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Effects of early childhood education training and video interaction guidance on teachers' interactive skills

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ABSTRACT

Research has demonstrated that teachers working in early childhood education and care (ECEC) are proficient in offering emotional support to young children, but markedly weaker when it comes to instructional support. We conducted a controlled experimental study in the Netherlands, to investigate the effects of targeted in-service training on improving teachers' instructional support. Teachers (N = 72) were randomly assigned to four conditions: an intensive early childhood education (ECE) training (N = 17), video interaction guidance (VIG) (N = 16), a combination of both training programs (N = 18), or a control condition with no training (N = 21). Teachers' interactive skills were measured pre- and postintervention, according the scales of the Caregiver Interaction Profile (CIP). The ECE training improved the proficiency of teachers' verbal communication and offering developmental stimulation. VIG proved to be effective in teachers' fostering positive peer interactions between children. Intensive and targeted training can successfully improve the quality of teachers' instructional support in ECEC settings, although more research on effective elements of professional development of ECEC teachers is needed.

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Introduction

Teachers working in early childhood education and care (ECEC) are required to display a wide range of skills during their interactions with young children. ECEC teachers not only need to offer young children emotional support, but are also responsible for classroom organization and supporting the development of the children (see Domitrovich et al., 2009; Hamre, 2014; Hamre, Hatfield, Pianta, & Jamil, 2014; Helmerhorst, Riksen-Walraven, Vermeer, Fukkink, & Tavecchio, 2014). The explicit stimulation of the linguistic, cognitive and social development of young children has proven to be the Achilles' heel of the ECEC sector. ECEC teachers appear to be relatively proficient in offering emotional support, but markedly weaker when it comes to instructional support. Stimulation of children's general development (e.g., cognitive, creative, development, self-regulation) in different developmental domains emerges as an obviously weaker and often insufficient element of ECEC process quality. This pattern has been found in studies from different countries, including Australia (Ishimine, Wilson, & Evans, 2010), Finland (Lerkkanen et al., 2012), Germany (von Suchodoletz, Fäsche, Gunzenhauser, & Hamre, 2014),

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Portugal (Abreu-Lima, Leal, Cadima, & Gamelas, 2013), Spain (Sandstrom, 2012) and the United States (see Burchinal et al., 2008; Denny, Hallam, & Homer, 2012; Domitrovitch et al., 2009; Hamre et al., 2012; La Paro et al., 2009; La Paro, Pianta, & Stulman, 2004).

The Netherlands is not an exception to the rule. National assessments in Dutch ECEC have indicated that teachers are proficient in basic interaction skills like sensitive responsiveness, respecting the autonomy of the child, and structuring and limit setting, whereas they show relatively lower levels of skills within the educational domain; including verbal communication, developmental stimulation and fostering peer interactions between children (Helmerhorst, Riksen-Walraven, Deynoot-Schaub, Tavecchio, & Fukkink, 2015). Therefore, the challenge facing the ECEC sector is to improve the quality of teachers' instructional support within a broad spectrum of interactive skills—skills that are required for teachers in ECEC settings in interactions with children throughout the day. In this study, we evaluate the effect of in-service training on the interactive skills of teachers working in Dutch ECEC settings, focusing on three professional programs: an early childhood education program with a focus on instructional support, a professional program with a focus on socioemotional support, and a combination of these two professional programs. This experimental study into ECEC professional development aims to deepen our insight into effective approaches to improve teachers' interactive skills, specific to instructional support.

Effects of professional development in the early childhood education and care sector

The importance of effective in-service professional development for ECEC teachers, after their initial vocational training, is widely recognized (Eurofound, 2015; Oberhuemer, Schreyer, & Neuman, 2010; OECD, 2012; Urban, Vandenbroeck, Van Laere, Lazzari, & Peeters, 2012; Zaslow, Tout, Halle, Whittaker, & Lavelle, 2010). The results of experimental research indicate that targeted training can improve the process quality of interactions between teachers and children. A meta-analysis of Fukkink and Lont (2007) showed that targeted training has a positive effect on the competences of ECEC teachers. After completion of a training program, teachers showed more professional expertise and a more professional attitude towards their work, as well as improvement of their interactive skills. A recent meta-analysis by Werner, Linting, Vermeer, and Van IJzendoorn (2016) of randomized controlled trials also showed that targeted interventions focusing on improving child care quality, caregiver interaction skills, and child social-emotional development had a positive effect on the interactive skills of teachers.

The above-mentioned meta-analytical research has also revealed a striking variation in the results of training courses for teachers in ECEC. While the effects of teacher training on ECEC teachers' competency are, on average, positive (with medium effect sizes, according to the rule of thumb by Cohen, 1988), there are striking low peaks; training programs with nil effects or even negative effects (Fukkink & Lont, 2007). Therefore, another important theme for research is to find effective methods for addressing the professional development, to offer greater insight into the elements that contribute to improving the professional competences of ECEC teachers (see Sheridan, Edwards, Marvin, & Knoche, 2009). Taking into account the significant difference between the levels of emotional support and explicit stimulation of children's development as observed in many countries, this line of study should also make clear whether it is possible to

increase teachers' educational skills without a trade-off in other domains of pedagogical quality, including emotional support.

Meta-analytical research into the effects of professional development in ECEC has revealed some moderators that were linked to more substantial results. Egert (2015) found that effective training programs provided opportunities for active learning, guidance, and feedback. Werner and colleagues (2016) found that programs with an individual training component led to higher effect sizes. Coaching and related individualized interventions seem to be effective strategies that are being implemented in ECEC settings for professional development of teachers (see also Isner et al., 2011; Zaslow et al., 2010).

Video feedback is an often used tool in teacher programs and allow a critical analysis of the interactions of trainees. Video feedback interventions show wide variation, ranging from teachers independently reflecting on their own videos to more extensive interventions with added forms of coaching (Fukkink, Trienekens, & Kramer, 2011). Video feedback is often part of a broader professional development program that also includes additional instructions and consultation. Pianta, Mashburn, Downer, Hamre, and Justice (2008) found that teachers that received feedback targeting videotapes of their interactions and online consultation showed significantly greater increases of the quality of interactions than teachers that only received access to a website with video clips. More specifically, trainees in the video and consultation condition were more sensitive, used more language modeling, and provided higher quality instruction than trainees in the video-feedback only condition. Video feedback interventions can thus enhance the quality of teachers' interactions in prekindergarten. Based on a narrative review of European professional development programs (Eurofound, 2015), video feedback appears to be an effective approach (see also Fukkink et al., 2011). As video feedback is primarily focused on increasing teachers' sensitivity, positive results of experimental studies on the effects of video feedback often relate to teachers' skills with regard to emotional support (Eurofound, 2015; Fukkink & Lont, 2007). There is less evidence that video feedback methods are also effective when used to offer training regarding teachers instructional support in the general cognitive domain.

The above-mentioned findings suggest that an individual focus on the participants in the context of their working environment and support by video feedback contribute to the effects of in-service training. However, various researchers (Schachter, 2015; Sheridan et al., 2009; Snyder et al., 2012) have also highlighted the fact that further research into training is needed in order to solidify the relatively limited knowledge base. Experimental research, particularly controlled studies in which the training and its effects are well specified, is necessary in order to gain more insight into the effectiveness of professional development programs.

Aim of the study

This study is an external evaluation of the effect of two forms of in-service training on interactive skills of ECEC staff. In a controlled pretest-posttest design with four conditions, we evaluated the effect of an early childhood education (ECE) training with a focus on teachers' instructional support (1), the effect of video-interaction guidance (VIG)—an intervention using video feedback method—which is primarily focused on sensitive responsivity and social exchange within the classroom (2), a

combined professional ECE+VIG program (3), and a control condition (4). We hypothesize that both types of training are effective in enhancing ECEC teachers' skills with regard to instructional support. Based on the content of the professional program (see Method section), we hypothesized that the ECE approach improves the quality of teachers' verbal communication and developmental stimulation while respecting the children's autonomy (Hypothesis 1). Further, we hypothesized that the VIG approach improves the quality of teachers' sensitive responsivity, fostering peer interactions while respecting the children's autonomy (Hypothesis 2). We hypothesize that the combined ECE+VIG condition combines the effects of both individual professional programs (see Hypothesis 1 and 2). By evaluating the effects of two types of training (ECE, VIG), and the combination of both (ECE+VIG), in a quasiexperimental design with a control group, we aim to gain insight into the differential and aggregate effects of these types of training on ECEC teachers' interactive skills.

Method

Description of interventions

Drawing on the descriptive frameworks outlined by Buysse, Winton, and Rous (2009), Schachter (2015), and Snyder and colleagues (2012) for the description of ECEC training courses, we describe both professional development programs, including objective, process, content, implementation, and context.

Early childhood education (ECE) training

The newly developed in-service ECE professional program, developed by the *Korein Group* in the Netherlands, has three primary cornerstones: (1) professional expertise regarding the children's development, and (2) offering an attractive learning environment for children, and (3) educational activities. In the training, teachers first learn to become aware of the importance of a well-organized classroom with sufficient, developmentally appropriate learning materials. Teachers also learn to reflect upon their planning, implementation, and evaluation of their instructional activities with a special focus on vocabulary development.

A significant theme that runs through the ECE training program, is safeguarding the balance between preparing and enriching educational activities on the one hand and ensuring sufficient scope for the personal initiatives of young children on the other hand. The ECE program focusses on teaching teachers to have an active role in the classroom and to actively contribute to the child's learning, without 'taking over' the children's learning through their active role.

The ECE program consists of on-location coaching sessions (coaching on the job) in which an experienced coach offers face-to-face individual feedback. In several sessions, the ECEC teachers and the coach discuss the organization of the classroom, as well as the preparation, implementation, and evaluation of educational activities.

The professional program comprised a basic module of nine 2.5-hour sessions, complemented by two additional biannual 2.5-hour meetings focusing on implementation (a total of 27.5 hours in a period of approximately a school year, equal to 10 months). The coach

was a senior consultant with extensive experience in ECEC. On each participating location, there was also a so-called ECE coordinator employed—funded by municipal subsidies—to monitor the implementation of the training and to coach the teachers for 8 hours per week.

The professional program was structurally embedded in the pedagogical and educational policy drafted by the management of the primary schools and childcare organization concerned and dovetails with the local policy enacted by the local municipality. Also an annual ECE monitor was implemented and individual schooling plans were drafted for each location, based on the audits with this monitor.

Video Interaction Guidance (VIG)

The Video Interaction Guidance (VIG) for childcare (see Eliëns, 2017) as developed by the *Associatie voor Interactiebegeleiding en Thuiszorg* and the *Korein Group*, is an in-service training using video feedback to improve the interaction quality between teachers and children, following a child-centered approach in the context of ECEC. This intervention is primarily focused on contact and social exchange within class. VIG is an intensive method of training in which a VIG coach and a teacher, the participant, jointly analyze and discuss video-recordings of the teachers' classroom interactions. Therefore, VIG can function as a catalyst for critical reflection and the improvement of interactive skills. VIG as evaluated in this research is a further developed variant of the training program that was earlier evaluated in a different phase and setting by Fukkink and Tavecchio (2010).

Video-feedback is the predominant component of the VIG program. During the VIG program, each teacher was repeatedly filmed for 10 minutes during situations of structured play in his/her own permanent classroom. These situations often consisted of reading to the children, craftwork activities or play in one of the different theme corners. After filming, the VIG coach selected a series of episodes for watching and discussing together with the concerning teacher on a later moment during shared review sessions.

In the context of this study, the shared review sessions were focused on social interactions in class, including dyadic contact between the teacher and the individual children, between the teacher and the group of children, and the interactions among the children themselves. In the review sessions, the videos were paused or watched repeatedly in order to thoroughly observe, analyze, and discuss the interactions. The VIG coaching protocol stimulates trainers to address the involvement of children in the activity. Central categories in the analysis of the video clips are receiving children's initiatives (e.g., follow child's lead, being face-to-face) and interaction in the group (e.g., taking turns in the conversation, helping each other, and connecting the children by making them aware of each other's activities). This approach is intended to help improve the quality of interactions between the teacher and the children and also to foster positive peer interactions. VIG does not include specific standards related to instructional support. The VIG coach used a positive self-modeling approach to emphasize successful classroom interactions. This approach is intended to help further bolster such positive behavior and it also contributes to the creation of a secure supervision climate and a positive self-image for the teacher (see Thurlings, Vermeulen, Bastiaens, & Stijnen, 2013). During the shared review sessions, the coach encouraged the teachers to reflect upon their interactions and to ask themselves questions about their classroom interactions.

The VIG professional program comprised four sessions, held within a period of approximately 16 weeks. Each session was on average 30 minutes long. The sessions

were run by a group of four coaches in total. All of the coaches had extensive experience as a VIG coach (9 years on average).

The childcare organization that participated in this research, has approximately 15 years of experience with VIG. The VIG coaches are supported by a documentalist, who is responsible for archiving the collected recordings.

Early childhood education (ECE) training + Video interaction guidance (VIG)

The ECE+VIG condition combined the two professional programs. No specific changes were made to either the ECE or VIG program in this condition. The two professional programs were provided sequentially and the ECE training preceded the VIG training.

Both the ECE and VIG program have been developed by Korein, which is a nongovernmental, nonprofit organization. The VIG program is provided by different trainers in the Netherlands; the newly developed ECE professional program is not yet widely available. There are no government mandates for in-service training of ECEC staff, but governmental policy emphasizes the importance of interactive skills for pedagogical quality of childcare.

Sample and design

The effects of the experimental conditions were evaluated in a controlled experimental design with pretest and posttest. Teachers were randomly assigned at individual level to receive only ECE training, receiving only VIG, receiving both ECE training and VIG, or the control condition without training.

We planned data collection for a sample of 78 ECEC teachers. All participating teachers worked at preschool groups of 22 community schools of the Korein organization, which were subsidized by the municipality to invest in early childhood education. All teachers at the 22 locations participated; only teachers who had already participated in either the ECE or VIG program were not selected. For a small number of teachers data were incomplete or inadequate. For 4 out of 78 teachers, no posttest was available. Further, two video clips of two teachers were too short (only 21 and 98 seconds) to assess interactive skills in a valid manner. This resulted in a final sample of 72 participants with complete data for the ECE program (N = 17), VIG program (N = 16), receiving both ECE training and VIG (N = 18), or the control condition without training (N = 21). An a priori power analysis indicated that the size of the sample was sufficient to demonstrate medium-to-large effects (Cohen's $d \approx 0.65$) at the conventional alpha level of .05 (one-sided) with a statistical power of .80; the a priori effect size was based on the results of the experimental research conducted by Fukkink and Tavecchio (2010).

The majority of the teachers were female (N = 71) with an average age of 46 years old (SD = 9.7), at the time that the study commenced. Teachers had an average of 14.3 years of working experience in ECEC (SD = 6.0), of which 6.7 years (SD = 7.5) in their current classroom. The majority of the teachers (59%) had completed intermediate vocational education. Teachers who had completed higher professional education (34%), and teachers with an academic background (6%) were also represented in the sample (see Oberhuemer et al., 2010 for an overview of the Dutch vocational education system for ECEC).

Procedure

The pretest took place 1 to 2 weeks before the intervention. Posttests took place approximately between 1 to 2 weeks after the final training session. Pretests and posttest were scheduled on an individual basis. During both the pre- and posttest, teachers were filmed for 10 minutes by one of the VIG trainers during a teacher-led activity with a small group of, on average, four children (SD = 1.5), in most cases two girls and two boys, from the permanent classroom of the teachers.

The in-service context for the ECE and VIG training contributed to the fidelity of both types of professional development. All planned sessions of both the ECE and VIG in-service training took place as scheduled; one VIG trainer was replaced in the planning due to long-term disease. Both sessions and pretest and posttest measures were scheduled in an individualized manner. Further, there was no staff turnover for participants from the three experimental groups or control group during the conduct of our study.

Measures

Caregiver interaction profile (CIP)

To assess the interactive skills of the teachers at the pretest and posttest, we coded the videotaped clips of the teachers using the CIP. Six interactive skills are identified in this measure: (1) *Sensitive responsiveness*, (2) *Respect for autonomy*, (3) *Structuring and limit setting*, (4) *Verbal communication*, (5) *Developmental stimulation* and (6) *Fostering peer interaction*, measured on a 7-point scale with the following anchors: 7 = *very high*, 6 = *high*, 5 = *moderately high*, 4 = *moderate*, 3 = *moderately low*, 2 = *low*, and 1 = *very low*. We selected the CIP measure because it is a validated instrument which has regularly been applied in childcare studies in the Netherlands, including experimental research (see Fukkink et al., 2011). Further, the ECE and VIG programs are related to the distinguished interactive skills (see Hypothesis 1 and 2 below).

Sensitive responsiveness refers to the extent to which a caregiver recognizes children's individual emotional and physical needs and responds appropriately and promptly to their cues and signals. Respect for autonomy refers to the extent to which a caregiver is nonintrusive but instead recognizes and respects the validity of children's intentions and perspectives. Structuring and limit setting refers to the ability of a caregiver to clearly communicate expectations toward children and structure the situation accordingly, and to set clear and consistent limits on the children's behavior. Verbal communication refers to the frequency and quality of verbal interactions between caregiver and children. Developmental stimulation concerns the degree to which a caregiver deliberately attempts to foster children's development (e.g., motor skills, cognitive development, and creativity). Appropriate developmental stimulation means not only providing novel stimuli and learning opportunities but also attuning the stimulation to children's focus of attention, developmental level, and state, thereby challenging the children while at the same time preventing overstimulation. Fostering positive peer interactions refers to a caregiver's guidance of interactions between children in the child care center. This stimulation of prosocial behavior and social development of young children is an explicit part of the CIP measure. The CIP skills (1) and (2) are related to the domain of 'emotional support' from the Classroom Assessment Scoring System); skill (3) is related to the CLASS domain of

'classroom organisation'; and skills (4), (5) and (6) are related to the domain of 'instructional support', acknowledging differences between the two measures (see Helmerhorst et al., 2014 for the CIP; and Pianta, La Paro, & Hamre, 2008 for the CLASS).

Three trained observers assessed the filmed episodes. All observers completed six training sessions in advance, each lasting approximately 4 hours. Observers were certified if they met the criterion of an intraclass correlation (*ICC*, two-way random, absolute agreement) of ≥.70 for each of the CIP skills. The observers were blind to the condition of the teachers (experimental or not) and to the measurement moment of the episodes (pretest or posttest), and they only assessed one of those latter two. A random selection of episodes (n = 16, 11%) was coded by a second observer. For all recordings, the average observer agreement with a maximum deviation of one scale point was 94.8%; in 5.2% of the recordings, a difference of two points was noted. The percentages of agreement were 94, 94, 100, 100, 88, and 94 for *sensitive responsiveness, respect for autonomy, structuring and limit setting, verbal communication, developmental stimulation*, and *fostering peer interaction* respectively.

Analysis

The CIP outcome measures were analyzed with the experimental condition as the independent variable and the aggregated CIP score (Cronbach's α = .84) as covariate. Overall effects were tested with a MANCOVA with contrasts for each experimental condition (ECE, VIG, and the combined ECE+VIG program) and the control group at multivariate level. Subsequently, we tested the effects for the separate CIP skills with ANCOVAS and report effect sizes for each experimental comparison (Hedges' g). The significance level for each analysis was set at α = .05.

A preliminary analysis of the pretest data did not reveal statistically significant differences between the conditions for the total CIP score, F (3, 68) = 0.36, p = .78; the average pretest CIP scores were 4.26 (SD = 0.74), 4.23 (1.10), 4.48 (0.59), and 4.20 (0.78), respectively, for the VIG, ECE, VIG+ECE, and control condition. There was no significant difference in CIP pretest scores between the teachers with regard to the number of years that they had worked in the visited classes (F (3, 68) = 1.31, p = .28), total years of working experience (divided into more or less than 5 years; χ^2 (3, N = 72) = 4.90, p = .18), educational level (intermediate vocational education or higher; χ^2 (3, N = 72) = 1.62, p = .66), and Dutch as mother tongue (χ^2 (3, N = 72) = 4.19, p = .24).

Results

Teachers who received either the Video Interaction Guidance (VIG) program, the early childhood education (ECE) program or both, showed on average higher levels of CIP skills compared to teachers in the control group (see Table 1). Table 1 also shows that teachers who had received both the ECE program and VIG, show less variation in their CIP scores (with the lowest mean score of 3.56 and the highest mean score of 5.22, a difference of 1.66), closely followed by teachers in the VIG condition (*min-max* = 3.44–5.19, a difference of 1.75). The difference was larger in the case of the teachers who had received ECE program (*min-max* = 2.76–5.18, a difference of 2.42 points), while the difference in teachers' CIP scores in the control group was most marked (*min-max* = 2.29–4.95, a

Table 1. Means, Standard Deviations, and Effect Sizes (ES) for the CIP Scores at the Posttest

	ECE (n = 17)		VIG (n = 16)		ECE+VIG (n = 18)		Control (n = 21)
	M (SD)	$ES_{ECE - CON}$	*M (SD)*	$ES_{VIG - CON}$	*M (SD)*	$ES_{ECE+VIG - CON}$	*M (SD)*
Sensitive responsiveness	5.18 (1.02)	0.23	5.19 (0.66)	0.29	5.22 (1.06)	0.27	4.95 (0.92)
Respect for autonomy	4.88 (0.86)	0.14	4.94 (1.00)	0.19	5.06 (0.94)	0.33	4.76 (0.83)
Structuring and limit setting	4.94 (1.34)	0.25	4.24 (1.27)	−0.32	4.59 (1.33)	−0.03	4.63 (1.15)
Verbal communication	5.00 (1.06)	1.00*	4.19 (1.22)	0.27	4.67 (0.97)	0.74*	3.86 (1.15)
Developmental stimulation	4.59 (1.23)	0.96*	3.44 (1.46)	0.16	4.00 (1.24)	0.56#	3.19 (1.57)
Fostering peer interactions	2.76 (1.44)	0.40	3.44 (1.37)	1.02*	3.56 (1.34)	1.13*	2.29 (0.85)

Note. Statistically significant effects have been indicated with an asterisk (*); trend effects (.05 < p < .10) have been indicated with a hashtag (#).

difference of 2.66 points). Hence, the level of teachers that completed the VIG training program, showed a relatively balanced profile without notable differences between the individual CIP skills.

Effects of the ECE training program

A multivariate analysis showed that the ECE training program had a significant positive effect on the interactive skills of teachers, $F(6, 62) = 3.43$, $p = .006$, partial $\eta^2 = .25$. A univariate analysis of the various interactive skills showed, as expected, that positive effects of the ECE program related to teachers' *verbal communication,* $F(1, 67) = 15.38$, $p < .001$, partial $\eta^2 = .17$, and *developmental stimulation,* $F(1, 67) = 20.64$, $p = .002$, partial $\eta^2 = .14$. No significant effect was found for *respect for autonomy* or the other interactive skills.

Effects of the VIG training program

The multivariate analysis also showed a statistically significant effect for the VIG training, $F(6, 62) = 2.25$, $p = .05$, partial $\eta^2 = .18$. A follow-up analysis at univariate level showed that the VIG training program had a positive effect on the teacher's *fostering peer interactions between children,* $F(1, 67) = 10.79$, $p = .011$, partial $\eta^2 = .09$. No significant difference was found for *sensitive responsivity* or the other interactive skills.

Effects of the ECE+VIG training program

Teachers from the combined ECE+VIG condition also showed a significant difference with the control group, $F(6, 62) = 2.60$, $p = .026$, partial $\eta^2 = .20$. At univariate level, the combined professional program showed effects for *verbal communication,* $F(1, 67) = 6.85$, $p = .011$, partial $\eta^2 = .09$, and *fostering peer interactions between children,* $F(1, 67) = 9.56$, $p = .003$, partial $\eta^2 = .13$. The effect on *developmental stimulation* only approached statistical significance, $F(1, 67) = 3.83$, $p = .055$, partial $\eta^2 = .05$.

In sum, the ECE training program was effective for teachers' interactive skills with regard to *verbal communication and developmental stimulation*, whereas the VIG program was effective for teachers' interactive skills with regard to *fostering peer interactions between children*. The combined ECE+VIG program showed the positive training effects

of both the ECE and VIG programs, with positive outcomes for *verbal communication* and *fostering peer interactions between children*, although the effect for *developmental stimulation* only approached statistical significance for this condition.

Discussion

This experimental research demonstrates positive effects of in-service training on early childhood education and care (ECEC) teachers' interactive skills. Both of the evaluated types of professional development program improved teachers' interactive skills within the instructional domain, skills that emerge as being relatively weak in domestic and international research. Our study showed differential effects for the two evaluated professional programs. The early childhood education (ECE) program had a positive effect on teachers' *verbal communication* and *developmental stimulation* (but not *fostering of interactions between children*). Conversely, after video interaction guidance (VIG), teachers improved the *fostering of interactions between children* (but not *verbal communication* and *developmental stimulation*). These differential outcomes could be explained by the different approaches of the two forms of professional development. The ECE program has a teacher-centered approach, placing emphasis on the central and active role of the teacher as instructor during educational activities. This could explain why after ECE training, the teachers improved their verbal communication and developmental stimulation, and the quality of their instructional support was relatively high. VIG, on the other hand, follows a more child-oriented approach, in which teachers learn to strike a balance between teacher-led activities and child-initiated activities. In other words, VIG fosters an active, social learning climate in the ECEC setting (see also Snyder et al., 2015) and this approach may explain the positive effect of VIG on teachers' ability to foster peer interactions between children. The VIG intervention did not produce significant changes for *sensitive responsivity, respect for autonomy*, or *structuring and limit setting* in this study. Possibly, the alignment of the VIG program with these interactive skills needs further development. The fact is that the VIG training has a specific focus on concrete interaction behaviors (e.g., following initiatives of children, confirming the reception of these initiatives, and turn-taking), which are directly linked to sensitivity of the teacher in caregiver–child interactions and peer-to-peer interaction. However, there is not a direct link to all interaction skills from our outcome measure. It seems interesting, therefore, to extend the VIG program with other concrete behaviors that are specifically related to *respect for autonomy* and *structuring and limit setting*, for example, or *verbal communication* and *developmental stimulation*.

An alternative explanation is that the initial levels at the pretest for these interactive skills were already moderately high in our sample. Also large-scale assessments of Dutch childcare have repeatedly shown that Dutch caregivers show relatively high levels for these skills, and this leaves relatively little room for improvement in intervention studies. Also, staff in other Dutch studies showed relatively high levels before the training and no further improvement for sensitive responsivity after the training (see Groeneveld, Vermeer, Van IJzendoorn, & Linting, 2011). However, the study of Helmerhorst, Riksen-Walraven, Fukkink, Tavecchio, and Gevers Deynoot-Schaub (2017) recently reported significant improvements for *sensitive responsivity, respect for autonomy*, or *structuring and limit setting* of Dutch early childhood staff after a training with a newly developed video-

feedback training program. In the current study, however, both the VIG and the ECE training were only effective in improving instructional support without additional gains for other interactive skills.

The positive results on specific teachers' skills within the instructional domain for each training were realized without a trade-off with regard to the other, more basic, interactive skills (*sensitive responsiveness, respect for autonomy*, and *structuring and limit setting*). In other words, teachers that improved specific dimensions of their instructional support did not compromise the quality of their emotional support. Related to this, the characteristic discrepancy between the teachers' level of performance of basic skills and that of the more educational skills, visible in Dutch assessments (Helmerhorst et al., 2015) as well as in international research (see, e.g., Domitrovich et al., 2009; La Paro et al., 2009), was less pronounced with the trained staff in this experimental study, although this balance was more clear for the ECE program than for the VIG program. Further, neither the ECE nor the VIG intervention proved effective in improving basic interactive skills as *sensitive responsivity* or *respect for autonomy*.

This study did not demonstrate any synergistic effects by combining ECE training and VIG. This could be due to the different approaches of both types of professional development. It might have been difficult for teachers that have received both types of training to combine the teacher-centered approach of the ECE professional program with the more child-oriented approach of VIG. However, both types of professional development proved complementary. The combined professional program did not result in additional effects but their positive results were not canceled out either. This study shows, therefore, that the two evaluated types of professional programs, each with a different focus, resulted in specific gains which proved complementary in a combined approach.

Finally, the vocational training levels of most staff in our study were below bachelor level. This reflects the Dutch ECEC context where the large majority of teachers have followed a 3-year upper secondary vocational course; an associate or bachelor degree is not required and these qualifications are rare in the Dutch ECEC workforce. Further, the teachers in our sample with a mean age of 46 years is older than regular Dutch ECEC staff; in the most recent national quality assessment, the average caregiver was 33 years old with 9 years working experience (see Helmerhorst et al., 2015). The findings of our study underline that ECEC staff with preservice training below bachelor level and with relatively high levels of working experience can benefit from professional development programs with a focus on the instructional domain.

Limitations of this study

This study is not without its limitations. First, the filmed situation involved a teacher-led activity, which means that the results cannot be generalized to other parts of the full day program. The positive effect of the training programs was observed in the specific context of teacher-led activities. Because ECEC teachers appeared to be less skilled in targeted educational stimulation, our findings are relevant with regard to the improvement of quality of instructional support in ECEC. However, future research will need to clearly establish whether a specific effect on (solely) instruction moments can be identified, or whether the results can be generalized to other contexts and are also visible in 'spontaneous' stimulus in other elements of the program. Second, although large sample sizes are

relatively difficult to accomplish in this field of research (see Werner et al., 2016), it would be desirable to evaluate the effects of both professional programs in a larger sample. A third limitation is that, due to the lack of retention measurement in this research, we cannot establish whether the progress is sustainable.

Finally, a fourth limitation of this study is the lack of detailed information about the fidelity of the training. In future studies, logbooks of the ECE and VIG training sessions may provide general information about the professional program, but video analysis of the sessions may provide more detailed information with regard to the content and delivery. This line of study may reveal which specific learning processes take place during the training. More specifically, fitting in with the results of this experimental study, it seems interesting to analyze for the ECE program how trainer and teachers discuss developmental support and verbal communication. For the VIG training, an analysis of the videotaped shared review sessions may shed light on how teachers develop their skills for this specific interaction skill. By linking process research with significant findings from experimental research, future process studies have a clear focus and may reveal how training formats are delivered and shape the professional development of ECEC teachers effectively in the instructional domain (see also Sheridan et al., 2009).

Conclusion

This research demonstrates that targeted professional development programs can improve teachers' interactive skills in ECEC and results in a substantial improvement of the pedagogical process quality. This result is especially relevant because progress was made with regard to the instructional skills, which have proven to be relatively weak in ECEC practice. This study shows that intensive professional programs with specialized and experienced coaches, systematic monitoring, and video-feedback can be effective in improving ECEC teachers' instructional support. It is an open question whether it is possible to scale up the evaluated interventions in practice. Based on this study, we conclude tentatively that relatively extensive training seems required to improve instructional skills of ECEC teachers. A specific context of our experimental study is that the training took place in an organization that facilitates training and focuses on continuous development of training methods. This organizational context may support the professional development of staff (see Urban et al., 2012), and therefore should be taken into consideration in the generalizability of the positive results of this study to other contexts of professional development. In future studies of professional development programs, it is important to include this organizational context and describe relevant factors for successful implementation at the level of trainers and other professionals involved.

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