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Teachers' Perceptions of an Early Intervention Coaching Program

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Abstract

Objectives Inclusive preschools appear to be logical settings for the delivery of early intervention for young autistic children. Regular preschool teachers may also be well-suited to delivering early intervention. This study is part of a larger study, in which three preschool teachers participated in a coaching program based around the Early Start Denver Model (ESDM), a promising early intervention model for young autistic children. The aim of the present study was to evaluate teachers' perceptions regarding the social validity of the coaching program and the ESDM techniques.

Methods A quantitative questionnaire and semi-structured qualitative interviews were used to explore teachers' perceptions of the acceptability and effectiveness of the intervention. Quantitative data were analyzed using descriptive statistics and thematic analysis was used to analyze qualitative data.

Results Overall, findings suggest that teachers perceived the coaching program and the ESDM strategies to be highly acceptable and effective; however, there was some variation in teachers' perceptions of specific elements and strategies. Teachers suggested that the program could be further improved through the provision of more targeted coaching support focused on behavioral teaching strategies and more time for one-on-one practice with target children.

Conclusions This research could be viewed as providing preliminary support for the social validity of the focus intervention for this group of teachers. It seems important for future research to address the identified limitations in the present research and to examine in further detail the social validity of this intervention for ECE teachers in inclusive preschool settings.

Trial Registration Australian New Zealand Clinical Trials Registry (ANZCTR): Registration no. 12618000324213.

Keywords Early intervention · Autism spectrum disorder · Teacher coaching · Inclusion · Early Start Denver Model

Currently, early diagnosis and the provision of early intervention (EI) are considered to be the best approach for improving long-term outcomes for individuals on the autism spectrum (Volkmar et al., 2014). EI can be broadly defined as non-pharmacological support "designed to promote developmental skill acquisition across a range of domains, such as social-communication, language, cognition, and adaptive functioning" (Whitehouse et al., 2020, p. 17). EI approaches can vary across several dimensions including theoretical underpinnings, intervention targets, delivery agent(s), and delivery settings (Debodinance et al., 2017). Naturalistic developmental behavioral interventions (NDBIs) are a relatively new and increasingly popular class of EI (Estes et al., 2019). NDBIs draw upon principles from behavioral and developmental science and emphasize the teaching of developmentally appropriate skills within a child's natural everyday environment (Sandbank et al., 2019). The efficacy of NDBIs is well-supported by a growing body of research (Estes et al., 2019).

Inclusive preschools appear to offer a logical setting for community-based delivery of EI, especially NDBIs, which are designed to be implemented in a child's natural environment. Inclusive preschool–based delivery may also offer several potential benefits over delivery in other settings. For example, in a preschool setting EI may be delivered to more than one child at a time which may be more cost-effective and efficient than one-on-one delivery (Leaf et al., 2018). The inclusive preschool setting also appears to satisfy current legal and best practice recommendations which suggest that EI should be delivered in a child's natural environment, with the least amount of restriction required to meet the child's needs (Ledford & Wolery, 2011) and with ongoing opportunities to interact with typically developing peers (Broderick, 2017;

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United Nations, 2006). Preschool teachers also appear to be well-suited to delivering EI because they are likely to understand the unique needs and interests of the children that they teach (Lawton & Kasari, 2012). However, regular pre-service teacher training may not adequately equip teachers for supporting children on the autism spectrum, so specific in-service training may be necessary (Dynia et al., 2020). Teacher coaching appears to be an increasingly used approach for in-service training (Elek & Page, 2019). A number of studies have demonstrated that effective coaching can lead to changes in ECE teachers' practice and can help teachers to support children's learning and development in a range of different areas (e.g., Knoche et al., 2013; McLeod et al., 2019).

In New Zealand, where the present study is set, the education system places a strong legal and moral emphasis on inclusion. Since 1989, the Education Act has provided the right for all children, regardless of ability or need, to receive an education at their local school. Other policies such as *Special Education 2000* (Ministry of Education, 1996) and *Success for All. Every School. Every Child* (Ministry of Education, n.d.) affirm the government's commitment to providing a fully inclusive education system for all New Zealanders. Almost all preschools in New Zealand are inclusive, in the sense that they include children with disabilities and other diverse learning needs. Thus, inclusive preschool–based delivery of EI appears to make logical sense in the New Zealand context.

One promising NDBI model is the Early Start Denver Model (ESDM; Rogers & Dawson, 2010), a comprehensive manualized intervention for young children on the autism spectrum aged between 12 and 60 months. With the ESDM, behavioral teaching techniques (e.g., prompting and systematic use of reinforcement) are used in combination with developmental teaching techniques (e.g., following a child's lead and using sensitivity and responsivity) to teach developmentally appropriate skills within a child's natural routines and environment. The ESDM can be delivered across several different formats and settings including one-on-one therapy with a certified therapist, one–one-one parent-mediated therapy, and group-based delivery. Therapy is typically delivered by certified ESDM therapists and/or parents who have participated in parent coaching with a certified ESDM therapist. Group-based ESDM is usually delivered by teams of teachers and other EI professionals who have received ESDM training. Teams usually include at least one team member who is certified in the ESDM. To become a certified therapist, a trainee must (a) complete the ESDM introductory and advanced training workshops, and (b) provide two videotaped submissions of themselves delivering ESDM therapy that are assessed by a certified ESDM trainer as being above the minimum fidelity threshold of 80%. A parent coaching training program is also available to certified ESDM therapists.

Several previous studies have demonstrated the effectiveness of group-based ESDM when delivered for 15 to 44 h per week in designated ESDM preschools with low child-teacher ratios (Eapen et al., 2013; Fulton et al., 2014; Sinai-Gavrilov et al., 2020; Vinen et al., 2018; Vivanti et al., 2013, 2014, 2016, 2019). Two of these studies evaluated delivery of the ESDM in inclusive or community-based preschool settings and so are particularly relevant to the present study. In the first study, Vivanti et al. (2019) compared outcomes of children on the autism spectrum who received ESDM in an inclusive preschool with those of children who received ESDM in a specialized autism preschool. Both groups demonstrated improvements in communication, social interaction, imitation, adaptive behavior, and ASD symptoms, with no significant difference between inclusive versus specialized delivery. Results from this study suggest that it is feasible and effective to deliver the ESDM to autistic children in an inclusive preschool setting. In the second study, the ESDM was integrated into Israeli community preschools for autistic children (Sinai-Gavrilov et al., 2020). Children from the eight participating preschools received either (a) their regular multidisciplinary developmental intervention (MDI) or (b) the ESDM. The ESDM group made significantly greater gains than the MDI group on measures of cognition, receptive and expressive language, socialization, and communication. The authors suggested that these findings support the feasibility and effectiveness of incorporating the ESDM into existing community preschool settings.

Although findings from previous preschool-based ESDM studies are promising, there do not appear to be any studies evaluating the social validity of preschool-based ESDM or ESDM coaching/training delivered in a preschool setting. Social validity (Wolf, 1978), also referred to as treatment acceptability (Kazdin, 1980), describes the extent to which the goals, procedures, and effects of an intervention are perceived as socially important and appropriate by stakeholders (Finn & Sladeczek, 2001). Social validity is an important consideration in EI research because when interventions are viewed as acceptable, they are more likely to be used as intended and may therefore be more likely to be successful (Finn & Sladeczek, 2001; Miramontes et al., 2011). This is likely to be especially important for EI in community settings, such as community preschools, as stakeholders' views appear to impact upon the long-term viability of the intervention (Stahmer et al., 2017).

There is very little research evaluating the social validity of EI for autistic children delivered by teachers in inclusive preschool settings. A recent review of the literature on this topic found that only 44% of the 16 included studies reported on teachers' perceptions regarding the social validity of the intervention (Tupou et al., 2019). Overall, findings suggest that teachers viewed the interventions positively and one study found a significant positive correlation between

teachers' fidelity of implementation and their rating of the social validity of the intervention. There also appears to be a general paucity of data related to the social validity of coaching programs for preschool teachers. Indeed, in a review of the quantitative early childhood education (ECE) teacher coaching literature, Artman-Meeker et al. (2015) reported that only 30% of the 49 studies in their review included a measure of social validity. The 15 studies that did report on social validity suggested that teachers rated the coaching programs favorably, indicating that they were socially valid. However, these were typically only brief self-report ratings provided by teachers. In a separate qualitative study, Knoche et al. (2013) explored the perspectives of 21 ECE teachers, childcare workers, and parents who had participated in a coaching program and found that respondents generally perceived the program positively.

Several previous studies have considered parent perspectives regarding the social validity of therapist-delivered or parent-mediated ESDM (e.g., Ogilvie & McCrudden, 2017; Vismara et al. 2012; Waddington et al., 2020). Ogilvie and McCrudden (2017) used a mixed methods study, involving both the Treatment Acceptability Rating Form—Revised (TARF-R; Reimers et al., 1991) and semi-structured interviews, to explore the perceptions of four mothers whose children had received one-on-one therapist-delivered ESDM. Overall, mothers from this study rated the intervention positively. Similarly, Waddington et al. (2020) used the TARF-R and semi-structured interviews to evaluate the perceptions of five mothers who had participated in an ESDM-based parent training program. Results from this study suggest that the mothers found the intervention and training program to be highly acceptable. However, there is a recognized need for research that addresses the community viability of group-based ESDM (Capes et al., 2019).

The present study reports on the social validity of a brief ESDM-based teacher coaching program. It is part of a larger study, which evaluated outcomes for three teacher–child dyads after teachers participated in a coaching program based around the ESDM (Tupou et al., 2020). The purpose of the present study was to explore teachers' experience with the intervention and their perceptions regarding its acceptability and effectiveness. We were also interested in understanding the challenges that teachers faced with regard to the intervention, and the impact that it had on the teachers, the children they worked with, and the wider preschool community.

Methods

Participants

Convenience sampling was used to recruit three teachers via a local preschool association that oversaw 19 individual preschools. The participating teachers were all female with bachelor's level teaching qualifications and 8–16 years teaching experience. None of the teachers had received any previous autism-specific training. The preschools where participating teachers worked shared similar layouts and were similarly resourced with average child-teacher ratios of 10:1. Each preschool offered five 6-h sessions per week. Participant and preschool demographics are summarized in Table 1.

Detailed information about participating children is presented in the original study (Tupou et al., 2020). Briefly, the three participating children (Ricky, Tama, and Anaru) were all male with a diagnosis of autism spectrum disorder and aged between 3:6 (years:months) and 4:11 at the beginning of the study. Prior to the study, the third edition of the

Table 1 Teacher, child, and preschool demographic characteristics

	Preschool 1	Preschool 2	Preschool 3
Preschool size	3 teachers, 30 children	4 teachers, 40 children	4 teachers, 40 children
Participating teacher demographics			
Pseudonym	Kelly	Helen	Bear
Gender	Female	Female	Female
Ethnicity	NZ European	NZ European	NZ European
Qualification	Bachelor's Degree	Bachelor's Degree	Bachelor's Degree
Teaching experience (years)	8	10	16
Participating child demographics			
Pseudonym	Ricky	Tama	Anaru
Age (years:months)	3:6	4:11	4:8
Gender	Male	Male	Male
Ethnicity	Fijian Indian	Māori-Niuean	Māori
Vineland-3 adaptive behavior composite	49	42	41
Hours per week enrolled at preschool	12	30	24

Vineland Adaptive Behavior Scales (Vineland-3; Sparrow et al., 2016) was used to interview each teacher regarding the participating children's adaptive behavior. Ricky's composite adaptive behavior score was 49. His teacher reported that he was minimally verbal and occasionally used functional sounds and words. Tama's composite adaptive behavior score was 42. According to his teacher, he was minimally verbal and showed infrequent use of a limited range of functional single-word utterances. Anaru's composite adaptive behavior score was 41. His teacher reported that he was minimally verbal and made infrequent use of functional sounds.

Procedures

Design

A qualitative multiple case study design was used, where each participant was considered to constitute a single "case." The case study design was selected because it allows for flexibility and, according to Simons (2009), allows researchers to gain an in-depth, holistic understanding of the phenomena being studied.

Teacher Coaching Intervention

For ease of understanding, the term "coaching program" will be used to refer to the coaching sessions that the teachers participated in, the term "ESDM strategies" will be used to refer to the ESDM procedures that the teachers used, and the term "intervention" will be used to refer to the entire intervention, that is, both the implementation of the coaching program and the teachers' use of ESDM strategies.

Teachers participated in an adapted version of the ESDM parent coaching program (P-ESDM; Rogers et al., 2012), following the procedures described in the ESDM parent coaching manual (Rogers et al., 2021). The program was modified to make it appropriate for teachers to use in the preschool setting. The parent coaching program was used because, at the time of the study, there was no ESDM training program specifically for preschool teachers and the standard ESDM training and certification program was considered to be prohibitively expensive and time-consuming for the participating teachers.

Teachers received one 60-min coaching session per week for 10 weeks. Coaching sessions were delivered at teachers' preschools and included a mixture of discussion, reflection, in-vivo practice with the children, feedback, and goal setting. Table 2 details the structure that was followed for each session. Each week a new topic was introduced, with each topic based around a chapter from the P-ESDM manual (Rogers et al., 2012). Teachers were provided with a handout for each topic, summarizing the content of the associated chapter. The following topics were covered: (a) attention, (b) sensory social, (c) joint activity routines, (d) teaching new behaviors, (e) managing unwanted behaviors, (f) non-verbal communication, (g) imitation, (h) play, (i) joint attention, and (j) speech. During the final week, a summary was provided, and the teacher and researcher reviewed the child's goals and, where appropriate, set new goals. Teachers were encouraged to practice using the ESDM strategies outside of the coaching sessions, and to embed them within their regular teaching practice.

Measures

TARF-R

Upon completion of the coaching program, teacher perceptions regarding the acceptability of the intervention were measured using the Treatment Acceptability Rating Form Revised (TARF-R; Reimers et al., 1991). The wording of the items from the original scale was changed to make the

Table 2 Structure of coaching sessions

Activity	Time (min)	Location	Description
Greeting and check-in	5	Office	Coach greets teacher and asks about the teacher's progress over the previous week. The teacher is invited to share any issues/concerns/questions they have encountered over the week
Warm-up play	10	With child	Teacher spends 10 min playing with the child, demonstrating what they have been working on over the week
Reflection	5	Office	Coach invites teacher to reflect on the warm-up play session
Introduction of topic	10	Office	Coach introduces new topic for the week using handouts, video, verbal explanation, and/or illustration
Practice activity 1	10	With child	Teacher spends 10 min playing with the child, practicing skills discussed during the introduction of the new topic Coach provides in vivo coaching and support as required
Reflection	5	Office	Coach and teacher reflect on practice activity 1 and plan for practice activity 2
Practice activity 2	10	With child	Teacher spends 10 min playing with the child, practicing skills discussed during the introduction of the new topic and the reflection in a different play activity Coach provides in vivo coaching and support as required
Reflection and closing	5	Office	Coach and teacher reflect on practice activity 2 and teacher sets goal/intention for the week

form suitable for use with teachers. For example, the phrase "your child" was replaced with "the child that you teach." The TARF-R was selected because it has been used previously to evaluate the social validity of the ESDM (Ogilvie & McCrudden, 2017; Waddington et al., 2020) and has high internal validity (Carter, 2007) and reliability (Finn & Sladeczek, 2001). The scale consists of 20 items, each scored on a 7-point Likert-type scale. Two items relate to the severity of child difficulties and one relates to the respondent's understanding of the intervention. The remaining 17 items, spread across the following six subscales, relate to the acceptability of the intervention: (a) reasonableness, (b) willingness, (c) affordability, (d) side effects, (e) effectiveness, and (f) disruption/time. Subscale scores were summed to provide a score for each of the following scales: total acceptability, severity, and understanding. For total acceptability, a higher total score indicates a greater level of acceptability.

Teacher Interviews

Interviews were conducted by the first author (JT) immediately after each teacher's final follow-up session. Teachers were interviewed individually at a time and place that suited them. For all teachers, interviews were conducted at the preschool where they worked. The interviews followed a semi-structured format. This means that the researcher loosely followed a protocol of questions and probes, but this was not strictly adhered to, and the researcher remained responsive to emerging ideas and topics put forward by the teachers. The researcher emailed the proposed interview protocol to each teacher 1 week before their scheduled interview to allow teachers the time to read through the questions and to make adjustments (e.g., adding or altering proposed questions). None of the teachers suggested any changes or additions to the proposed interview protocol. Each interview lasted for 60–90 min.

The protocol (available from the first author upon request) covered the following topics: (a) the ESDM topics presented during coaching sessions, (b) the practical ESDM strategies, (c) the structure and content of the coaching sessions, and (d) the perceived effectiveness of the intervention in terms of outcomes for the teacher and participating child, as well as for other teachers and children at the preschool. Teachers were free to discuss the topics in any order. Interviews were audio-recorded using an Apple® iPhone and were later transcribed verbatim and then summarized. Pseudonyms were used and all transcription records were kept confidential.

Data Analyses

TARF-R

Data from the TARF-R were analyzed using descriptive statistics (see Table 3). Reflexive thematic analysis was used

Table 3 TARF-R results

TARF-R scale/subscale	Kelly	Helen	Bear	Maximum score	Mean
Understanding	7	6	7	7	6.7
Severity	14	11	9	14	11.3
Total acceptability	103	95	113	119	103.7
Reasonableness	19	19	21	21	19.7
Willingness	19	16	21	21	18.7
Affordability	14	11	14	14	13
Side effects (RC)	17	14	19	21	16.7
Effectiveness	18	18	19	21	18.3
Disruption/time (RC)	16	17	19	21	17.3

TARF-R, Treatment Acceptability Rating Form – revised edition (Reimers et al., 1991); *RC*, reverse-coded

to analyze interview data following the process described by Braun and Clarke (2019) and Clarke et al. (2019). Specifically, during the first stage of analysis, the first author (JT) read and re-read the interview transcripts to familiarize herself with the data and to develop an understanding of its possible overall meaning. Notes were made during this stage to capture elements common to the different teachers and to note connections in the data, such as common words and phrases used across participants or contrasting descriptions of different phenomena. Next, codes were generated in line with the research questions. Specifically, data were organized into chunks of text that appeared to have a shared meaning (e.g., all responses that included reference to child-teacher ratios were grouped together) and each chunk was assigned a label (code, such as "ratios").

Teacher Interviews

A deductive approach to coding was used where the researcher started with ideas and concepts based on findings from recent qualitative study examining parent perceptions of an ESDM-based parent coaching program (Waddington et al., 2020) and some general ECE teacher coaching studies (e.g., Artman-Meeker et al., 2015; Elek & Page, 2019; Knoche et al., 2013; Twigg et al., 2013). Some codes were also constructed inductively during the coding process. Because the aim was to provide a descriptive account of teacher's experiences and perceptions, semantic codes were used. This means that the coding occurred at the surface level and focused on the explicit content of the data rather than on underlying or implicit ideas (Clarke et al., 2019). In the next step of analysis, tentative themes were constructed by organizing codes into clusters of meaning. For example, all of the codes that related to complications associated with using the intervention in a preschool environment were organized together. Themes

were then refined and defined and finally checked against the entire dataset to ensure that they accurately reflected the data.

Trustworthiness of Qualitative Data In line with Braun and Clarke's (2019) recommendations on thematic analysis procedures, no inter-coder agreement checks were conducted. Braun and Clarke assert that such checks are unnecessary in thematic analysis because under this approach coding is subjective and shaped by the researcher's own personal knowledge and understanding. Thus, there is "no one 'accurate' way to code data" (p. 14). Several measures were employed to support trustworthiness. First, prior to data analysis, teachers were provided with a summary of their interview transcript via email and asked to check that their ideas and contributions had been accurately captured. All three teachers confirmed that their ideas had been accurately captured. Peer debriefing was also used to check the credibility of themes with a colleague who was also conducting research into professional development for preschool teachers (Guba, 1981). Specifically, after initial codes and themes had been constructed, the colleague reviewed the coded transcripts and provided critical feedback regarding the credibility of constructed themes. This feedback was used to further refine the themes.

Researcher Positionality The first author (JT) has a background in teaching and providing support to young children on the autism spectrum. At the time of the study, she was a certified ESDM therapist, but had not completed formal ESDM parent coaching training. She was responsible for delivering the coaching program and conducting the teacher interviews. It was decided that her knowledge of the participants and the coaching process would be valuable in conducting the interviews. However, it is possible that her relationship with the teachers may have influenced their responses to the interview questions. The second author (HW) was a certified ESDM therapist and had completed formal ESDM parent coaching training.

Results

Teacher Coaching Intervention

Child and teacher outcomes from the teacher coaching intervention are reported in detail in Tupou et al. (2020). Overall, results indicate that all three teachers improved in their use of the ESDM strategies. In terms of child outcomes, all children demonstrated improvements in active participation but results for communication and imitation were mixed.

Teacher Experience and Perceptions

Quantitative Questionnaire

TARF-R results for the three teachers, Kelly, Helen, and Bear, are displayed in Table 3. Results suggest that, overall, teachers rated the ESDM intervention as highly acceptable (M = 103.7; maximum score = 119). Teachers also rated the intervention as highly effective (M = 18.3; maximum score = 19). Helen's ratings for willingness, affordability, and side effects were lower than Kelly's and Bear's ratings for the same subscales; as a result, Helen's total acceptability score (95; maximum score = 119) was the lowest of the three teachers. However, Helen's score was still well above the midpoint and thus indicates that Helen found the intervention to be acceptable. The subscales that received the lowest overall ratings were side effects and disruption/time. This may indicate that teachers found the intervention to be somewhat disruptive and somewhat likely to lead to undesirable side effects.

Interviews

Eight major themes were constructed from the interview data; these were the following: (a) the importance of time and practice; (b) the relation between knowledge, understanding, frustration, and patience; (c) the relationship between teacher and coach; (d) understanding and using the different strategies; (e) child outcomes were the most important indicator of intervention success; (f) the impact of the intervention was wider than just one teacher and one child; (g) child relationships and sense of belonging; and (h) complications associated with using the intervention in a preschool environment. Themes (a) to (d) pertain to the second research question, themes (e) to (g) pertain to the third research question, and theme (h) pertains to the fourth research question.

Teacher Experiences with the Intervention

The Importance of Time and Practice Time was an important influence on teachers' experience of the coaching program. This was highlighted by Kelly who, due to an administrative error, did not receive the 1 h per week of release time that the other teachers received for the coaching. Kelly spoke about the pressure of "juggling too much" and being unable to complete the weekly self-review checklists due to time constraints. She also described the feeling of failure she experienced as a result.

> I thought it was good being able to set a goal for something to work on, but to be honest with you I didn't ever really get time to go through and evaluate

myself… I kind of felt like I'd failed a bit in not being able to.

Kelly went on to suggest that "if I had that release time, I think it would have been fine." However, Helen, who did receive release time, also described time constraints as a barrier to her engagement with the coaching program.

All teachers indicated that they would have liked more time to learn and practice using the ESDM strategies. Helen suggested that teachers who had more years of teaching experience may require more time and practice because they would have to "think about, reflect and change their practice quite considerably." Bear suggested that it would have been better to have more than one coaching session per week, while Helen indicated that it would have been useful to have "a longer period of time" between each of the topics. Time was also described as a barrier to using the ESDM strategies with the children and all teachers indicated a desire for more time to work one-on-one with participating children.

The teachers also suggested that while the content of the coaching program was relatively simple to learn, they needed practice to perfect and fine-tune their use of the ESDM strategies. They found that the hands-on practice portion of the coaching program was the most valuable, as typified by the following quote:

> That was a real key for me around my own learning it was actually just implementing it at the time and you giving me that kind of, that verbal support as I went through and modelling or suggesting "actually give it a try this way or…" (Kelly)

Bear explained that hands-on practice helped to solidify her understanding of the written coaching materials and that without the practical component, the coaching would be "just words on paper and stuff in your head." All teachers indicated that more hands-on practice time would have been beneficial. Bear and Kelly also commented on how they found it useful when the coach modeled new strategies during practice sessions.

Helen suggested that completing the training alongside other teachers from the same preschool would have provided more opportunity for practice and feedback from others who would be "on the same page" with their understanding of ESDM. Teachers also indicated that it would have been useful to have their own copies of the video observations (taken during the research project) to reflect on in their own time, rather than just during the coaching sessions.

Time and practice were also important to the children's learning, which the teachers described using phrases such as "over time," "little by little," and "slow." The significance of time in relation to children's development and readiness to learn was described by Kelly who found that it was important to revisit strategies with Ricky because strategies that were "not successful" during the early stages of the intervention were later successful. Kelly suggested that this was because the early strategies (e.g., gaining attention, building a fun, responsive relationship, and learning to take turns) "supported other learning" and helped Ricky to "learn to learn." Teachers also commented on the progress that they observed in children because of regular practice and the lack of progress in skills that were not practiced as often. For example, Bear explained that Anaru did not show progress in learning to "high-5." She suggested that progress was slow because "it's something that we have to actually practice lots." Practice was also described as important to the maintenance of improvements in child behavior/skills:

> There wasn't anywhere where we saw no improvement really, apart from when he was away and just the fact that we couldn't consistently keep doing it…it made me realize that it's not one of those things you can just do once or a few times and then put it in a box for two months and then come back to it and expect them to be right where they were. (Helen)

The Relation Between Knowledge, Understanding, and Frustration The teachers reported gaining new knowledge through their participation in the coaching program. For example, Helen explained that the coaching had provided her with a "new way of thinking" as many of the strategies were things that she would have "never in a million years thought of doing." Helen also explained that the new knowledge "doesn't undo what you've learnt in your (teacher) training," instead it "adds to your repertoire." Indeed, all the teachers talked about storing the new knowledge that they gained in their "teaching kete (Māori bag/basket)" alongside their existing professional knowledge.

The intervention was also associated with an increase in understanding for teachers. Teachers discussed improvements in three different areas of understanding: (a) their understanding of ASD, (b) their understanding of the ESDM strategies, and (c) their understanding of the child they were working with. For example, Kelly reflected on improvements in her understanding of challenges that are commonly faced by children with ASD. She went on to say that this has helped her to recognize when she might need to make a referral for an ASD assessment for children at the preschool. Teachers also spoke about their increased understanding of the ESDM strategies and the impact that this had on their teaching practice:

> I understand more and I'm more confident working with children with ASD. So yeah, I just find that if I see something happening, I know how to respond more confidently. (Bear)

Teachers also described the impact of the intervention on their understanding of the target children. For example, Helen

reflected on how she "got better at reading Tama's cues" and Bear shared how she felt more "attuned" to Anaru's "moods and behaviors" and understood how to "recognize the signs of over-stimulation and under-stimulation" and "know the times when he's ready to move on to a new activity."

There was a clear relation between understanding and frustration for the teachers. Bear described the feelings of frustration that she felt due to a lack of understanding before the intervention and how she became more patient with Anaru once she could "understand more about strategies to use with him" and could "patiently use them without wondering what's going on." Similarly, Kelly described an increase in her tolerance when working with Ricky:

> I think I've got more tolerance because I kind of understand it more and I understand ways to support him more instead of feeling that overwhelming frustration and overwhelming sense of "what do I do? I do not know how to support you."

The Relationship Between Teacher and Coach Teachers indicated that their experience with the coaching program was influenced by their relationship with the coach.

Bear described how she felt supported and confident in the process because she knew that "if I did get stuck on something, I knew you (the coach) could help me with it." Kelly shared how having an open and honest relationship helped her to build confidence:

> We could just kind of freely and honestly talk and nothing was ever not ok, you know.
> I could say "hey I really struggled with it this week" and you know, you (the coach) were good with that.

Teachers also expressed the importance of having a coach who was "willing to be flexible" and work around the demands of a busy preschool. Helen commented that the flexibility of the coach was "really beneficial because you know in this environment it's really difficult, you're not going to go very far if you've got a very rigid timetable and everything is really prescribed."

Understanding and Using the Different Strategies Teachers reported finding all strategies useful but described some strategies as feeling "more natural" than others. Interestingly, the strategies that teachers reported as natural or easy to use were also the ones that they described as useful or effective. For example, teachers found it felt natural to add pauses to songs and people games to encourage communication. They also found this strategy to be one of the most effective:

> When he was on the swing and then I'd push him and then I'd either grab on hold of the swing or grab his

legs and then stop and you know and like all communication would stop, all movement would stop and he'd give either eye contact or a sound to indicate "hey I want some more of this, you know, I'm really enjoying this," that worked really well. (Kelly)

Other strategies that teachers described as "fitting naturally" into their teaching practice included positioning themselves face-to-face with the child, providing choices, holding objects up near their faces, and observing and responding to the child's cues and communicative attempts.

Some strategies did not seem to fit naturally into the teachers' existing teaching practice. Teachers all described the behavioral teaching techniques (e.g., using clear cues, prompting to elicit behavior) as "challenging." Bear explained that for her, the techniques were "something I have to think about quite hard" and "I would have to really work on to get more right and to get into my head." She suggested that it would have been helpful to have a simplified handout with "lots of practical examples" to explain the strategies because she found the handout that was used in the coaching program "really hard to follow." Kelly found it easy to understand the behavioral teaching techniques but found it challenging to use them:

> You're trying to think of a, b, c, d and e, and then I kind of like, I would be "damn I forgot C" or you know...it was a hell of a lot to remember.

Kelly also commented that she did not get the same level of success with the behavioral techniques as she was able to achieve when using the more natural strategies. She referred specifically to the techniques for dealing with unwanted behavior, explaining that she felt that "trying to use some of those strategies to redirect him, they may work one day but then they don't work the next time." She felt the techniques were still useful, as she had success using them with other children, but indicated that it would have been valuable to have some alternative strategies to use with Ricky. Helen also found it difficult to prompt for replacement behaviors when dealing with Tama's challenging behavior:

> You'd see something unfolding before your eyes and by the time he (Tama) had you know hit out at a child or broken something, you had like a second and so it was too late by then...and you know you can do the prompt after, but it kind of almost didn't feel relevant to do it after-the-fact.

Teacher Perceptions Regarding the Impact of the Intervention

Child Outcomes Were the Most Important Indicator of Intervention Success Teachers viewed child outcomes as a key indicator of the success of the intervention. When speaking

about child progress, they consistently used phrases such as "it's so cool," "I'm amazed," and "it's very exciting." Teachers also commented on child outcomes in relation to their goals for the child at the beginning of the intervention. For all teachers, these goals centered around the child's participation in the preschool program and their relationships with others. All teachers indicated that they felt the intervention had been successful in supporting them to achieve these goals:

> What I wanted to achieve out of it (the intervention) was to be able to support him (Tama) to you know, be immersed more in the program and to develop interactions with kind of the wider preschool, not just specific teachers. And that happened so we kind of met the goal of what I was hoping to get out of it. (Helen)

Teachers also described improvements in the children's communication as a result of the intervention. Bear described how Anaru's receptive communication improved during the intervention, commenting on how he now "turns around to look at you" when his name is called. Helen observed an improvement in Tama's verbal communication, noting that after the intervention Tama became "really good at telling you when he didn't like something." She also commented on how Tama learned to participate in "back and forth" communication with her during the intervention. Kelly noted improvements in Ricky's ability to follow simple instructions and his non-verbal communication skills. She also commented that by the end of the intervention, Ricky had begun to "make speech sounds" and "say some words."

Bear and Kelly also viewed the intervention as successful in addressing specific challenging behaviors displayed by the children they were teaching. Bear described how, prior to the intervention, Anaru would take food from other children's lunchboxes and would frequently remove his trousers and then refuse to put them back on, even in very cold weather. She also described how this behavior had improved during the intervention and commented that "he's gone from that (the unwanted behavior) to having several activities which he enjoys." According to Kelly, prior to the intervention, Ricky spent a lot of time at preschool climbing on furniture or running around the inside of the preschool, tipping toys off shelves. She described how Ricky's development of positive behaviors during the intervention contributed to a reduction in these unwanted behaviors:

> We saw a huge positive change in his behavior once he could start to communicate and we actually kind of understood what he was trying to communicate.

Teachers also observed behaviors/skills where children showed minimal/no improvement. Bear commented on how Anaru had not shown any progress in pretend play skills and had not learned to share a "high-5" with a teacher or peer. She also noted that his progress in imitation had been only minimal. Helen explained that Tama's progress with combining vocalizations with gestures had been only minimal and suggested that it would require "a lot more time and practice" for Tama to "really get it." Kelly talked about challenges in getting Ricky to participate in activities that did not involve his favorite alphabet blocks. However, she noted that she had observed some progress in this towards the end of the intervention.

Helen also observed that the intervention had a minor negative impact on Tama during the early stages when she was still learning to read Tama's cues and respond to them sensitively:

> I suppose when he (Tama) wasn't in the mood it could kind of, I mean I got better at reading his cues over time and coming back to just sitting or just being next to him and stuff, but you know really momentarily little bits of kind of anxiety and stress because someone was kind of getting in his space.

However, she explained that she only observed this during the early stages of the intervention when she was "still learning what to do."

The Impact of the Intervention Was Wider than Just One Teacher and One Child. Helen, Kelly, and Bear were the only teachers from each of their preschools to participate in the coaching program. However, they all indicated that they shared the ESDM strategies and coaching materials with the other members of their teaching teams. On the other hand, Helen reported that her use of the intervention put extra pressure on the other teachers at her preschool. She explained that at times "another teacher would have to cover the whole floor because I was trying to work one-on-one with Tama." Similarly, Kelly explained that the teaching team at her preschool faced "extra pressure" due to her participation in the coaching program.

The teachers reported that they were also able to use the ESDM strategies with other children, with and without ASD, at their preschools. Kelly commented that with children who were at risk or waiting for a diagnosis of ASD, she and the other teachers now had the knowledge and confidence to "just start implementing these strategies." Bear indicated that she was finding the strategies useful for all children at the preschool, including those with ASD. Helen commented that her teaching team found the strategies were also useful with children with "developmental or sensory difficulties."

Child Relationships and Sense of Belonging This theme covers the importance of relationships and the impact of the intervention on different relationships. It is made up of two sub-themes: (a) the relationship between the teacher and

the child, and (b) the relationships with others and sense of belonging.

The Relationship Between the Teacher and the Child When asked what the most rewarding part of the intervention was, Helen replied:

> I think it was just you know having those really nice interactions where you could tell he was really engaged and just the like the smiles and the laughter and you know you'd start something with him and he would carry it on, that was him interacting with you rather than you trying to force yourself on him.

This sentiment was also reflected in comments from Kelly and Bear. Kelly suggested that before the intervention Ricky "probably saw me as the grumpy teacher" but now "I've become the fun teacher." She also described how building predictable activity routines with Ricky had led to a more reciprocal, interactive relationship between herself and Ricky, commenting that "he (Ricky) really is engaged in what's happening between the two of us."

Bear shared how she had become Anaru's "go-to" teacher and that other teachers often sought her out when Anaru became distressed. She also discussed the challenges that this brought, such as being called to help Anaru during her allocated time in the office.

Relationships with Others and Sense of Belonging Teachers also reported that the children developed stronger relationships with other teachers and peers as a result of the intervention. Kelly shared that:

> He (Ricky) is huge on relationships now. So Kim, the teacher support, she arrived late one day and he obviously noticed her coming in the gate he just ran up to her and gave her the biggest hug… those relationships have actually become really strong.

Bear noticed Anaru "seeking out other people to be with" and "watching what the other children are doing." She also spoke about the relationships that Anaru had developed with other teachers. Helen also noticed positive changes in Tama's relationships with other teachers and peers.

Strongly linked to the idea of relationships was the concept of belonging. Bear spoke of how Anaru had become "part of the whole gang" at preschool. Kelly talked about how Ricky was beginning to notice the teachers and seemed to "really know which one is which now." She also shared that he had started to participate in a wider range of activities at the preschool. Helen commented:

> Towards the end (of the intervention) he (Tama) was starting to show naturally that he wanted to be part of what others were doing and that was really amazing

to see because there had never been anything like that before.

She went on to explain that this was challenging to begin with because some of the children "were a bit nervous of him (Tama) coming because you know the only other interaction they had ever had with him was when he whacked them because they were in his space."

However, once they saw that "he was actually trying to do what they were doing" they "were fine."

Challenges

Complications Associated with Using the Intervention in a Preschool Environment Another theme that was evident in teachers' interview responses related to complications associated with using the intervention in a busy preschool environment. For example, Kelly described challenges associated with the physical layout and free-play nature of the preschool. Specifically, she described how there were always a lot of activities out and available so when she offered Ricky choices of activities that did not involve the alphabet, he would "just kind of zone out and head off for something he wanted to do." This made it difficult to support Ricky in participating in a range of different activities.

Helen noted that the high teacher–child ratio made it difficult for her to have the opportunity to work one-on-one with Tama; she suggested that a ratio of 1–5 would be ideal for implementing the intervention. She went on to explain that because of the high ratios, her interactions with Tama were often "in the moment," so she did not usually have the opportunity to mentally plan and prepare for them. Also, as discussed in the "learning and using different strategies" theme, Helen found it hard to "get to Tama in time" to prompt for replacement behaviors. She explained that this was especially challenging on days when there were "40 kids and everybody's inside because it's raining." The teachers also talked about the challenge of having to deal with the needs of multiple children at once together with other teaching-related tasks. Helen commented that "other things going on at the preschool sometimes superseded" their use of the ESDM strategies.

Helen and Bear also indicated that having many "children with diverse needs" at their preschools made it challenging for them to spend time using the intervention. Teachers also talked about the challenge they faced when other children wanted to join in but the child they were working with did not want them to:

> Quite often there were children really interested in what was happening and you know sometimes it would work but then others that maybe wanted to get right in there when he (Tama) didn't want to have a bar of it,

that would prove kind of challenging because it kind of stopped what you were doing. (Helen)

Helen suggested that "in an ideal world" she would like to have access to a space where "you can shut the door and there's resources in there that the child can explore one on one with you." She suggested that it would be valuable to spend some time each day using the ESDM strategies with the child in this sort of space, then spending the rest of the day in the normal preschool environment.

Discussion

We sought to explore the perceptions of three preschool teachers who participated in an ESDM coaching program. Upon conclusion of the coaching program, teachers completed the TARF-R and participated in semi-structured interviews. Findings from these measures suggest that, overall, teachers found the intervention, that is, the coaching program and the ESDM strategies that they learned, to be both acceptable and effective. Total acceptability scores from the TARF-R were high, indicating that teachers perceived the intervention to be highly acceptable. During the interviews, teachers expressed enthusiasm and made comments suggesting that they were generally positive about the intervention. They also reported that a number of the ESDM strategies fit naturally into their usual teaching practice and they were able to use them regularly, without the need for a significant level of extra planning or resource. The intervention was also perceived to have had a positive impact on teachers' knowledge and confidence and a positive impact on the children's communication, engagement, and relationships with others. On the other hand, teachers reported challenges related to learning and/or using the behavioral teaching strategies and using the ESDM strategies in a busy preschool environment. Several suggestions were offered by the teachers to address these challenges in future coaching programs.

While a direct comparison with findings from previous studies is not possible, the results from the present study appear to align with the positive social validity ratings reported in previous teacher coaching studies (e.g., Artman-Meeker et al., 2015; Knoche et al., 2013). For example, in Artman-Meeker et al.'s review of the ECE teacher coaching literature, all 15 of the included studies that examined social validity reported positive findings. The positive findings from the present study also appear to align with the generally positive findings from previous studies evaluating the social validity of ESDM parent coaching programs. For example, the study by Waddington et al. (2020) which used a similar approach to the present study to examine the social validity of the ESDM parent coaching program also reported generally positive results.

In the current study, TARF-R findings suggest that overall, teachers found the ESDM strategies to be acceptable and effective. However, interview findings suggest that teachers' perceptions may have varied across the individual strategies. Some strategies, such as using pauses to elicit communication and encouraging eye contact, were described as a more natural fit in the preschool environment. These more natural strategies were also perceived by teachers to be the most effective. On the other hand, comments made by teachers during the interviews suggest that they may have perceived the behaviorally based strategies as less acceptable and effective. For example, the teachers reported that they found some of the behavioral strategies challenging to use in a busy preschool environment. This appears to somewhat align with findings from Twigg et al.'s (2013) evaluation of a teacher coaching program, where participating teachers also reported difficulty in using some of the techniques they had learned due to distractions in the preschool environment. Teachers' perceptions regarding the use of pausing also appear to align with findings from a study examining parents' perceptions of ESDM strategies, in which parents reported pausing to be an effective strategy for improving their child's learning (Waddington et al., 2020).

Teachers also rated all elements of the coaching program as useful, but reported that hands-on practice, including live coaching, feedback, and modelling, was the most useful element. This is consistent with findings from Knoche et al. (2013) who reported that preschool teachers and parents who had received coaching viewed the practical elements of their coaching sessions as useful in preparing them to apply the strategies to their everyday practice. Similarly, Elek and Page (2019) found that 30% of the 53 studies included in their review of the quantitative ECE teacher coaching literature described the practical elements of coaching as important to the success of the coaching program. Teachers in the present study also felt that their relationship with the coach was an important element of the coaching program and described the relationship as open, honest, supportive, and flexible. Other studies have also described the coach-coachee relationship as a key element of the overall ESDM coaching program (e.g., Waddington et al., 2020).

TARF-R findings from the current study suggest that teachers also found the intervention to be effective. During the interviews, the teachers indicated that child outcomes were the most important indicator of intervention effectiveness. They reported that the children showed improvements across a range of different outcomes particularly in the areas of communication and relationships. Difficulty in social communication is one of the defining characteristics

of autism (American Psychiatric Association, 2013) so it is therefore promising that teachers noted an improvement in participating children's interactions and relationships with their peers.

Although results from the TARF-R were generally positive, Kelly and Helen provided slightly lower ratings for items related to the side effects of the intervention and the disruption/time involved in implementing it. This may indicate that they perceived the intervention to have some negative side effects and to be somewhat disruptive/time-consuming. Interview findings provide some insight into why these teachers may have provided lower ratings for these two subscales. For example, Helen noticed some anxiety in Tama during the early stages of the intervention and Kelly described extra demands faced by her teaching team, which both could be viewed as negative side effects. Kelly and Helen also spoke of how the intervention sometimes caused disruption in the preschools where they worked. This may have contributed to these teachers providing a lower rating for the disruption/time subscale in the TARF-R.

Indeed, time was a key theme across all three teachers' interviews. The teachers indicated that they wanted more coaching time and more time to practice new skills. This is consistent with findings from a previous ESDM parent coaching study, where parents who were interviewed after receiving coaching also indicated a desire for more coaching time (Waddington et al., 2020). Teachers also highlighted the importance of adequate release-time to allow them to fully engage with the coaching program. Previous preschool teacher coaching research suggests that time may be an issue for teachers as coaching is often an addition to their already busy workloads (e.g., Twigg et al., 2013). Finally, the teachers from the current study also wanted more time to practice using the intervention with the children. However, demands from the preschool environment, such as high child-teacher ratios and the needs of multiple other children with diverse learning needs, often interfered with this. The teachers suggested that lower teacher–child ratios would enable them to use the ESDM strategies more often, leading to better results for the target children. Other researchers have also reported that demands from the preschool environment may impact upon teachers' use of skills that they have learnt through coaching (Knoche et al., 2013; Twigg et al., 2013).

Limitations and Future Research

There are several limitations that should be considered when interpreting the results of this research. First, it is possible that data were affected by a social desirability bias, which is defined as "the pervasive tendency of individuals to present themselves in the most favorable manner" (King & Bruner, 2000, p. 80). Social desirability bias is a risk with any self-report data, but the risk was especially high in the present

research because the same researcher delivered the coaching and conducted the interviews. It was decided that the researcher's knowledge of the participants and the coaching process would be valuable in conducting the interviews; however, it is possible that teachers would have been more likely to share negative responses had a neutral person conducted the interviews. Nonetheless, all teachers' responses included details of things that did not work and things that they felt could have been done better, perhaps indicating that teachers were comfortable to share answers that could have been perceived as negative. Future studies could involve interviews conducted by individuals who do not have any involvement with the coaching program. A further limitation relates to the semi-structured nature of the interviews used. With semi-structured interviews, the interviewer follows a flexible interview guide rather than adhering to a set of specific interview questions, so specific the questions that are asked may vary across each interview. This may limit the consistency of information provided across interviews and limit the ability to make comparisons across participants (Newton, 2010).

Also, the findings from this study should not be interpreted as universal or generalizable. This is consistent with the purpose of qualitative educational research, which is typically designed to gain an in-depth understanding of a particular case or cases (Johnson & Christensen, 2012). Thus, alternative data may have led to different interpretations and conclusions. For example, different teachers may have perceived the coaching program differently and a different coach may have delivered the program differently, leading to an altered experience for the participating teachers. Readers should therefore be mindful of contextual factors when applying the findings from the current study to other participants or settings.

The current study provides a small contribution towards the need for research on the community viability of group-based ESDM (Capes et al., 2019). However, more research is needed and findings from the present study may have several important implications for future research. First, the difficulty that teachers had in understanding and/or using some of the strategies may have important implications for future research. Teachers from the current study found it challenging to understand and/or use the behavioral teaching techniques but it is possible that their understanding and use of these strategies may have improved if they had been provided with more time and opportunity to learn and practice them. Future research could examine whether teachers' experience with behaviorally based techniques is more favorable when they receive extra coaching support focused on these techniques. This research could involve adapting the coaching program to include extra sessions focused specifically on techniques for using behavioral teaching techniques and managing unwanted

behavior. It may also be valuable to evaluate how teachers' improved understanding of these techniques impacts upon their fidelity and child outcomes.

Also, current results appear to support findings from previous studies which have highlighted hands-on practice and a positive coach-coachee relationship as key elements of successful teacher coaching programs. It may be useful for future research to examine the specific practices and attributes that contribute to teachers' positive perceptions of the coaching relationship. This sort of research could inform the design of future coaching programs and may also be valuable in training future coaches. It may also be useful for future studies to compare teachers' perceptions of the coaching program used in this study with the more traditional approach to ESDM training used in previous preschool-based ESDM research.

Finally, teachers from the current study all indicated that they would have liked more time to spend learning the strategies and practicing their use with the children. The teachers specifically mentioned that the time that they were able to dedicate to the intervention was negatively impacted by high child-teacher ratios. It may therefore be valuable for future research to explore the relationship between child-teacher ratios and teachers' perceptions of the intervention.

Declarations

Ethics Approval This study received ethical clearance from the New Zealand National Health and Disability Ethics Committee (reference no. 18/CEN/29/AM01).

Consent to Participate Informed consent was obtained from participating teachers and parents of participating children. Child assent was inferred by children's willingness to take part in teaching activities.

Conflict of Interest The authors declare no competing interests.

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