care</td>
<td>1436 (downloaded)</td>
</tr>
<tr>
<td>PsycINFO &amp; PsycArticles</td>
<td>Abstract/Keywords/Journal Title: (Teacher* OR Educator* OR Carer* OR Staff*) AND (Behav* OR Social* OR Emotion* OR Internal* OR External*) AND (Problem* OR Difficult* OR Challenge* OR Disrupt* OR Aggress* OR conduct OR Tantrum* OR Withdraw* OR Bully*) AND (Intervention* OR Program* OR Strateg* OR Support* OR approach* OR Manage*) AND (&quot;Early Education&quot; OR &quot;Early Years&quot; OR “Child care” OR “Preschool” OR “Early Childhood” OR “Pre-School” OR “Kindergarten” OR “pre-K”)  <strong>AND Age</strong></td>
<td>872 (downloaded)</td>
</tr>
</tbody>
</table>

Scopus (select journals only1) TITLE-ABS- KEY ( ( teacher* OR educator* OR carer* OR staff* ) AND ( behav* OR social* OR emotion* OR internal* OR external* ) AND ( problem* OR difficult* OR challeng* OR disrupt* OR aggress* OR conduct OR tantrum* OR withdraw* OR bully* ) AND ( intervention* OR program* OR strateg* OR support* OR approach* OR manage* ) AND ( "Early Education" OR "Early Years" OR "Child care" OR "Preschool" OR "Early Childhood" OR "Pre-School" OR "Kindergarten" OR "pre-K" ) ) AND ( LIMIT-TO ( SRCTYPE , "j" ) ) AND ( LIMIT-TO ( SUBJAREA , "PSYC" ) OR LIMIT-TO ( SUBJAREA , "SOCI" ) OR LIMIT-TO ( SUBJAREA , "ARTS" ) ) AND ( LIMIT-TO ( DOCTYPE , "ar" ) ) AND ( LIMIT-TO ( PUBYEAR , 2000-2022 ) AND ( EXCLUDE ( EXACTSRCTITLE [List provided in footnote1] ) AND ( LIMIT-TO ( PUBSTAGE , "final" ) ) AND ( EXCLUDE ( EXACTKEYWORD , "Adolescent" ) OR EXCLUDE ( EXACTKEYWORD , "Major Clinical Study" ) OR EXCLUDE ( EXACTKEYWORD , "Middle Aged" ) OR EXCLUDE ( EXACTKEYWORD , "Young Adult" ) )

Total 4050 (downloaded)

1 Journals excluded where focus of journals is on clinical conditions, special needs education or disability.
## Appendix 3. CASP Qualitative Research Critical Appraisal Checklist

<table>
<thead>
<tr>
<th>Author (Date)</th>
<th>Was there a clear statement of the aims of the research?</th>
<th>Is a qualitative methodology appropriate?</th>
<th>Was the research design appropriate to address the aims of the research?</th>
<th>Was the recruitment strategy appropriate to the aims of the research?</th>
<th>Was the data collected in a way that addressed the research issue?</th>
<th>Has the relationship between researcher and participants been adequately considered?</th>
<th>Have ethical issues been taken into consideration?</th>
<th>Was the data analysis sufficiently rigorous?</th>
<th>Is there a clear statement of findings?</th>
<th>Overall Rating</th>
<th>Some concerns</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cekaite 2018</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Can't Tell</td>
<td>No</td>
<td>Yes</td>
<td>Can't Tell</td>
<td>Can't Tell</td>
<td>Can't Tell</td>
<td></td>
<td>Some concerns</td>
</tr>
<tr>
<td>Church 2018</td>
<td>Yes</td>
<td>Can't Tell</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Can't Tell</td>
<td>Yes</td>
<td></td>
<td>Some concerns</td>
</tr>
<tr>
<td>Kelley 2018</td>
<td>Yes</td>
<td>Yes</td>
<td>Can't Tell</td>
<td>Yes</td>
<td>Can't Tell</td>
<td>Can't Tell</td>
<td>Can't Tell</td>
<td>No</td>
<td>No</td>
<td></td>
<td>Some concerns</td>
</tr>
</tbody>
</table>
### Appendix 4. Cochrane Risk of Bias Assessment Tool (Randomised Studies: ROB-2)

<table>
<thead>
<tr>
<th>Author (Date)</th>
<th>Domain 1: Randomisation</th>
<th>Domain 2.1: Intervention (assignment)</th>
<th>Domain 2.2: Intervention (adherence)</th>
<th>Domain 3: Missing outcomes</th>
<th>Domain 4: Measurement outcomes</th>
<th>Domain 5: Selected reporting</th>
<th>Other sources of bias</th>
<th>Overall Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alamos 2018</td>
<td>Low</td>
<td>Some concerns/ Unsure</td>
<td>Low</td>
<td>Low</td>
<td>Some concerns/ Unsure</td>
<td>Some concerns/ Unsure</td>
<td>Low</td>
<td>Some concerns</td>
</tr>
<tr>
<td>Brazzelli 2021</td>
<td>Low</td>
<td>Low</td>
<td>N/A</td>
<td>Low</td>
<td>Low</td>
<td>Some concerns/ Unsure</td>
<td>N/A</td>
<td>Some concerns</td>
</tr>
<tr>
<td>Driscoll 2010</td>
<td>High</td>
<td>High</td>
<td>Low</td>
<td>High</td>
<td>High</td>
<td>Some concerns/ Unsure</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Girard 2011</td>
<td>Low</td>
<td>Some concerns/ unsure</td>
<td>Some concerns/ unsure</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Some concerns</td>
</tr>
<tr>
<td>LoCasale-Crouch 2018</td>
<td>Low</td>
<td>Some concerns/ Unsure</td>
<td>Some concerns/ Unsure</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Some concerns</td>
</tr>
<tr>
<td>Williford 2017</td>
<td>Low</td>
<td>Low</td>
<td>Some concerns/ Unsure</td>
<td>Some concerns/ Unsure</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Some concerns</td>
</tr>
</tbody>
</table>
## Appendix 5. Cochrane Risk of Bias Assessment Tool (Non-randomised studies: ROBINS-I)

<table>
<thead>
<tr>
<th>Author (Date)</th>
<th>Domain 1: Confounding</th>
<th>Domain 2: Selection</th>
<th>Domain 3: Classification of interventions</th>
<th>Domain 4: Deviations from interventions</th>
<th>Domain 5: Missing data</th>
<th>Domain 5: Measurement of outcomes</th>
<th>Domain 6: Selected reporting</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beaulieu 2012</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Benish 2011</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
<td>Some concerns/unsure</td>
<td>Low</td>
<td>Some concerns</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Carpenter 2002</td>
<td>Some concerns/Unsure</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Some concerns</td>
<td></td>
</tr>
<tr>
<td>Choi 2019</td>
<td>Some concerns/Unsure</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Some concerns/unsure</td>
<td>Low</td>
<td>Some concerns/Unsure</td>
<td></td>
</tr>
<tr>
<td>Driscoll 2011</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Some concerns/unsure</td>
<td>Low</td>
<td>Some concerns</td>
</tr>
<tr>
<td>Drogan 2014</td>
<td>Some concerns/Unsure</td>
<td>Some concerns/Unsure</td>
<td>High</td>
<td>Low</td>
<td>Some concerns/Unsure</td>
<td>Some concerns/Unsure</td>
<td>Some concerns/Unsure</td>
<td>High</td>
</tr>
<tr>
<td>Dufrene 2012</td>
<td>High</td>
<td>Some concerns/Unsure</td>
<td>Low</td>
<td>Low</td>
<td>High</td>
<td>High</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Green 2013</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>High</td>
<td>Some concerns/unsure</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Author (Date)</td>
<td>Domain 1: Confounding</td>
<td>Domain 2: Selection</td>
<td>Domain 3: Classification of interventions</td>
<td>Domain 4: Deviations from interventions</td>
<td>Domain 5: Missing data</td>
<td>Domain 5: Measurement of outcomes</td>
<td>Domain 6: Selected reporting</td>
<td>Overall</td>
</tr>
<tr>
<td>---------------</td>
<td>-----------------------</td>
<td>--------------------</td>
<td>----------------------------------------</td>
<td>---------------------------------------</td>
<td>-----------------------</td>
<td>---------------------------------</td>
<td>--------------------------</td>
<td>---------</td>
</tr>
<tr>
<td>Hemmeter 2011</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
<td>Some concerns/unsure</td>
<td>High</td>
<td>Some concerns/unsure</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Hyatt 2007</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Some concerns/unsure</td>
<td>Low</td>
<td>Some concerns/unsure</td>
<td>Low</td>
<td>Some concerns</td>
</tr>
<tr>
<td>Kim 2012</td>
<td>Some concerns/unsure</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Some concerns/unsure</td>
<td>Low</td>
<td>Some concerns</td>
</tr>
<tr>
<td>Lau 2019</td>
<td>Some concerns/unsure</td>
<td>NA</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Some concerns</td>
</tr>
<tr>
<td>Levine 2013</td>
<td>Some concerns/unsure</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>Some concerns</td>
<td>High</td>
</tr>
<tr>
<td>Ling 2013</td>
<td>Some concerns/unsure</td>
<td>Low</td>
<td>Low</td>
<td>High</td>
<td>Low</td>
<td>Some concerns/unsure</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>McCoy 2017</td>
<td>High</td>
<td>Low</td>
<td>Some concerns/unsure</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Moffat 2011</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Some concerns/unsure</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Author (Date)</td>
<td>Domain 1: Confounding</td>
<td>Domain 2: Selection</td>
<td>Domain 3: Classification of interventions</td>
<td>Domain 4: Deviations from interventions</td>
<td>Domain 5: Missing data</td>
<td>Domain 5: Measurement of outcomes</td>
<td>Domain 6: Selected reporting</td>
<td>Overall</td>
</tr>
<tr>
<td>--------------</td>
<td>------------------------</td>
<td>---------------------</td>
<td>------------------------------------------</td>
<td>----------------------------------------</td>
<td>------------------------</td>
<td>---------------------------------</td>
<td>-----------------------------</td>
<td>---------------</td>
</tr>
<tr>
<td>Murphy 2007</td>
<td>Some concerns/unsure</td>
<td>Low</td>
<td>Low</td>
<td>Some concerns/unsure</td>
<td>Low</td>
<td>Low</td>
<td></td>
<td>Some concerns</td>
</tr>
<tr>
<td>Ndoro 2006</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Some concerns/unsure</td>
<td>Some concerns/unsure</td>
<td>High</td>
</tr>
<tr>
<td>Pasqua 2021</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Some concerns</td>
</tr>
<tr>
<td>Reitman 2004</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Some concerns/unsure</td>
<td>Some concerns/unsure</td>
<td>High</td>
</tr>
<tr>
<td>Roseth 2008</td>
<td>Low</td>
<td>Low</td>
<td>Some concerns/unsure</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Some concerns</td>
</tr>
<tr>
<td>Silkenbeumer 2018</td>
<td>High</td>
<td>Some concerns</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Some concerns</td>
<td>Some concerns</td>
</tr>
<tr>
<td>Smith 2011</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
<td>Some concerns</td>
<td>Low</td>
<td>High</td>
<td>Some concerns</td>
<td>High</td>
</tr>
<tr>
<td>Stormont 2007</td>
<td>Some concerns</td>
<td>High</td>
<td>Some concerns</td>
<td>Some concerns</td>
<td>Some concerns</td>
<td>Low</td>
<td>Some concerns</td>
<td>Some concerns</td>
</tr>
<tr>
<td>Zinsser 2013</td>
<td>Low</td>
<td>Low</td>
<td>Some concerns</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Some concerns</td>
<td>Some concerns</td>
</tr>
</tbody>
</table>
Contact details

Dr Sally Staton and Professor Karen Thorpe
E  s.staton@uq.edu.au; k.thorpe@uq.edu.au
W uq.edu.au

CRICOS Provider Number 00025B