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Primary school teachers' patterns in using communication-supporting strategies following a professional development program: lessons learned from an exploratory study with three teachers

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Oral language skills underpin later literacy achievement and life prospects, and many children struggle with oral language for various reasons. Hence, it is crucial for teachers to provide a learning environment with rich opportunities for all children to practice their oral language. The aim of this exploratory study was to explore a professional development (PD) program designed to coach teachers in using communication-supporting strategies during verbal teacher-child interactions in regular classrooms. In focus were five strategies from the Communication Supporting Classroom Observation Tool. The study used a mixed-method case design with multiple observations across four time points over 10 weeks and a follow-up observation after two months. Outcome measures were collected at pre-and, post-intervention and at follow-up. The cases were two intervention teachers and one comparison teacher in second grade in Swedish primary schools. The teachers were directly observed and video-recorded during teacher-child structured small group conversations while discussing different texts with two groups of children each. The groups were mixed and comprised both children struggling with oral language as well as more typically developing children. To further understand the verbal interactions, the teachers' amount of talk in relation to the children was analyzed in terms of the percentage distribution of the total number of words per minute. The overall patterns of strategy use showed that the two intervention teachers applied more varied strategies from the PD program during the intervention period, but this was not maintained at the follow-up. The amount of teacher talk appeared stable over time, with individual differences in the three teachers. We also discuss the teachers' own insights and our experience in the design of the PD program, which may guide future research and applications of the PD program.

KEYWORDS

oral language, communication-supporting strategies, professional development, verbal interactions, structured small group conversations, primary school

1. Introduction

This is an exploratory study (Hallingberg et al., 2018) of a small-scale professional development (PD) program targeting teachers' use of communicative strategies in order to promote children's oral language skills. Children's oral language development underpins later literacy achievement in school, both regarding progress in reading skills (Hjetland et al., 2019; Snow, 2021; Snowling and Hulme, 2021) as well as in writing skills (Dockrell et al., 2009; Spencer and Petersen, 2018). In addition, continued poor oral language skills may have implications for children's behavior and socio-emotional well-being (Yew and O'Kearney, 2013; Lyons and Roulstone, 2018; St Clair et al., 2019), future academic achievement (Snow, 2016), and employment prospects (Cronin et al., 2020). Children who struggle with their oral language may have speech, language, and communication needs (SLCN) due to various reasons (Law et al., 2011). For example, the prevalence of developmental language disorder is approximately 7–10% in school-aged children (Norbury et al., 2016). Also, vulnerable children from exposed socio-economic home conditions (Law et al., 2011; Dockrell et al., 2014), or children who are second-language learners (Dockrell et al., 2010, 2014; Fälth et al., 2022) may be at risk of developing poor oral language skills associated with SLCN. Thus, also considering children without clinical diagnoses, the number of children and students with SLCN is suggested to be approximately 13% (McLeod and McKinnon, 2007). The consequence of the prevalence figure is that in Sweden, most children with SLCN follow the curriculum in regular classes with teachers without specialized training, and thus they are particularly affected by the academic language they encounter in the classroom and across the curriculum (Bruce et al., 2016). Therefore, it is essential to support regular teachers in providing high-quality teacher-child interactions in regular classrooms to promote all children's oral language (Law et al., 2012; Starling et al., 2012; Dockrell et al., 2015; Dobinson and Dockrell, 2021).

1.1. Professional development

Previous PD programs aiming at supporting children's oral language have mainly targeted preschool settings (e.g., Piasta et al., 2012; Cabell et al., 2015; Whorral and Cabell, 2016), while fewer studies have been situated in primary schools (Law et al., 2012; Dobinson and Dockrell, 2021). Generally, when children enter formal education, teachers seem to devote less attention to oral language development and instead the focus is on developing other academic skills in children (Law et al., 2019). This change of focus might have implications for the number of interactive classroom activities and opportunities there are for children to practice their oral language (Law et al., 2019), which is considered of particular importance for children with SLCN (Law et al., 2012; Dockrell et al., 2014). However, many teachers in formal education are aware of this situation and have expressed their need to develop knowledge and training skills to be able to support children's oral language in the classroom (Dockrell and Lindsay, 2001; Glover et al., 2015; Dockrell et al., 2017), thus expressing a need for PD in this area. Determining exactly how a PD program aiming at children's oral language development could be designed to affect a change in teacher practice is crucial. A combination of theory and practice

included in the program has been shown to be more effective than to only provide teachers with single courses, which is rarely efficient enough to yield sustained change (Markussen-Brown et al., 2017). Also particular activities intended to transfer theoretical knowledge into practical use in the classroom may be needed (Piasta et al., 2020; Mathers, 2021). Thus, to add elements such as observations, training, feedback, and coaching may contribute to a more effective PD program (Snyder et al., 2015; Markussen-Brown et al., 2017). At the same time, only occasional classroom observations and coaching sessions are rarely sufficient to obtain changes, and therefore a more developed PD program with recurrent observations and a pre-post and follow-up design to evaluate its effects is recommended (Starling et al., 2012; Cabell et al., 2015).

1.2. Interventions for children with SLCN

Although receptive and expressive language skills are of equal importance in children's language development, previous research suggests that interventions in educational contexts should focus on developing children's expressive language skills (Rogde et al., 2016; Melby-Lervåg et al., 2020; Dobinson and Dockrell, 2021). In a meta-analysis, Law et al. (2003) found that interventions targeting expressive language skills in children with language disorders indicated overall positive effects. Although interventions targeting receptive language skills may need to be further researched (Law et al., 2003), a systematic scoping review by Tarvainen et al. (2020) found that children with language disorders may improve their receptive language skills when adults are guided to improve the communication strategies in interactions with the children. The results from a study by Melby-Lervåg et al. (2020) suggest that a general language intervention including both expressive and receptive language mainly improve children's expressive language skills, and similar results are found for children who are second-language learners (Rogde et al., 2016). In the Swedish curriculum, expressive language is a skill stressed in all school subjects. Expressive language in schools involves advanced verbal activities such as discussing, presenting and reasoning (Swedish National Agency for Education, 2022), which are activities that may be especially challenging to children with SLCN. To support children with SLCN, teachers need to plan and provide rich opportunities for children to practice their expressive language skills (Dockrell et al., 2015) to manage these demanding tasks in the curriculum. To frame language interventions in educational settings, Ebbels et al. (2019) suggest a three-tiered response to intervention model, in which high-quality teaching and interactions may provide support on a general level (Tier 1), to all children. However, for children with language disorders, the general level does not always provide sufficient support, and thus a Tier 2 approach with organized small-group activities is suggested to provide more targeted opportunities to practice the oral language. Language interventions at Tier 3 provide individualized support to children with persistent language disorders (Ebbels et al., 2019).

1.3. Communication-supporting strategies

Communication-supporting strategies are evidence-based language promoting techniques described in the Communication

Supporting Classroom Observation Tool (CSCOT), specifically focusing on children's oral language skills in the early primary school years (Dockrell et al., 2012, 2015). The CSCOT is suggested to be used as a flexible tool applied in classroom observations and to frame PD interventions during feedback conversations with the teachers (Dockrell et al., 2015; Law et al., 2019). Some communication-supporting strategies concern teacher-child interactions, and include strategies such as the teacher using open-ended questions and extending children's utterances to encourage the children to express themselves and engage in conversations (Dockrell et al., 2012, 2015). Research involving classroom observations with the CSCOT has demonstrated that overall, teacher-child interactions do not occur very frequently (Dockrell et al., 2012, 2015; Law et al., 2019). Also, during these teacher-child interactions teachers may use communication-supporting strategies to varying degrees, and the use of open-ended questions represents the most prevalent strategy (Dockrell et al., 2015; Waldmann and Sullivan, 2017). Nordberg (2021) used the CSCOT in a PD program with preschool teachers focusing on collegial discussions, and found that also among them the open-ended questions were frequently used, yet an increase in other communication-supporting strategies was also obtained by the program. Also in other studies, but with other observation tools than the CSCOT, the use of open-ended questions has been more commonly observed compared to other types of strategies (Piasta et al., 2012; Eadie et al., 2021). Thus, as open-ended questions appear to be the default strategy for many teachers, it is of particular interest to study whether the use of other types of strategies could be enhanced. Another example of using the CSCOT in a PD program is a study by Andersson et al. (2022). Primary school teachers were involved in an 11-week PD program, including all types of items in the CSCOT, evaluated with teachers' self-perceived change in classroom communication skills, but the results yielded no significant effects. The authors concluded that to obtain a positive result, an individualized coaching approach and outcome measures more closely aligning with the PD content are crucial. Also, Law et al. (2019) suggest that PD interventions framed by the CSCOT may benefit from focusing on specific aspects of communication.

1.4. Teacher talk and activities promoting teacher-child interactions

For a teacher to provide rich opportunities for children to practice oral language in a whole class setting can be challenging as the amount of time for each child to practice their own oral language skills with the teacher is very limited in the regular classroom. Hattie (2008) studied teacher talk in the classroom and found that the average teacher talk is usually 70–80% of the total lesson time. Eadie et al. (2021) studied early primary school teachers following a PD program focusing on oral language and literacy. The distribution of teacher and student talk was measured by the total number of utterances during verbal interactions during story book reading in a whole class setting. The intervention teachers' spontaneous talk occupied about 65% of the time, and about 9% was teachers' reading/reciting, while the student talk occupied about 26%, and the control teachers' distribution was about the same. A classroom activity that may be especially beneficial to provide opportunities for practicing oral language in

teacher-child verbal interactions is structured small group conversations (Beck and McKeown, 2001; Wasik and Iannone-Campbell, 2012; King and Dockrell, 2016). The conversations are often framed by discussing the content of texts adapted from children's books and characterized by the teacher explicitly using language strategies to promote children's oral language skills and to practice vocabulary. Important in such small group conversations is that the choice of texts is considered carefully to provide a varied and challenging text content that will engage children (Beck and McKeown, 2001).

To summarize, while there is previous research examining teachers' professional development in using strategies to promote children's oral language, these studies often appear to target preschool teachers, and fewer studies have been conducted with primary school teachers. Communication-supporting strategies concerning teacher-child interactions are important to provide opportunities for children to practice oral language. However, whole class activities provide very limited time for children to practice oral language with a teacher, while structured small group conversations may be a setting more favorable to enhancing teacher-child verbal interactions.

2. Present study

The aim of the present study is to explore and gain insights from a small-scale PD program targeting teachers' use of five communication-supporting strategies from the CSCOT during teacher-child verbal interactions. The research questions for this study are:

What are the patterns of use of the targeted strategies before, during and after the PD program as shown by two intervention teachers and a comparison teacher?

What is the amount of teacher talk compared to the children's talk for each of the three teachers before, during and after the intervention?

How do teachers receiving the PD program self-rate their weekly overall strategy use in everyday classroom teaching, and how do they describe the use, challenges, and benefits when implementing targeted strategies in everyday classroom teaching?

3. Method

3.1. Design

A mixed methods case study design with multiple observations with measure points at pre-, post, and follow-up was applied to gain insights from how a small-scale PD program affected teachers' communication-supporting strategy use over time, and to evaluate the methods in use prior to conducting a larger study (Hallingberg et al., 2018; Paparini et al., 2020, 2021). The quantitative data was derived from video-recorded observations allowing detailed analysis of classroom talk (Mercer, 2010). Furthermore, weekly checklists were filled out by the teachers, consisting of a quantitative element of self-rating, supplemented with qualitative open-ended questions. The research was approved by the Swedish Ethical Review Authority (protocol number 2019-02735).

TABLE 1 Description and examples of targeted strategies (from the CSCOT and the coding guide for this study).

Strategy (code)	Description	Example
Open-ended questions (OPE)	Adults ask open-ended questions that extend children's thinking (what, where, when, how, and why)	Teacher: "And what's this book about?" Teacher: "How do you think the story will continue?"
Extending the child's utterance (EXT)	Adults respond to what the child is saying by adding syntactic or semantic information, with or without explicitly repeating first.	Child: "Under water." Teacher: "Under water. The fish swim under water."
Labelling items/actions (LAB)	Adults provide labels for familiar and unfamiliar actions, objects or abstractions (e.g., feelings). Adults describe/introduce words.	Child: "I need to be careful." Teacher: "That's right, you need to be precise." Teacher: "Thorns are prickly and you can see them on roses."
Highlighting contrasts (CON)	Adults use contrasts that highlight differences in lexical items and in syntactic structures.	Small/smaller/smallest Long vs. short Teacher: "We have feet and hands. But a dog has paws."
Encouraging the use of new words (ENC)	Adults encourage children to use new words in their own talking.	Teacher: "What's another word for that?" Teacher: "Something you drew yesterday. A shark and a ...?"

3.2. Participants

The first author recruited participants by contacting principals in Swedish compulsory schools by e-mail, providing short initial information about the study. Inclusion criteria were that teachers should have adequate degrees for teaching second grade in primary school but no specialist competence in SLCN. In cases where schools were interested, meetings were held with teachers and principals to inform about the overall aim of the study. The participants were three voluntary second grade teachers from three different compulsory schools. The schools were located in two different suburban municipalities with similar demographics. First, two intervention teachers were recruited, followed by recruitment of the comparison teacher. The teachers were given fictitious names in the study: Emma and Mary (intervention teachers), and Lisa (comparison teacher). A second comparison teacher was planned to participate, but due to delay, followed by the pandemic situation in 2020, this was canceled. The teachers were all female, aged 44–47, with 17–19 years of teaching experience. From each teacher's class, 12 voluntary children participated ($N=36$), aged about 8 years old. The 12 participating children in each class were divided into two small conversation groups ($n=6$ children per conversation group). Within each small conversation group, the children were selected to comprise both children with SLCN and age-matched children without SLCN.

3.3. Intervention

The intervention was a 10-week PD program lasting a total of 270 min, designed to coach teachers in applying five communication-supporting strategies from the CSCOT (Dockrell et al., 2012, 2015), with a focus on teacher-child verbal interactions. The strategies were: open-ended questions (OPE), extending children's utterances (EXT), labelling items/actions (LAB), highlighting lexical or syntactic contrasts (CON) and encouraging children to use new words (ENC) (Dockrell et al., 2012, 2015). The CSCOT in its entirety comprises several aspects of oral language, both verbal and non-verbal language skills. The rationale for selecting the five targeted strategies in this study was three-fold. First, the targeted strategies were selected to focus on teacher-child verbal interactions. Thus, non-verbal strategies (e.g., gestures) were not part of the PD program. Second, the selected strategies were techniques to promote children to use their expressive

language in conversations, which corresponded to the activity of structured small group conversations. Other strategies in the CSCOT may be more general and applicable to observe in a whole-class activity. Moreover, previous research has indicated that expressive language is an especially crucial skill for children, in general, to practice in educational settings (Rogde et al., 2016; Melby-Lervåg et al., 2020; Dobinson and Dockrell, 2021), and specifically for children with SLCN (Law et al., 2003, 2012; Dockrell et al., 2014). Third, this was a small-scale PD program, and including several other strategies from the CSCOT was considered not feasible. Table 1 shows a description and examples of the targeted strategies in the CSCOT (see also the Introduction for more details on the tool). The setting for the observations was teacher-child structured small group conversations discussing different texts. Figure 1 provides a timeline of the observations, the coaching sessions, and the content of the PD program. The intervention teachers participated in three individual coaching sessions plus one final session, all of which were based on the direct observations during the structured small group conversations. The CSCOT was used to observe the teachers during the direct observations to collect examples of their use of targeted strategies, and formed the basis for the following feedback conversations in the coaching sessions. The coaching sessions were delivered by the first author, who had a professional background as a special needs teacher in Swedish compulsory school. The sessions were carried out every other or third week during the intervention period and on the same day as each observation. The first session (90 min) included an introduction to the program and a review of the five targeted strategies in the CSCOT. Furthermore, implementation aspects were addressed. The intervention teachers were asked to explore and use the targeted strategies in their everyday classroom teaching in between observations and coaching sessions. In addition, the intervention teachers were asked to fill out weekly checklists to rate and describe their own strategy use during a school week. In the first session, practice of the strategies and a feedback conversation based on teachers' spontaneous strategy use at the first observation took place. The following two coaching sessions (60 min respectively) focused on providing teachers with theoretical background, opportunities to practice the strategies, and feedback conversations. The fourth session (60 min) was a final summing-up of the PD program with feedback conversations, but since no further theory or coaching was provided, this session was not considered to be part of the actual intervention.

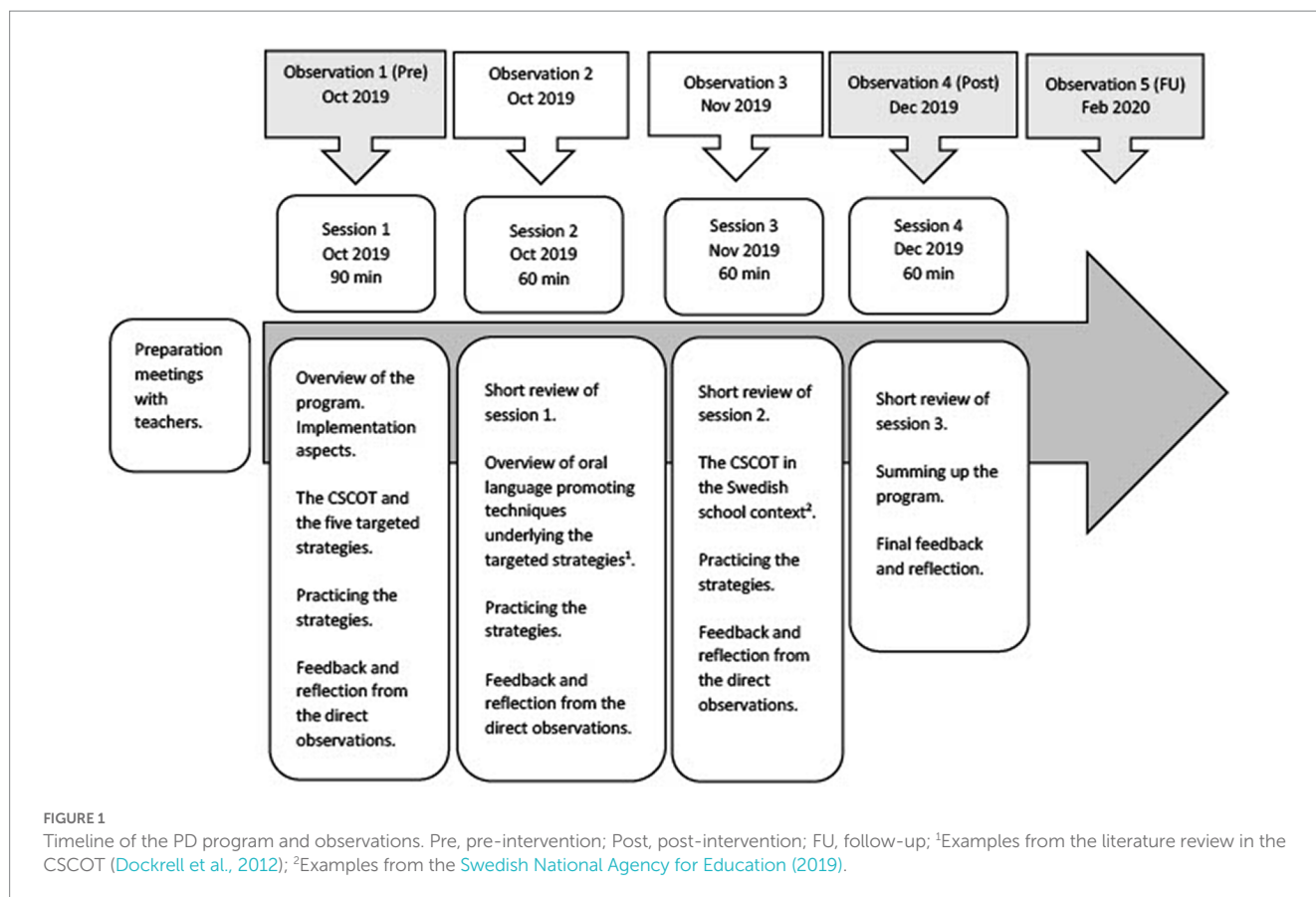


FIGURE 1

Timeline of the PD program and observations. Pre, pre-intervention; Post, post-intervention; FU, follow-up; ¹Examples from the literature review in the CSCOT (Dockrell et al., 2012); ²Examples from the Swedish National Agency for Education (2019).

3.4. Procedures

Before the observations, a preparation meeting (see Figure 1) was held with each teacher to set the schedule for observations, provide instructions for the structured small group conversations, and prepare the small child groups. At this time point, no information on the specific content of the PD program was disclosed. For the small group conversations, the teachers were instructed to first read a text aloud from a shorter part of an authentic children's book and afterwards begin the conversations, and to limit each session to about 20 min. They were also urged to ensure that all the children were provided with opportunities to talk. The conversation locations were small group rooms near the classroom, with teacher and children sitting side by side around a table. All three teachers read the same texts, which were provided about one week in advance, to allow time for the teachers' own preparations before the small group conversations. The texts were selected with advice from a children's book librarian and the main criteria for the choices of texts were that: (a) the content was age-adequate and appealing to the children in terms of the narrative, regardless of genre, (b) the texts were newly published to ensure that they were not familiar to the children, and (c) the teachers could read a short part from the text aloud in about 5 min and discuss the content with the children. Five texts were chosen (one for each observation) with topics that children may relate to from everyday life and that are commonly addressed and discussed in school. In the present study, the texts were a mix of fiction and non-fiction with themes related to friendship, identity, animals and space. For the analyses, all teacher-child structured small group conversations were video-recorded.

While the small group conversation was going on, the children who were not currently taking part in the activity (i.e., both children participating in the study as well as non-participating children), instead conducted ordinary classroom activities with other teachers already working in the classes. The comparison teacher was offered to participate in a workshop with a focus on teaching the targeted strategies after the intervention period was completed.

3.5. Data collection

Data was collected during the observations both through direct observations with the CSCOT (used for the coaching sessions) and through video-recordings (used for outcome data). Each teacher was observed at a total of five time points: pre-intervention, twice during the intervention, post-intervention, as well as at a follow-up observation 2 months after the intervention was completed. At each time point, each of the teachers was observed during two structured small group conversations with the children. The conversation groups were the same over time. The video-recorded observations ranged from 11:11 to 23:18 min (median duration 17:70 min), including the teachers' read-aloud session. The first author was present during the observations, but there was no coaching or interference during the observations. For the video-recordings, a small video camera on a tripod with an external microphone was used, and as a back-up camera we used an iPad. The equipment was placed near to the small groups and it was not moved around during the recordings. The comparison

teacher was observed under the same conditions as the intervention teachers, carrying out the structured small group conversations, but without receiving the PD program. Furthermore, outcome data was collected by having the intervention teachers fill out weekly checklists concerning strategy use in the everyday classroom teaching during a school week.

3.6. Transcription and coding

After video recording was completed, the teacher-child small group conversations were transcribed orthographically on word level, according to the CHAT (Codes for the Human Analysis of Transcripts) guidelines in the CHILDES system (Child Language Data Exchange System) (MacWhinney, 2000) by the first and fourth authors. Since the focus of this study was the teachers' verbal interactions, the read-aloud session, and general talk prior to the conversations were excluded from analyses, yielding transcriptions ranging from 7:74 to 19:24 min (median duration 12:73). A coding scheme was used based on the targeted strategies from the CSCOT, and teachers' strategy use was added to the transcriptions, represented by the codes OPE, EXT, LAB, CON, and ENC (see Table 1). Each teacher utterance was allocated to one of the strategies, and in cases with no match the utterance was coded with "other" (OTH). Some utterances were part of a conversational unit with a main clause and its subordinates (MacWhinney, 2000). In those cases every single utterance was marked with the specific strategy (see Supplementary Appendix 1 for an example of strategy coding). Utterances consisting solely of a feedback morpheme (e.g., "mm") were excluded from analysis.

3.6.1. Interobserver agreement

Point-by-point interobserver agreement (%) was calculated for word-and utterance level transcriptions and also for coding of the strategies. Agreement analyses were conducted by the first and fourth authors on nine randomly selected 6-min sequences representing all five observation time points. Author 4 was blind to the order of observations as well as teacher belonging (i.e., intervention or comparison). Percentage agreement yielded satisfactory results on both transcription (word level: $M = 93.32$, $SD = 1.68$; utterance level: $M = 90.46$, $SD = 7.43$) and strategy coding ($M = 80.02$, $SD = 5.89$). Any disagreement was resolved through discussion.

3.7. Measures

3.7.1. Strategy use

To measure strategy use in detail, frequencies of each teacher's use of the targeted strategies were calculated from the coded video recordings in rate-per-minute due to variations in observation length.

3.7.2. Amount of talk

To estimate the amount of teacher talk in relation to the children, teachers' and children's language production of the total number of words (TNW) was calculated in rate-per-minute, excluding unintelligible words and feedback morphemes across observations.

3.7.3. Self-rated strategy use

Nine weekly checklists designed for the present study and consisting of five questions (i.e., one question for each strategy) measured the intervention teachers' own self-rated overall strategy use in the everyday classroom teaching during a school week. The checklists were filled out by the two intervention teachers during the intervention period, starting in the same week as the first coaching session was conducted and ending in the week of the last session. The scale was in the range 0–3 (0 = not used at all, 1 = used at some lessons, 2 = used some time every lesson, and 3 = used several times every lesson). In addition, there were three open questions each week for the teachers to briefly describe examples of strategy use, and to describe challenges and benefits of strategy use in the everyday classroom teaching. The comparison teacher did not fill out any checklists of self-rated strategy use.

3.8. Data analyses

In the analyses, the two small group conversations conducted by each teacher at each time point were each merged into one group. This was motivated by the teachers behaving similarly in both groups in relation to strategy use, and language production of TNW/min.

3.8.1. Strategy use

Calculations of the teachers' strategy use were completed using the CLAN programs (Computerized Language Analysis) in the CHILDES system (MacWhinney, 2000). Each teacher's strategy use was analyzed in rate-per-minute at three time points; pre-intervention, post-intervention, and follow-up. To show patterns over time, the strategies were presented visually in graphs.

3.8.2. Amount of talk

Calculations of the teachers' and children's TNW/min were completed using CLAN (Computerized Language Analysis; MacWhinney, 2000). The distribution of the amount of talk (i.e., TNW/min) between teachers and children was analyzed in percentage terms at pre-intervention, post-intervention, and follow-up.

3.8.3. Self-rated strategy use

Quantitative analysis of the weekly checklists was based on the average score per teacher for each of the five targeted strategies. The analysis was based on eight self-ratings per teacher because they each did not complete one checklist. In addition, an approach of qualitative conventional content analysis, in which keywords are derived directly from the data without predetermined categories (Hsieh and Shannon, 2005), was used to describe the intervention teachers' answers to the open questions in the weekly checklists. Quotations from the teachers' answers were used to highlight the challenges and benefits of strategy use.

4. Results

Emma's, Mary's (intervention teachers), and Lisa's (comparison teacher) cases are presented below. Quantitative data are presented visually in graphs and in Table 2, and qualitative data are reported in running text.

4.1. Case Emma: intervention teacher

4.1.1. Strategy use

Figure 2 shows the pattern of Emma’s use of the five targeted strategies over time. At pre-intervention, she used the strategy OPE the most frequently (1.61 times/min). This use decreased at post-intervention (0.81 times/min), but at follow-up she returned to using OPE more frequently again (1.71 times/min). The strategy EXT increased from pre-intervention (1.15 times/min) to post-intervention (2.53 times/min), and continued to increase to the time of follow-up (3.26 times/min). Emma increased her use of the strategy LAB from pre- (0.63 times/min) to post- (2.17 times/min) intervention, but this was not maintained at follow-up (1.07 times/min). The strategies CON and ENC were rarely used at all over time.

4.1.2. Amount of talk

Figure 3 shows the pattern of the amount of teacher talk in relation to the children’s talk in Emma’s conversation groups over time. At pre-intervention, the percentage distribution of Emma’s amount of talk was lower (41%) in relation to the children’s talk (59%). The pattern changed at post-intervention with an increased amount of teacher talk (55%). By follow-up, the amount of talk was about equal between Emma and the children (51 and 49%, respectively).

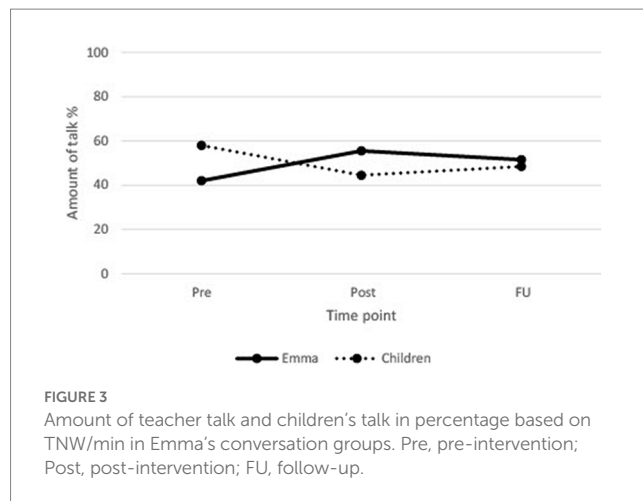
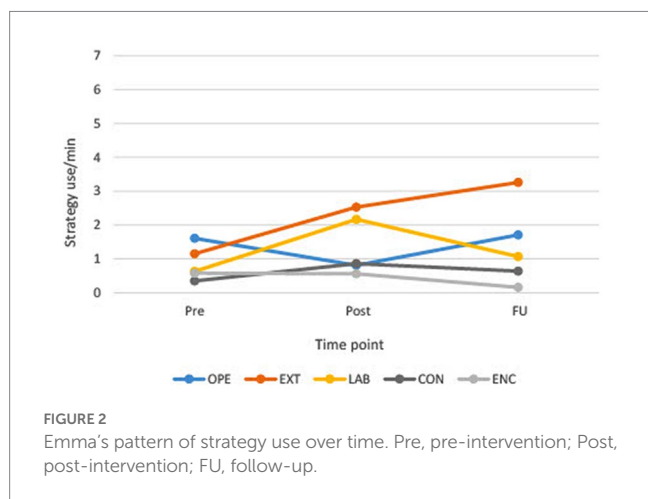
4.1.3. Self-rated strategy use

The average of Emma’s ratings in the weekly checklists is presented in Table 2. She rated her use of the strategy OPE the highest ($M = 3.0$). Furthermore, the strategy EXT, which was the strategy the most frequently observed during the intervention period, was rated the lowest ($M = 1.8$). Qualitative analysis showed that Emma described

TABLE 2 Average of the intervention teachers’ self-rated strategy use.

Strategy	Emma	Mary
OPE	3.0	2.4
EXT	1.8	1.8
LAB	2.3	0.9
CON	2.6	1.3
ENC	2.3	1.1

OPE, open-ended questions; EXT, extending children’s utterances; LAB, labelling items/ actions; CON, highlighting contrasts; ENC, encouraging the use of new words.



several examples of spelling activities in which she had highlighted differences between words (CON). She also said that she used the strategies LAB and ENC, but mainly at the beginning of the intervention period. During one of the weeks the class worked on book-reading activities, in which she said that the strategy OPE was mostly used. The strategy EXT was not mentioned in her example descriptions. Emma described overall challenges with using the strategies in everyday classroom teaching such as: “It is difficult to catch spontaneous opportunities.” Moreover, she said “We sometimes get away from the topic. For example, instructions to the whole class may be time-consuming. It is easier to do it in small groups.” Overall benefits of strategy use that Emma described were: “They [the children] have more courage using new words/concepts,” and “It strengthens the children’s talk.” Furthermore she said that “It gives better opportunities for children who have difficulties expressing themselves.”

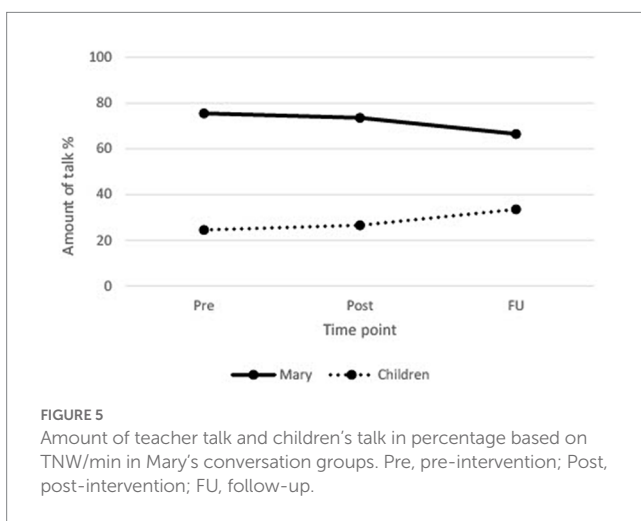
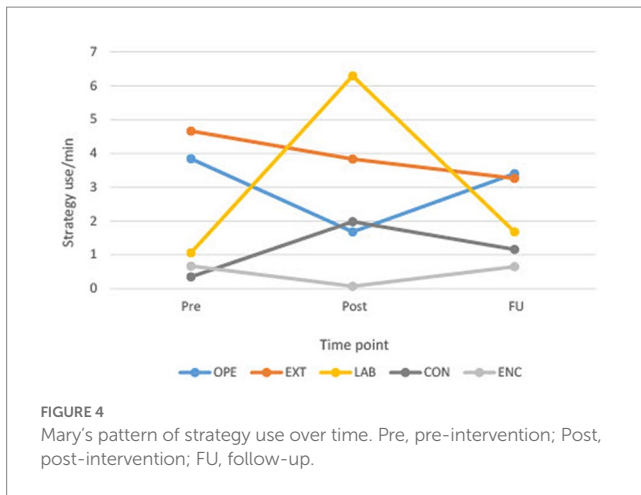
4.2. Case Mary: intervention teacher

4.2.1. Strategy use

Figure 4 shows the pattern of Mary’s strategy use of the five targeted strategies over time. At pre-intervention, she used the strategy EXT (4.66 times/min) and OPE (3.84 times/min) the most frequently, both of which decreased at post-intervention (3.83 and 1.68 times/min respectively). However, at follow-up, she returned to using OPE (3.40 times/min) more frequently again, but this was not the case for the strategy EXT (3.26 times/min). The use of the strategies LAB and CON increased from pre- (1.06 and 0.35 times/min respectively) to post-intervention (6.29 and 1.98 times/min respectively), but this was not maintained at follow-up (1.68 and 1.16 times/min respectively). The strategy ENC was rarely used at all over time.

4.2.2. Amount of talk

Figure 5 shows the pattern of the amount of teacher talk in relation to the children’s talk in Mary’s conversation groups over time. At pre-intervention, the percentage distribution in the amount of talk for Mary and the children was 76 and 24%, respectively. The pattern of teacher talk was about the same at post-intervention (74%), but at follow-up the distribution was somewhat changed between Mary and the children (67 and 33%).



4.2.3. Self-rated strategy use

The average of Mary's ratings in the weekly checklists is presented in Table 2. She rated her use of the strategy OPE the highest ($M = 2.4$). The strategy LAB, which was the strategy the most frequently observed during the intervention period, was rated the lowest ($M = 0.9$). Qualitative analysis showed that Mary used the strategy OPE in a book-reading activity at the beginning of the intervention period, which she later on described as the "easiest" strategy to use together with the strategy EXT. Furthermore, she described examples of using the strategies LAB, CON, and ENC in activities about word comprehension and storytelling. Mary described overall challenges with using the strategies in everyday classroom teaching such as: "It is often I who talk too much, I explain things." Furthermore, she said that "It is not easy to use the strategies when they do not come naturally as the open-ended questions do," and "You open up for communication but then you have to stop the children because of lack of time, and they get tired of listening to each other or to me." Overall benefits of strategy use that Mary described were: "They [the children] often ask about the meaning of words," and "More children have the courage to participate in classroom talk." Furthermore she said, "I think more of focusing on language/oral language now."

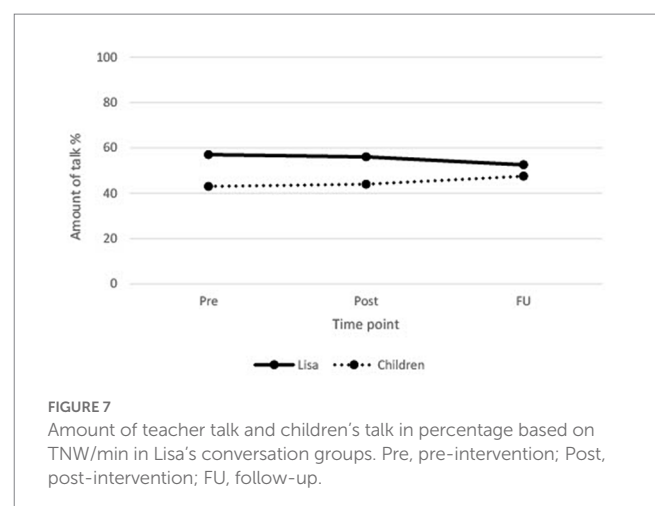
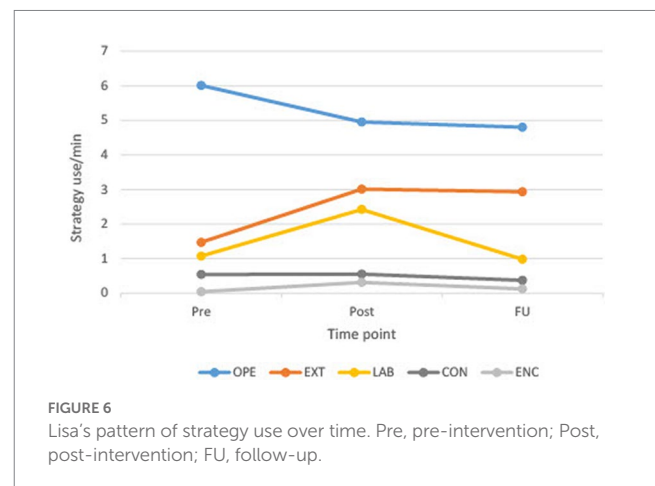
4.3. Case Lisa: comparison teacher

4.3.1. Strategy use

Figure 6 shows the pattern of Lisa's spontaneous strategy use over time. At the time of the pre-intervention, she used the strategy OPE the most frequently (6.01 times/min), which decreased at the time of the post-intervention (4.95 times/min), and at the time of the follow-up (4.80 times/min). Still, the strategy OPE was the most frequently used strategy over time. The strategy use of EXT and LAB both increased from the time of pre- (1.47 and 1.07 times/min respectively) to post-intervention (3.01 and 2.42 times/min respectively). The use of EXT was nearly maintained at the time of the follow-up (2.93 times/min), but this was not the case for the strategy LAB (0.98 times/min). Lisa used the strategies CON and ENC less spontaneously over time.

4.3.2. Amount of talk

Figure 7 shows the pattern of the amount of teacher talk in relation to the children's talk in Lisa's conversation groups over time. At the time of the pre-intervention, the percentage distribution in the amount of talk for Lisa and the children was 57 and 43%, respectively. The pattern remained about the same at the time of the post-intervention (56 and 44%, respectively), and at the time of the



follow-up the amount of talk was about equal between Lisa and the children (53 and 47%, respectively).

5. Discussion

The aim of this study was to explore and gain insights from a small-scale PD program targeting primary school teachers' use of five communication-supporting strategies in teacher-child verbal interactions. From the results of this small-scale exploratory study we cannot draw any solid conclusions. However, we discuss overall gained insights from each of the two teacher cases following the PD program, and from the case of the comparison teacher who did not follow the PD. Furthermore, we discuss the methods in use in the present study. Altogether, this may provide useful information prior to a scale-up of the study (Hallingberg et al., 2018; Papparini et al., 2020, 2021).

The PD program appeared to affect the teachers' use of the five targeted communication-supporting strategies from the CSCOT (Dockrell et al., 2012, 2015), and the overall pattern was that it appeared that Emma and Mary (intervention teachers) adopted and used other strategies than OPE during the intervention period. However, at the follow-up they returned to about the same strategy use pattern as at pre-intervention, using OPE more frequently again. Lisa (comparison teacher), who did not receive the PD program was consistent in using the strategy OPE frequently over time. However, she also showed spontaneous increases in using other strategies. Although Lisa did not receive the PD program, she was observed under the same conditions as the intervention teachers, meaning that the structure of recurring small group conversations might have led to a spontaneous enhancement in communicative skills. The use of OPE is a well-established strategy to engage children in conversations (Dockrell et al., 2012, 2015), and previous research has shown that the strategy is frequently used during classroom observations (Dockrell et al., 2015; Waldmann and Sullivan, 2017; Eadie et al., 2021; Nordberg, 2021). All three teachers in this study were skilled in using OPE, and a possible explanation could be that before the intervention they may have already been well aware of the importance of using the strategy in teacher-child interactions. Another explanation could be that teachers may find it applicable and natural to use OPE during teacher-child conversations based on discussions of texts. Gained insights suggest that PD programs could put less emphasis on coaching teachers in using the strategy OPE, and instead could emphasize other strategies. In the present study it appeared as if the strategy ENC was particularly challenging to implement, a result also found in other studies (Dockrell et al., 2015; Nordberg, 2021).

Overall, the findings in this study showed that the teachers' individual patterns concerning the amount of talk in relation to the children appeared to be consistent over time. During the intervention period, Emma and Lisa showed patterns of about an equal amount of talk between teacher and children. Considering previous studies on the amount of teacher talk in whole-class (Hattie, 2008; Eadie et al., 2021), these patterns are encouraging seeing that structured small group conversations may represent a classroom activity that has been shown to be beneficial to promoting teacher-child verbal interactions and providing rich opportunities for children to practice their oral language (Beck and McKeown, 2001; Wasik and Iannone-Campbell, 2012; King and Dockrell, 2016). Specifically for children with SLCN, a Tier 2 approach with organized small group activities may provide

targeted support (Ebbels et al., 2019). However, Mary showed another pattern of much more ongoing teacher talk over time compared to the children, which reflects what has been found in studies of whole-class talk, namely that the majority of classroom talk is the teacher's (Hattie, 2008; Eadie et al., 2021). The patterns of the amount of talk between teachers and children demonstrated in this study leads to an interesting discussion of teacher talk characteristics. More specifically, teachers who usually talk a lot may do so regardless of whether the classroom activity is performed in whole-class or in small group constellations, that is, teachers might have their own "teacher style." Thus, in addition to the targeted strategies in this study, other aspects of teacher talk may be crucial variables to include in the PD program to balance the teacher-child interactions. Such important aspects might be teachers trying to use a slow pace during teacher-child interactions, giving children time to respond, and distributing the talking time equally among the children. The CSCOT (Dockrell et al., 2012, 2015) does include two strategies of pacing and pausing respectively, which accordingly should be included in a larger study.

The self-rated strategy use by the intervention teachers in everyday teaching during a school week showed high ratings of using the strategy OPE compared to other strategies, which aligns well with the findings from the observations in the present study and in previous studies (Dockrell et al., 2015; Waldmann and Sullivan, 2017; Eadie et al., 2021; Nordberg, 2021). Interestingly, Emma and Mary rated the most frequently used strategies (EXT/LAB) during the intervention as the least used ones. Perhaps this finding reflects a difference in implementing the strategies in whole-class everyday teaching as compared to in the structured small group conversations, which was the setting during observations in the present study. It is also possible that this finding may reflect challenges in distinguishing the strategies clearly from each other. The supplementary open questions in the weekly checklists showed that Emma and Mary overall described examples of using almost all strategies, including the strategy ENC. Both Emma and Mary gave examples of the strategy OPE being used during book-reading activities and described it as a strategy that was "easy" to use. The quantitative and qualitative results both confirm each other, regarding for example the intervention teachers' strategy use of OPE, and also show the challenges of implementing other strategies. This is somewhat in line with findings in the study by Andersson et al. (2022), in which teachers' self-perceived ability and their actual use of new communicative skills showed discrepancies. Overall challenges with strategy use appeared to concern taking advantage of spontaneous opportunities and using the strategies naturally in teacher-child interactions. Furthermore, issues were described concerning the feasibility of using the strategies in whole class vs. small groups, where small groups were preferred. Concerns about the amount of teacher talk vs. children's talk were also described, and specifically Mary stated that she talked a lot and was well aware of her own communicative style in this respect. Overall benefits of strategy use were described as children having more courage to participate and express themselves in classroom talk, as well as children starting using new words and asking about the meaning of words.

The results from the present study are encouraging in that the intervention teachers appeared to be affected by the relatively short PD program during the intervention period, and because they described positive outcomes for the children when using the strategies. However, to assist with transferring theoretical

knowledge to classroom practice (Piasta et al., 2020; Mathers, 2021), and to sustain their communicative skills, the teachers may have indeed needed more coaching sessions to learn and automatize the strategies so that they could take advantage of opportunities and use them more naturally in their teacher-child verbal interactions. To further understand the teachers' patterns of strategy use, a scaled-up study should consider implementation fidelity measures to evaluate the intended outcome effects (Carroll et al., 2007). One suggestion is to monitor the teachers' adherence to the core ingredients of the PD program (i.e., strategy use) by occasionally conducting direct classroom observations of the teachers in their verbal interactions during everyday teaching, and not only during the measure points in the activity of structured small group conversations. For this, the CSCOT (Dockrell et al., 2012, 2015) could be used to inform an overview of how the teachers adhere to implementing the targeted strategies. A common way to measure participant responsiveness is through self-reports (Carroll et al., 2007). The teachers in this study performed weekly checklists with additional open-ended questions designed to self-rate their strategy use in everyday teaching during a school week. The checklists were also a reminder for the teachers to use the strategies in between observations, but more importantly to bring forward the teachers' own perceived benefits and challenges with strategy use. In a larger study, using extended checklists might give further information of participant responsiveness. However, in the current study, the checklists were deliberately designed to be short to promote the teachers to fill out the checklists and to consider the teachers' workload in their everyday teaching.

Although exploratory and small-scale, one of the strengths of this study is the mixed-methods case design, which enabled us to test and evaluate the intervention in a real-life context (Paparini et al., 2020, 2021). The study has strong ecological validity due to several aspects. The observations were conducted in a real-life context, in which the teachers were asked to explore and implement the strategies in their everyday teaching between observations, rather than being burdened with checklists or assignments. Furthermore, structured small group conversations based on discussions of texts is a familiar activity to most teachers, and do not require special costs. Finally, the duration and intensity of the PD program took account of the time constraints that many teachers face in their everyday practice. Based on these considerations, the design of the current PD program could in many aspects be suitable to apply within schools.

In the present study, data on teachers' strategy use and amount of teacher-child talk were collected using video recordings, allowing detailed quantified language analyses over time (Mercer, 2010). In this way, the outcome measures aligned closely to the PD content, which is a conclusion addressed in previous research framed by enhancing the use of communication-supporting strategies (Andersson et al., 2022). We used video recordings to keep track of the separate teacher-child interactions and their speech production, which would not be possible with audio recordings. The teachers were exposed to both direct observations, with the first author as an observer, as well as video recordings. This may have had an impact on how the teachers performed during the observations. A potential risk with any form of observation is subject reactivity (Kazdin, 1982), which is a phenomenon that may affect the participants in performing differently merely by being observed, regardless of the intervention. However, the

observer did not interfere in the teacher-child conversations, nor move the cameras during observation. To reduce the impact of any inconvenience during the observations, the observer had also held preparation meetings with each teacher and visited each class shortly before the intervention started to inform the children about the procedure and answer their questions. All three teachers said early in the preparation procedures that they commonly used iPads or similar devices with the children in school activities.

5.1. Limitations and future development

The explorative design of the intervention in the present study entails a number of limitations and some of them are addressed. First of all, a scaled-up study with a larger sample is needed to evaluate the effects of the intervention statistically. As an increased sample of teachers requires more coaches, we intend to cooperate with special needs teachers in schools to conduct the PD program. This would entail training, monitoring, and support by a research team to ensure implementation fidelity (Carroll et al., 2007). Furthermore, we intend to extend the PD program to cover a longer time period to ensure more sustainable changes in teachers' strategy use. The set-up would include more frequent initial coaching sessions, followed by occasional guidance and coaching over time. In a scaled-up study, we suggest maintaining a pre-, post, and follow-up research design to evaluate sustainability of the intervention.

If statistically significant effects can be demonstrated in a scaled-up study, further future development might entail that parts of the content in the PD program are carried out by special needs teachers with groups of teachers. For example, workshops in combination with fewer individual coaching sessions might increase the cost-effectiveness of the intervention. Furthermore, workshops might provide teachers with an element of cooperative learning. However, a caveat might be that trying to change aspects of "teacher style" in terms of teacher talk and classroom interactions could be sensitive issues for teachers. In line with previous research showing that adding several elements to a PD program may be more effective (Snyder et al., 2015; Markussen-Brown et al., 2017), it appears important to somewhat maintain the ingredient of trustful individual feedback conversations that takes place in the coaching sessions.

Although the method of using video recordings allowed a detailed description of teachers' strategy use and amount of teacher-child talk, the transcription and coding was time-consuming. In a larger sample, it may be more efficient to conduct analyses of time samples. In this study, the setting for observations was structured small group conversations discussing different texts. A suggestion for future research could be to investigate if different text types affect teachers' strategy use. Furthermore, analyzing other classroom activities would also be important to see if strategy use and the amount of talk between teacher and children would turn out differently.

In the present study, patterns of the amount of talk between teachers and children were overall explored during the small group conversations. However, in a scaled-up study, we recommend to perform a statistical analysis to explore the correlation between teachers' strategy use and word productivity (TNW/min). Regarding the children, measures of child outcomes should be considered to evaluate what impact teachers' strategy use may have on children's oral language skills, since improved

child oral language abilities are the ultimate goal of the intervention. Child language outcomes could be measured for children in general, but should also explore differences between children with and without SLCN to examine whether the intervention is particularly beneficial for children with SLCN. We intend to explore child outcome data in a forthcoming study. Finally, with the present study we hope to inspire the further development of practice-close PD programs involving communication-supporting strategies during teacher–child interactions.

Data availability statement

The datasets presented in this article are not readily available because of the confidential nature of the primary data. Requests to access the datasets should be directed to KE, karin.edlund@specped.su.se.

Ethics statement

The studies involving human participants were reviewed and approved by the Swedish Ethical Review Authority (protocol number 2019–02735). Written informed consent to participate in this study was provided by the participants' legal guardian/next of kin.

Author contributions

KE implemented the intervention, conducted the data collection, and drafted the manuscript. KE and EB conducted the transcriptions of the video-recorded data and carried out the interobserver agreement testing. All authors contributed substantially to the design, data analysis, and interpretation, as well as to critically revising the manuscript, and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Supplementary material

The Supplementary material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/feduc.2023.1036050/full#supplementary-material>

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