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Enhancing early childhood education student teachers' mentalization, interaction, and relationships: an online intervention

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ABSTRACT

Despite the growing importance of in-service teachers' mentalization in early childhood education (ECE), studies on pre-service teachers are scarce. We embedded a newly developed version of video enhanced reflective practice (VERP) program in an online study module in a bachelor's degree program to promote Finnish ECE student teachers' interactional and relational competence via mentalization. The study module included evidence-based lectures and tutorials on children's language development and teacher–child interactions, supplemented with multimedia material on a digital platform, independent work on assignments, and practical training. The VERP students' ($N = 21$) and the trainers' talk about cognition, but not about emotion, increased. The students rated their attuned interaction skills higher after the VERP training. After the study module, students perceived more closeness and less conflict in their overall relationships with children. The prospective ECE teachers appear to benefit from online mentalization training with complementary curricular content and teaching methods.

KEYWORDS

Mentalization; teacher–child relationships and interaction; early childhood teacher education; video enhanced reflective practice; online training; attachment theory; cognitive theory

Introduction

There is growing evidence that teachers' sensitive responsiveness to children's socioemotional and academic needs is a vital part of teacher–child relationships. Meta-analyses have shown that it is possible to improve early childhood education (ECE) professional competence and child developmental outcomes via high-quality, targeted, in-service training (Egert, Fukkink, and Eckhardt 2018; Werner et al. 2016). While the competence to reflect on mental states, such as thoughts, desires, and feelings (Meins 1997; Sharp and Fonagy 2008), is known to enhance the quality of parents' interaction and relationship with their child (Zeegers et al. 2017), there is a need for studies and interventions targeting ECE professionals' mentalization, especially at the beginning of their career (Colonnesi et al. 2017; Mata López, Santelices Álvarez, and Verges

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Gomez 2020; Spilt and Koomen 2022). To this end, we developed and evaluated an online training program to promote ECE student teachers' interactional and relational competence via mentalization.

Teachers' relationships, interactions, and mentalization in ECE

For 30 years, attachment theory has motivated educational researchers to investigate relationships and interactions in ECE settings. In their theoretical model on the antecedents of teacher–child relationships, Spilt and Koomen (2022) underline the importance of ECE teachers' individual- and classroom-level sensitivity as well as their attachment history and reflections on mental states. Teachers' perceptions of the quality of their relationships with children are often assessed with the Student-Teacher Relationship Scale (STRS; Pianta 2001). A number of studies in the United States and Europe have confirmed that ECE teachers perceive greater closeness and less conflict in their relationships with children (for a review, see Yang, Laakkonen, and Silvén 2021). Observational studies using the Classroom Assessment Scoring System (CLASS; Pianta, La Paro, and Hamre 2008) have yielded cross-cultural evidence of teachers' higher quality emotional support and lower quality instructional support for children's diverse social, emotional, and cognitive needs from infancy to kindergarten age (e.g. Pakarinen et al. 2010; Perlman et al. 2016; for pre-service teachers, see La Paro et al. 2012). However, there is scarce empirical evidence about how teacher–child interactions and relationships can be strengthened via mentalization, especially in pre-service training.

Methods for assessing mentalization were originally developed in studies on interactions between parents and their young child (Schiborr et al. 2013; Zeegers et al. 2017). More recently, researchers have also focused on ECE professionals' mental state talk directed to 0- to 5-year-old children in the classroom (e.g. Colonnesi et al. 2017; Ziv, Smadja, and Aram 2015). Observational studies of ECE professionals have revealed that the proportion of overall mental state talk during interactions with children ranges from 3% to 22% (Colonnesi et al. 2017; Frampton, Perlman, and Jenkins 2009; King and La Paro 2015).

Studies from culturally diverse ECE classrooms have reported that professionals referred most frequently to children's cognition in Dutch and Israeli samples (Colonnesi et al. 2017; Ziv, Smadja, and Aram 2015), to perception in a U.S. sample (King and La Paro 2015), and to motivation in Australian and Chinese samples (Degotardi, Han, and Hu 2021). When professionals interact with infants and toddlers, they more often talk about the children's rather than their own emotions (Degotardi, Han, and Hu 2021), whereas they are more likely to refer to their own than to the children's emotions during interactions with older, preschool-aged children (King and La Paro 2015). During reflective group discussions, Finnish ECE professionals referred more often to their own and to team members' than to children's cognitive states and more often to children's motivation than to other mental states (Marttila, Fukkink, and Silvén 2023; see Degotardi and Sweller 2012 for individual reflections). Regardless of culture or assessment method, then, emotion talk seems sparse among ECE professionals. To our knowledge, no studies on ECE student teachers' mental state talk have been published.

Interventions on teachers' interactional and relational competence

Buysse, Winton, and Rous (2009) distinguish between three core elements of professional training: what content is taught, to whom, and how. Targeted content-specific approaches seem most effective for both in-service and pre-service teachers' mental processes, such as awareness and representations, and behavioral outcomes, such as teaching interactions with children (Egert, Fukkink, and Eckhardt 2018; Fukkink et al. 2019; Werner et al. 2016).

Interventions with a focus on supportive teacher–child interactions and relationships have been applied with mixed success in teacher training programs (Fukkink et al. 2019; Hamre et al. 2013; Joseph and Brennan 2015; Kennedy and Lees 2016; Koenen et al. 2021; La Paro et al. 2012). For example, Kennedy and Lees (2016) found that ECE student teachers' quality of interaction improved for the CLASS domains after semester-long training where they video recorded their interactions with children and received weekly feedback from peers and individualized support from the teachers in the classroom and at the university. In contrast, La Paro et al. (2012) observed no improvement in ECE student teachers' instructional support and even found a decrease in emotional support after a semester-long video-feedback intervention. In a relationship-focused intervention study by Koenen et al. (2021), student teachers in special education reflected on their feelings and relationship with a self-chosen 'challenging' child during their final four month internship. Five out of the six student teachers perceived more closeness (STRS) in their relationship with the target child after the intervention.

As learning and teaching have become less restricted in time or location due to technological developments, online coaching with reflective discussions and feedback at both the individual and the group level has become a noteworthy option for ECE teacher training. In addition, web-mediated distance training can be as effective as face-to-face on-site practice (Powell et al. 2010; Varghese et al. 2022; for a review, see McLeod, Hardy, and Carden 2023). A recent study comparing online and on-site coaching (Crawford et al. 2021) found no differences related to the modality of coaching in the training outcomes for ECE professionals on children's language and literacy instruction, for example.

Recording live interactions in authentic ECE contexts (i.e. daycare centers) is a common practice during on-site and online ECE teacher training. Video recordings have been applied to improve professional competence by way of classroom observation, reflective group discussion, and individual feedback (e.g. Fukkink et al. 2019; Joseph and Brennan 2015; Kennedy and Lees 2016; La Paro et al. 2012). In a study by Joseph and Brennan (2015), ECE student teachers moved systematically from knowing about and identifying high-quality interactions to actively engaging in and reflecting on their own and other students' interactions with children. There is also evidence that interventions combining three components (e.g. workshop, coursework, and individual support) are more successful in enhancing ECE professionals' quality of interactions with children compared to interventions with fewer components (Egert, Dederer, and Fukkink 2020).

Present study

To our knowledge, studies aimed at the improvement of ECE student teachers' interactional and relational competence via mentalization are lacking (for in-service training, see Spilt et al. 2012). Thus, this study focuses at enhancing the sensitivity of Finnish

second-year undergraduates in their professional interaction by means of a newly developed, online version of video enhanced reflective practice (VERP). The video-stimulated reflection and guidance training was embedded in an online study module. The following questions are posed:

(1) Does the VERP training change the frequency and content of mental state talk of the ECE student teachers and the trainer during online shared review discussions?
(2) Does the VERP training change attuned interaction and guidance as perceived by the students?
(3) Is there a change in the perception of overall relationships with children among the VERP students compared to students receiving regular training?

Material and methods

Participants and procedure

The study reports data on Finnish second-year students in a bachelor's degree program in early childhood teacher education. All teaching was online due to Covid-19 restrictions at the university. Observation and questionnaire data were collected during a study module (6 ECTS). The students ($N = 100$) enrolled in the study module had completed approximately 60 ECTS credits, including one week of practical training in daycare centers. During the first lesson in September and again in the final lesson in December, the students filled out an online questionnaire containing items on demographic characteristics, attachment style (Relationships Questionnaire, RQ), and relationships with children (Student-Teacher Relationship Scale-Short Form, STRS-SF). In September, 79 (77 females) of the 93 students and in December 71 (67 females) of the 92 students who completed the questionnaire gave their consent.

The VERP training was introduced in the first lesson as an option to replace a part of the examination literature. The students were invited to express their interest by e-mail after the lesson. The 21 students who volunteered to participate completed an online questionnaire on interaction skills (Attuned Interaction and Guidance, AIG) before and after the VERP training. Four VERP students did not fill in the RQ and STRS-SF items.

Study module

The major goal of the study module was to develop, over a three-month period, ECE student teachers' competence in promoting young children's language and literacy learning, interaction skills, and identity development in both observational and interactional contexts. The study module included 18 h of evidence-based lectures given by five university teachers, experts in developmental and educational sciences. Typically, after each lecture, the students worked independently (122 h in total) on practical assignments based on multimedia materials and video-clips of lectures by leading experts. Moreover, the topics were elaborated in small groups including 13–19 students (20 h per group). During the tutorials, the students observed video-clips on children's language skills and picture book reading interactions, and the university teachers stimulated discussions between the students, self-reflections, and peer evaluations to integrate theoretical concepts with practice.

After six hours of lectures and four hours of tutorials about children's language and literacy development and high-quality teacher–child interactions as well as approximately 10–15 h of independent work, the ECE student teachers carried out practical assignments in daycare centers. During a five-week practical training period, the students observed ECE teachers' and team members' activities with children. They also planned, implemented, and assessed various teaching activities themselves. As a part of the study module presented here, all students were instructed to plan and video-record a 20-minute picture book interaction with two about 3- to 5-year-old children, a boy and a girl. The VERP students implemented the assignment three times. The topics of the selected picture books were familiar to preschool-aged children. The three stories were about the daily activities of a preschooler called Onni, who is starting daycare, gets a little brother, and experiences a scary event. Each page of the book contained a short text and colorful drawings to elicit both literal and dialogic reading. The heads of the daycare centers, the parents of children who participated in the video recordings, and the ECE student teachers gave written consent after receiving a letter about the intervention and research. The voluntary participants had the right to withdraw from the study at any point. The remaining lectures, tutorials, and assignments and the examination were held after the practical training period.

VERP training

The VERP training (Kennedy and Landor 2015) is an application of video interaction guidance, which was originally developed for high-risk family settings. The training aims to stimulate attuned interaction, which occurs when the adult and the child actively share the same focus of attention as they reciprocally communicate and negotiate meaning and intention. When implementing guidance, the adult mediates the child's learning by offering high-quality support when needed. A qualified VERP trainer facilitates trainee development and behaves in line with these two basic principles. To ensure intervention fidelity, the VERP trainer (the first author) was counseled by a certified VERP supervisor.

The student teachers who volunteered for the VERP training were divided into seven groups, which participated in three online video-recorded shared review discussions over a ten-week period. In addition to the first reading interaction, the VERP students recorded two more sessions with the same two children ($M = 44.93$ months, $SD = 10.84$, range 24–72). The children spoke Finnish as their first language. The reading interactions lasted, on average, 18 min (range 7–36 min).

After each picture book reading interaction, the students sent the recording to the VERP trainer, who selected one to three videos clips of successful interaction and pedagogy for each of the three students attending the shared review via a video-conferencing platform (Zoom). The setting of the shared review discussions is presented in Figure 1. The shared review started with watching the video clip and hearing the target student's first impression of the clip. Subsequently, the group rewatched the video clip, focusing on the moment-to-moment process of attuned interaction and guidance, which were introduced stepwise by the VERP trainer. The trainer aimed at creating trusting and warm relationships with the students by following the principles of attuned interaction and guidance (Kennedy and Landor 2015).

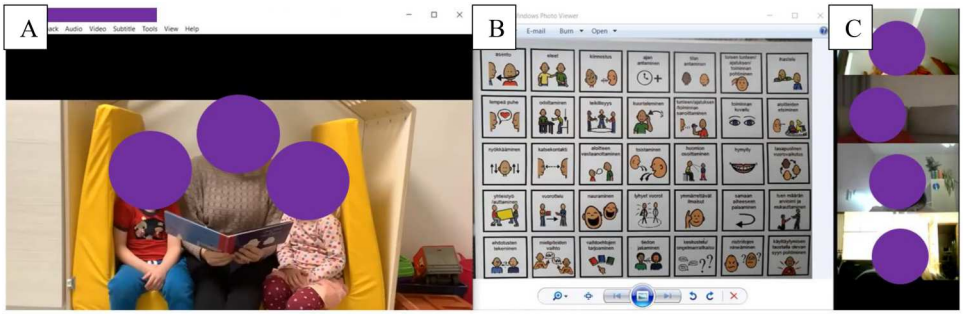

Figure 1. Online setting of the shared review discussion: A. video-recorded interaction in daycare center, B. pictures presenting attuned interaction and guidance, C. the VERP trainer and the trainees.

To structure the discussions, pictures with labels (35 in total) representing six attuned interaction and guidance subscales (Figure 1, B., see also Appendix 1) were presented during the three shared reviews. First, the pictures related to being attentive and encouraging initiatives (14 pictures), followed by receiving initiatives and developing attuned interaction (13 pictures), and, finally, guiding and deepening discussion (8 pictures). In addition, the trainer prompted the students' reflections by asking what happened in the clip and what the children and the student did, thought, felt, and aimed at, and by asking for the reasons for the behavioral and mental actions. Altogether, short fragments of the clips were discussed in a detailed fashion per student in each review. The length of each review was approximately 1.5 h with some variation (first: $M = 84.3$ min, $SD = 3.0$, range 81–90; second: $M = 100.9$ min, $SD = 5.0$, range 93–108; third: $M = 103.0$ min, $SD = 4.9$, range 96–111).

Measures

Perceived attachment style

To assess attachment history, we used a Finnish translation of the Relationships Questionnaire (RQ; Bartholomew and Horowitz 1991) based on brief statements regarding four adult attachment styles. The ECE student teachers were asked to choose the style that describes their relationships best. A secure adult experiences worthiness and has an expectation of others being accepting and responsive. As opposite to this, a fearful-avoidant adult experiences unworthiness and expects others to do so as well. The preoccupied adult experiences a lack of worthiness but expects others to be accepting and responsive. Inversely, a dismissive-avoidant adult has a sense of self-worthiness but experiences that others are negatively disposed to oneself.

Observed teacher–child interaction

The quality of the picture book reading interaction recorded during practical training was assessed using the Classroom Assessment Scoring System (CLASS Pre-K; Pianta, La Paro, and Hamre 2008). The highly structured, one-cycle observation with two children was rated on emotional and instructional support. A trained coder, who was blind to the other data and to the research questions, rated the dimensions on a 7-point Likert

scale. As expected, a two-factor structure of emotional support and instructional support fitted the data well (for statistics, see Yang and Silvén 2023).

Observed mental state utterances

The three video-recorded discussions of each of the seven VERP groups (21 discussions, 34 h 40 min) were professionally transcribed and pseudonymized. We used a newly developed coding scheme (Marttila, Fukkink, and Silvén 2023) to assess the mental state utterances produced by the VERP students and the trainer. Each mental state utterance was coded for type: cognition (e.g. think, understand), perception (e.g. look, listen), emotion (e.g. excited, content), or motivation (e.g. want, interested) and target (i.e. child, self, or other participant). In addition, the students' references to children's mental states were further coded into two subcategories: basic, when the student only referred to the child's mental state (e.g. 'The child is *excited*'), or enriched, when the student gave an example or explanation of the mental state (e.g. 'He *confuses* colors because when I asked what color this is, he said 'blue' although it was yellow'; 'She *saw* her friends through the window so she jumped off the couch and ran to the window'). Students' other-focused mental state utterances were excluded from the final analysis because they were scarce.

The type and target in the VERP trainer's talk were also coded. The trainer's frequent references to all participants' mental states (e.g. 'Let's have a look … ', 'As we noticed … ') reflected the interactional and pedagogical nature of the shared reviews. These utterances were included into the target category 'other participant.'

The first author coded a random selection of 50% of the shared review discussions. A trained coder blind to all other data and to the research questions analyzed the rest of the data. Inter-rater reliability was assessed with 10% of randomly selected transcripts using intra-class correlations (ICCs; two-way random effects model with an absolute agreement definition). The ICC values for type, target, and richness were excellent (.96–1). The few discrepancies were discussed to achieve a consensus on the codes.

Perceived interaction skills

Before and after the VERP training, the students filled out a 35-item questionnaire on Attuned Interaction and Guidance (AIG; see Appendix 1) developed by Marttila, Fukkink, and Silvén (2023) and based on the content of the VERP training (Kennedy and Landor 2015). The items for attuned interaction (22, representing four subscales) and guidance (13, representing two subscales) were rated on a 5-point Likert scale ranging from 1 (*not true at all*) to 5 (*almost always true*). Both attuned interaction (pretest $\alpha = .91$, posttest $\alpha = .88$) and guidance (pretest $\alpha = .93$, posttest $\alpha = .88$) showed high internal consistency.

Perceived relationships with children

Before and after the study module, the ECE student teachers' perceptions of their overall quality of relationships with children were assessed with a modified version of Student-Teacher Relationship Scale-Short Form (STRS-SF; Whitaker, Dearth-Wesley, and Gooze 2015), validated for the Finnish ECE context by Yang, Laakkonen, and Silvén (2021). The measure comprises a scale for closeness (e.g. 'I share an affectionate, warm relationship with the children') and conflict (e.g. 'The children are uncomfortable with physical

affection or touch from me'). The 15 items are rated on a 5-point Likert scale ranging from 1 (*definitely does not apply*) to 5 (*definitely applies*). Both closeness (pretest α = .69, posttest α = .70) and conflict (pretest α = .58, posttest α = .64) showed acceptable internal consistency. Confirmatory factor analyses also showed acceptable fit for the expected two-factor model at pretest and posttest. Instead of using summary scores, we multiplied the scale scores of the closeness items and conflict items with the corresponding factor loadings (for more details, see Yang and Silvén 2023).

Results

Due to the small sample size and the non-normality of variables, we used nonparametric tests in SPSS (version 29).

Controlling for selection bias

The 21 students (19 females) who volunteered to participate in the VERP training were compared with the 62 non-VERP students (60 females) at the start of the study module to analyze whether the VERP group was representative of the student population. Gender distribution, $\chi^2(1) = 0.849$, $p = .357$, work experience, $\chi^2(2) = 2.051$, $p = .359$, and age, $U = 0.424$, $p = .201$, were similar for both groups. The mean age of the VERP students was 27.7 years ($SD = 6.76$, range 20–41). Eleven students had less than one year, three students had less than two years, and seven students had two or more years of teaching experience. The other students were on average 25.5 years ($SD = 6.38$, range 19–46) of age. Forty students had less than one year, seven students had less than two years, and fifteen had two or more years of teaching experience.

As expected (Kouvo and Silvén 2010), the most common attachment style was secure (67.1%), whereas the fearful-avoidant (19.0%), preoccupied (11.4%), and dismissive-avoidant (2.5%) styles were relatively infrequent. The three insecure categories were combined into one insecure category. The secure-insecure distributions did not differ across VERP and non-VERP students, $\chi^2(1) = 0.120$, $p = .729$. Regarding the students' perceptions of their overall quality of relationships with children, the VERP and non-VERP students did not differ in closeness ($U = 0.296$, $p = .301$) or conflict ($U = 0.431$, $p = .215$) either.

Finally, the quality of the reading interactions of the VERP students ($n = 21$) with children and that of a randomly selected subgroup of the non-VERP students ($n = 16$) were compared. No group differences were detected in observed emotional or instructional support ($U = 0.156$, $p = .728$ and $U = 0.128$, $p = .229$, respectively).

VERP students' and trainer's mental state talk

To control for variation in the length of the shared review discussions (ranging from 81 to 111 min per meeting), frequency rates per 10 min were calculated (see Tables 1 and 2). Due to low frequencies for some types, we combined cognition- and perception-related utterances (henceforth: cognition) and emotion- and motivation-related utterances (henceforth: emotion).

Table 1 presents the statistics of the VERP students' mental state talk during the three shared reviews. There was an increase in child-focused cognitive talk across time: the

Table 1. VERP students' (N = 21) child- and self-focused mental state talk during shared reviews

	Time 1			Time 2			Time 3				
Mental state	M (SD)	Mdn	Range	M (SD)	Mdn	Range	M (SD)	Mdn	Range	χ^2 (2)	*p*
Child cognition											
Basic	0.80 (0.39)	0.70	0.35–1.51	1.09 (0.60)	1.14	0.20–2.10	1.28 (0.53)	1.25	0.31–2.19	8.667	.013
Enriched	0.40 (0.34)	0.25	0.00–1.44	0.42 (0.25)	0.40	0.10–0.93	0.59 (0.35)	0.57	0.00–1.52	9.566	.008
Total	1.20 (0.60)	1.11	0.35–2.33	1.51 (0.78)	1.36	0.30–2.86	1.87 (0.78)	1.90	0.31–3.71	9.810	.007
Child emotion											
Basic	0.72 (0.31)	0.72	0.22–1.34	0.62 (0.34)	0.58	0.00–1.24	0.76 (0.38)	0.81	0.20–1.98	2.000	.368
Enriched	0.52 (0.33)	0.47	0.00–1.28	0.53 (0.33)	0.57	0.10–1.40	0.51 (0.26)	0.48	0.09–1.31	0.667	.717
Total	1.23 (0.51)	1.20	0.47–2.09	1.16 (0.56)	1.05	0.49–2.60	1.27 (0.50)	1.25	0.45–2.50	1.143	.565
Self cognition	2.70 (0.96)	2.44	1.22–5.18	3.06 (1.18)	3.01	1.30–6.29	3.57 (1.20)	3.44	1.41–6.00	6.381	.041
Self emotion	1.16 (0.57)	1.05	0.47–3.05	0.81 (0.43)	0.75	0.31–2.1	1.03 (0.38)	0.99	0.50–1.98	12.667	.002

Note. Frequencies are mean rates per 10 min.

Table 2. VERP trainer's child-, self- and other-focused mental state talk during shared reviews.

	Time 1			Time 2			Time 3				
Mental states	M (SD)	Mdn	Range	M (SD)	Mdn	Range	M (SD)	Mdn	Range	χ^2 (2)	*p*
Child											
Cognition	2.49 (0.75)	2.84	1.53–3.29	4.35 (1.51)	4.67	2.41–6.60	4.39 (0.88)	4.19	3.46–6.04	6.000	.050
Emotion	3.30 (0.61)	3.54	2.35–3.89	3.11 (0.61)	3.44	1.39–4.00	3.68 (1.29)	3.81	1.83–5.52	1.143	.565
Self											
Cognition	6.27 (1.06)	5.78	5.12–7.91	6.51 (0.96)	6.48	5.37–7.96	7.08 (0.98)	7.12	5.29–8.12	3.714	.156
Emotion	2.04 (0.57)	2.05	1.46–2.89	1.75 (0.77)	1.65	0.72–2.90	2.62 (1.12)	2.70	1.11–4.38	1.143	.565
Other											
Cognition	16.33 (2.65)	16.22	13.84–21.88	16.00 (1.32)	15.63	14.72 –18.14	17.35 (2.42)	17.98	13.65–20.42	2.000	.368
Emotion	3.79 (0.64)	4.12	2.89–4.58	2.81 (1.20)	2.60	1.46–4.76	3.70 (1.18)	3.14	2.50–5.59	3.429	.180

Note. Frequencies are mean rates per 10 min.

post-hoc tests revealed that the students talked more often about children's cognitive states in the third than the first shared review ($p = .006$). The increase was also true for basic-level utterances ($p = .010$) as well as enriched utterances compared to the first ($p = .026$) and the second ($p = .021$) shared review. However, there was no significant change across time in child-focused emotional talk. According to Wilcoxon tests, the students referred equally to children's cognitive and emotional states during the first shared review ($Z = 0.348$, $p = .728$), whereas they talked more about children's cognitive than emotional states during the second ($Z = -2.054$, $p = .040$) and third ($Z = -2.614$, $p = .009$) reviews.

As shown in Table 1, there was also an increase in VERP students' self-focused cognitive talk in the third compared to the first shared review ($p = .041$). However, there was a decrease in self-focused emotional talk in the second compared to the first ($p = .002$) and third ($p = .026$) shared reviews. The students referred more often to their cognitive than their emotional states during each shared review (for all the variables, $Z = -4.015$, $p < .001$).

Table 2 presents the statistics of the VERP trainer's mental state talk during the three shared reviews. There was a change across time in child-focused cognitive talk but not in emotional talk. A post-hoc test showed that the trainer talked more often about children's cognition during the third than the first shared review ($p = .048$). The VERP trainer's self-focused or other-focused cognitive and emotional talk did not change over time.

The VERP students' attachment history was not related to their mental state talk, with the exception of the third shared review. The students ($n = 12$) who assessed their relationship style as secure talked more about children's emotions in the final shared review than students ($n = 5$) who perceived their relationships as insecure ($U = 11.50$, $p = .048$).

VERP students' interaction skills

As shown in Table 3, the students rated their interaction skills relatively highly at the beginning of the VERP training. The Wilcoxon signed rank test revealed that after the VERP training, the students rated their attuned interactions representing four subscales at a higher level, but the change in guidance did not reach significance. We further conducted the analysis for the two guidance subscales separately (see Appendix 1). The change was significant in guiding ($Z = 2.611$, $p = .009$) but not in deepening discussion ($Z = 0.425$, $p = .671$) after the VERP training. The two summary scores of attuned interaction and guidance were positively correlated before ($r_s = .842$; $p < .001$) and after ($r_s = .753$; $p < .001$) the VERP training.

The students' self-reported attuned interaction was not related to their mental state talk observed from shared review discussions. However, students' self-focused cognitive

Table 3. VERP students' (N = 21) self-reported interaction skills before and after training

	Before			After				
	M (SD)	Mdn	Range	M (SD)	Mdn	Range	*Z*	*P*
Attuned interaction	4.27 (0.41)	4.17	3.35–5.00	4.54 (0.30)	4.61	3.96–4.96	3.07	.002
Guidance	3.95 (0.55)	3.92	3.00–5.00	4.11 (0.38)	4.15	3.31–4.85	1.73	.084

talk during the third shared review was related to their self-reported guidance with children after the VERP training ($r_s = .598$; $p = .004$). No other correlations were significant.

Students' relationships with children

There was an increase in self-reported closeness ($Z = 3.428$, $p < .001$) and a decrease in conflict ($Z = -2.725$, $p = .006$) for the whole sample of ECE student teachers participating in the study module. The change in closeness and conflict for the VERP vs. the other students ($U = 0.394$, $p = .540$; $U = 0.398$, $p = .493$, based on difference scores, respectively) did not differ, nor did the two groups differ in closeness or conflict at the conclusion of the study module ($U = 0.336$, $p = .722$; $U = 0.428$, $p = .234$, respectively).

Discussion

In this study, we report the first outcomes of an online study module aimed at fostering ECE student teachers' professional competence in Finnish higher education. Due to the Covid-19 pandemic, the module on child development and ECE pedagogy was implemented online except for practical training in daycare centers. The goal was to provide the second-year undergraduates with knowledge and practice in identifying, implementing, and reflecting on high-quality interactions with preschool-aged children. A newly developed VERP training program focused on improving students' interactional and relational competence via mentalization was embedded in the study module. Our evaluation showed positive findings.

First, the VERP student teachers' talk about children's and their own cognitive and perceptual mental states (e.g. 'she thinks,' 'he listens,' 'I understand') increased during three reflective discussions and individual feedback from the VERP trainer and the peers about their recorded live interactions with two children. Also, the VERP trainer's talk about children's cognitive states increased. These findings extend scarce existing VERP evidence. Another VERP intervention revealed that in-service professionals' mental state talk did not change after discussions and feedback on their recorded interactions in authentic ECE contexts (see Marttila, Fukkink, and Silvén 2023). One reason for the different outcomes might be that the in-service professionals with different qualifications did not receive the complementary evidence-based content and teaching methods implemented in the present pre-service teacher education. Finnish ECE professionals in daycare centers typically work in teams of three where at least one, the teacher, has a bachelor's degree in education and the others have a bachelor's or vocational degree in health and social services.

The VERP training was not effective in improving the mentalization of emotional and motivational states (e.g. 'she is sad,' 'he wants'; see also Marttila, Fukkink, and Silvén 2023). Several studies have reported that qualified ECE professionals talk less about emotions during interactions with children than other types of mental states (Degotardi, Han, and Hu 2021; Ziv, Smadja, and Aram 2015). On the other hand, observations of Finnish ECE teachers' interactions with children reveal high-quality emotional support throughout early childhood (Pakarinen et al. 2010; Salminen et al. 2021; Yang and Silvén 2023). This indicates that ECE professionals express emotional support nonverbally by using facial expression, gesture, and touch instead of labeling or explaining

emotions. Interestingly, secure VERP students talked more about children's emotions in the final discussion than non-secure students, although research with larger samples is needed. It is possible that secure students were more open to the topic of attuned interaction including emotional sensitivity to others' need for comfort and communication than non-secure students, which would be in line with the basic tenets of attachment theory (Simpson et al. 2022). To improve functioning within social relationships, future pre- and in-service interventions could include a stronger focus on verbalizing emotional states as well as observations of recorded live interactions regardless of participants' qualification level or years of experience.

Second, the VERP student teachers perceived improvement in their attuned interaction after the training. They experienced themselves as more skilled in encouraging, receiving, and responding to children's initiatives during interaction, which gradually may strengthen actual teaching interactions. The students also experienced progress in expanding and providing information (guiding), but not in negotiating meaning to reach shared understanding with the children (deepening discussions). This may be due to the smaller dose of training in extended guidance to scaffold children's learning and in managing demanding interactions, which were mostly introduced in the final discussion. These results are different from those of Marttila, Fukkink, and Silvén (2023), who reported that in-service professionals perceived no change in either interactional dimension after the VERP intervention. Several authors have found observational evidence that not only prospective teachers but also qualified professionals appear to lack competence in promoting higher level cognitive processing in ECE classrooms (e.g. Hamre et al. 2014; La Paro et al. 2012; Pakarinen et al. 2010; Yang and Silvén 2023). Our findings contribute to the literature regarding the need for improving professional competence.

Our study confirms that more extensive training in reflecting on mental states, combined with observation and practice in high-quality interaction, is essential in teacher preparation programs to enhance ECE student teachers' mentalization and interactional competence. This is supported by the finding that the more the VERP students paid attention to their own cognitive mental states, the higher they assessed themselves in guidance with children after the training. Even though the students were in general more aware of cognitive mental states in the final VERP discussion, there was no improvement in self-reported ability in deepening discussion. This may suggest that the students became aware of their lack of competence in supporting children's higher level cognitive learning. This 'from ignorance to awareness' phenomenon has also been reported in related studies (Marttila, Fukkink, and Silvén 2023; Spilt et al. 2012).

Third, after the study module, all ECE students perceived more closeness and less conflict in their overall relationships with children. The positive change in self-reports was similar for the VERP students and the non-VERP students, who participated in the module but did not engage in more extensive reflective discussions and individual feedback. Spilt et al. (2012) also used mentalization in their intervention as a medium to change the quality of dyadic relationships, and they reported that qualified ECE teachers' perceptions of closeness increased and their observed sensitivity improved with two at-risk children (see also Koenen et al. 2021 for pre-service teachers in special education). Taken together, our VERP findings add to the still limited number of interventions using mentalization, reflections on mental states as the content, medium, and

outcome in enhancing prospective ECE teachers' interactional and relational competence.

Some research design and methods limitations of the intervention study are important to consider. Due to the restrictions of the curriculum, we used a business-as-usual control group instead of an experimental design. Moreover, the students enrolled in the study module could not be randomly assigned into the VERP training, nor could we assess the non-VERP students' mental state talk and perceptions of interaction. Although we were able to explore selection bias and to show that the two groups did not differ at baseline in demographic characteristics, attachment security, or quality of interaction and relationships, rival explanations for the differences in learning outcomes cannot be excluded. In addition, the small sample size and lack of observed change in interaction competence restrict interpretation of the outcomes as well as their generalizability. In order to improve mentalization beyond reading interactions, future intervention studies may include a greater variety of teaching activities (e.g. free play, craft) to expand student teachers' learning opportunities.

We applied reliable and validated measures, observations of mental state talk, and self-perceived interactional and relational processes to respond to the research questions. In line with previous empirical studies (e.g. Crawford et al. 2021; Fukkink et al. 2019; Joseph and Brennan 2015; see Egert, Dederer, and Fukkink 2020 for meta-analytic evidence), the study module targeted content-specific approaches and combined several components for enhancing professional development. The present first evaluation of an online study module with a representative ECE student teacher sample shows encouraging results regarding the effectiveness of distance learning and teaching for teacher training programs.

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Appendix 1. Questionnaire on interaction skills: attuned interaction (items 1–22) and guidance (items 23–35).

Being Attentive

1. I look interested and friendly.
2. I give time and space for the child.
3. I wonder what the child is doing, thinking, or feeling.
4. I enjoy watching the child.

Encouraging Initiatives

5. I listen actively.
6. I speak in a gentle voice.
7. I name positively what I see, think, or feel.
8. I use friendly and/or playful intonation in a suitable manner.
9. I describe what I am doing.
10. I look for when the child initiates interaction.

Receiving Initiatives

11. I show that I have heard or noticed when the child initiates interaction.
12. I acknowledge through my body language when the child initiates interaction.
13. I return the eye contact, smile, and nod.
14. I receive what the child is saying or doing with words.
15. I repeat/use the child's words or phrases.

Developing Attuned Interactions

16. I respond when the child initiates interaction.
17. I check that the child understands me.
18. I attentively wait my turn.
19. I give a second (and further) turn on the same topic.
20. I give and take short turns.
21. I contribute to interaction/activity equally.
22. I cooperate with and help the child.

Guiding

23. I support the child's participation.
24. I expand on the child's response. I build my response on the child's response.

25. I judge and adjust my actions to the child's needs.
26. I give information when needed.
27. I offer choices that the child can understand.
28. I make suggestions that the child can follow.

Deepening Discussion

29. I support goal-setting.
30. I help the child in problem-solving.
31. I name differences of opinion in an appropriate manner.
32. I investigate the child's intentions behind words/actions.
33. I name contradictions/conflicts (real or potential).
34. I easily reach a new, shared understanding.
35. I manage conflicts by returning the child to attuned interaction.