



# Interaction Quality and Children's Social-Emotional Competence in Norwegian ECEC

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**ABSTRACT:** This study investigated whether interaction quality in toddler groups, when children were age three, was associated with changes in children's social competence from age three to age five years in Norwegian Early Childhood Education and Care (ECEC). ECEC groups ( $n = 206$ ) were observed with the Infant/Toddler Environment Rating Scale Revised (ITERS-R). The subscale Interaction was used for this study, including four items: supervision of play and learning; peer interaction; staff-child interaction; and discipline. Children's social-emotional competence was rated by ECEC teachers using the Norwegian Lamer Social Competence in Preschool scale (LSCIP) with six dimensions: prosocial behavior, self-control, assertiveness, adjustment, empathy, and fairness. Multilevel models were applied to investigate the associations between the ITERS-R scale and social-emotional competence at age three and age five. Results showed an association of interaction quality with empathy at T1, and a marginally significant association between interaction quality and self-control at T2. No other associations were found between interaction quality and social-emotional competence. The paper discusses why the associations between interaction quality and outcomes are limited and the need to revise and expand quality measures especially in Norwegian

ECEC. This study also stresses the need to further investigate quality of interactions between staff and children, and its associations with children outcomes.

**Keywords:** *interaction quality, social-emotional competence, ECEC, associations*

## Introduction

Early childhood education and care (ECEC) has become an important part of most children's lives. For example, in Norway the most recent statistics indicate that 91.3% of children between 1-5 years are enrolled in an ECEC center (SSB, 2018). ECEC enrolment is important because children spend substantial time in its interactional context, where exposure and interactions matter. Therefore, the impact of ECEC quality on children's developments is an issue that is of importance to policymakers and practitioners. Quality in (ECEC) can be conceptualized in terms of structural aspects and processes to understand children's outcomes (Early Child Care Research Network (ECCRN), 2002). Structural quality refers to aspects such as staff-child ratios, staff qualifications, and group size, while process quality concerns interactions between staff and children, and interactions among peers (Litjens & Taguma, 2010; Philips, Mecos, Scarr, McCartney, & Abbot-Shim, 2000). Both structural and process quality characteristics have been linked to children's outcomes. Specifically, high quality ECEC experiences have been found to have positive effects on children's executive functions, cognitive and social-emotional competence (Early Child Care Research Network (ECCRN), 2006; Peisner-Feinberg et al., 2001; Weiland, Ulvestad, Sachs, & Yoshikawa, 2013).

A key characteristic of ECEC quality that has an impact on children's social-emotional competence is the nature of interactions between staff and the child (Shonkoff & Phillips, 2000). It has been shown in many studies that children in the early years require interactions with adults that are warm, predictable (Gloeckler, 2006), sensitive and responsive (Dalli, White, Rockel, & Duhn, 2011) and that include children's perspectives (Pianta, 1999). Other important characteristics of adult behavior in ECEC settings that have been identified are: modelling positive interactions and encouraging high quality social-emotional competence (Howes, 2000; Wu, Hu, Fan, Zhang, & Zhang, 2018); supporting self-regulation (Cameron & Morrison, 2011); prosocial behavior (Ferreira et al., 2016; Maggio, Zappulla, Pace, & Izard, 2017); and showing empathy (Spinrad & Gal, 2018).

While there is evidence of the importance of high process quality in ECEC, it has been found that interaction quality is not evenly distributed and not all children in ECEC experience high quality interactions on a daily basis. For instance, a US study reported that the quality characteristic 'supportive and warm interactions' varied through the day

(Phillipsen, Burchinal, Howes & Cryer, 1997). Similarly, a study from the UK reported minimal quality for toddlers as measured by the Infant/ Toddler Environment Rating Scale Revised (ITERS-R; Mathers, Singler, & Karemaker, 2012), though better results were found in a more recent study (Melhuish & Gardiner, 2017). Studies from Portugal (Barros & Aguiar, 2010) and the Netherlands (Helmerhorst, Riksen-Walraven, Vermeer, Fukkink, & Tavecchio, 2014) also show that the quality of interactions in toddler groups was relatively low. Finally, a recent Norwegian study also reported minimal quality of interactions in toddler groups using the ITERS-R (Bjørnstad & Os, 2018).

When looking at the research on the relations between ECEC process quality and young children's developmental outcomes, while there is some evidence from Europe, most studies have been conducted in the United States (Melhuish et al., 2015). While much ECEC research can be generalized from one context to another, it is well documented that support for parents, the use of ECEC, the competencies and practices of the staff working in these settings, and the extent of monitoring of quality, can differ between different countries (Pascal et al., 2013). Thus, it is important to also have country specific research.

Cross-sectional studies in Norway have shown that ECEC quality is not related to toddler's current cognitive development (Eliassen, Zachrisson, & Melhuish, 2018). Evidence regarding social-emotional development comes predominantly from studies on the amount of ECEC or structural aspects rather than process quality. For example, in Norway, exposure to ECEC have been investigated in relation to children's behavior (Zachrisson, Dearing, Lekhal, & Toppelberg, 2013; Zachrisson, Janson, & Nærde, 2013). However there is limited available evidence from Norway on the relation between interaction quality in ECEC and children's developmental outcomes and specifically children's social-emotional competence. Social-emotional competence is important, both for children's current well-being and as a prerequisite for their feeling of belonging in society. This paper seeks to contribute to this gap in knowledge by investigating this relationship in a sample of children participating in the Better Provision for Norway's Children (BePro) project. BePro is a longitudinal study that focuses on different aspects of ECEC quality and their relationship with children's development (Bjørnstad, Gulbrandsen, Johansson & Os, 2013).

### **The value of high-quality interactions from significant caregivers**

Children learn and develop through social practices with adults and other children (Säljö 2001; Wertsch 1998). High-quality interactions with significant caregivers affect children's brain development through the stimulation of neural connections, which are relevant to further development (Schonkoff & Bales, 2011). On the other hand, children

who experience inadequate interactions or neglect have an increased risk for mental health problems and physical illnesses (Solis et al., 2015). In addition to the important neurological evidence, understanding of the relevance of high quality interactions has roots in attachment theory and focuses on the psychological bonds between primary caregivers and the child. These bonds set the foundation for children to develop internal working models of interactions (Bowlby, 1988) that are expected to impact on their ability to develop other relationships in life, and also are relevant to their feeling of belonging.

The significance of high-quality sensitive interactions between caregivers and children in the early years for children's development has been identified in many research studies (Belsky & Fearon, 2002; Fearon, Bakermans-Kranenburg, Van IJzendoorn & Roisman, 2010; Groh et al., 2014; Lyons-Ruth 1996; Shonkoff & Bales, 2011). Warm and sensitive adult responsiveness is thus a major factor in children's development by allowing them to form secure predictions about supportive behaviour from adults. With a secure attachment a child is then able to explore the environment and develop their skills (Ainsworth, 1969; Ainsworth & Bell, 1970; Bowlby, 1988). Bowlby hypothesized there were three key social-emotional factors that early attachment influenced; self-reliance, emotional regulation and social competence (Bowlby, 1973; 1988). If interactions are erratic and unpredictable children are more likely to develop insecure (anxious or avoidant) perceptions of relationships with caregivers or to have a disorganized idea about how adults will behave (Lyons-Ruth, 1996). Early insecure or disorganized attachment has been shown to constrain the social-emotional competence of children through a reduced understanding of mixed emotions (Steele, Steele, Craft, & Fonagy, 2001). Parents are usually the primary caregivers, but the ECEC staff are also of great importance. Studies have shown that ECEC staff can compensate for children with insecure attachment to their parents (Goossens & van IJzendoorn, 1990). Studies stress that ECEC settings should both foster children's attachment to the staff as well as their attachment to peers (Maccoby & Lewis, 2003; Van Schaik, Leseman, & de Haan, 2017).

### **The importance of social-emotional competence**

The importance of young children's social-emotional competence for later developmental outcomes is highlighted in several studies (Jones, Greenberg, & Crowley, 2015; VanderVen, 2008). Social-emotional competence is important for toddler's current well-being so that they can establish and maintain relationship with others (Bagdi & Vacca, 2005; Kamerman, Phipps, & Ben-Arieh, 2010; McAuley, Rose, Dolan, Morgan, & Aldgate, 2011). Social-emotional competence is also linked to future well-being; fewer mental health problems, higher education levels, and better paying employment (Payton et al., 2000). Social-emotional competence has been highly valued

in the Nordic tradition of ECEC (Norwegian Directorate for Education and Training, 2017; Sylva, Ereky-Stevens, & Aricescu, 2015). Social-emotional competence is referred to as the sum of social skills and is divided into different positive dimensions, such as cooperation, self-control, and assertiveness (Gresham & Elliott, 1990), or to both positive and negative dimensions such as emotional symptoms, conduct problems, hyperactivity/inattention, peer relationship and prosocial behaviour (Goodman, 1997). Some studies use a sum score of different dimensions to create one index of social-emotional competence (Zachrisson et al., 2013), whereas other studies investigate different dimensions of social-emotional competence separately, like empathy and prosocial behaviour (Spinrad & Gal, 2018), and self-regulation (Cameron & Morrison, 2011). Even though general measures of social-emotional competence capture different dimensions of the concept, it can be problematic to aggregate these dimensions into one score. For example, children can score low on assertiveness and prosocial behaviour, but high on self-regulation. That is why this study takes a dimensional approach to assess social-emotional competence, while still acknowledging the holistic concept of social-emotional competence.

### **Interaction quality in toddler groups and children's developmental outcomes and social-emotional competence**

Indicators of high quality ECEC interactions, in line with attachment theory as described above, are staff who are involved (Bagdi & Vacca, 2005), sensitive (Helmerhorst et al., 2014; Thomason & La Paro, 2009), responsive and who provide care that is personalized to take each children's personality and other characteristics into account (Dalli, White, Rockel & Duhn, 2011). Staff with high-quality interactions guide children's behaviour and model good language skills (Pianta, 1999). Toddlers need an environment where the staff encourage each child to speak about their thoughts and feelings, and reflect on their knowledge (Dalli et al., 2011), enabling the children to talk about their emotions and narrate their activities. The staff should ideally be respectful, warm and listen with attention (Gloeckler, 2006). Secure attachments are more likely to develop with staff who are sensitive and responsive (Ahnert, Pinquart, & Lamb, 2006; Copple & Bredekamp, 2009; Sabol & Pianta, 2012).

There is evidence that nature of interactions between ECEC staff and children is a significant factor in predicting children's development (Cryer et al., 2005; Hamre et al., 2012). High quality adult-child interactions are known to have a positive impact on children's social competence and emotional regulation (Shonkoff & Phillips, 2000). Several studies have shown positive effects of high quality ECEC interactions on children's school readiness (Hatfield, Burchinal, Pianta, & Sideris, 2016), learning, cognitive, social-emotional competence (Birch & Ladd, 1997; Peisner-Feinberg et al.,

2001; Sylva et al., 2003; Thomason & La Paro, 2013). Moreover, children experiencing high quality interactions are likely to have lower levels of behavioural problems (Birch & Ladd, 1997; Pianta et al., 2005). However, while research on the effects of ECEC indicates that high process quality (teacher-child interactions) can be related to children's social-emotional competence (ECCRN, 2006) the relations appear to be only small to modest (Burchinal, 2018; Melhuish et al., 2015). Research also shows that the effects are stronger for children from disadvantaged backgrounds (Melhuish et al., 2015), and for boys and children with lower self-regulatory skills (Broekhuizen, Van Aken, Dubas, Mulder, & Leseman, 2015). Some studies also report zero findings (Barnes et al., 2010; Stein et al., 2013), and even negative findings (Burchinal, 2018), and a systematic review and meta-analysis of interaction quality between staff and children, related to child outcomes claims that greater consistency in methodology is needed (Perlman et al., 2016). Thus this topic merits further investigation.

### **Aim of the study**

Despite the large expansion of ECEC settings and the high enrolment of toddlers in Norway, studies of the impact of quality have not focused on potential positive impacts on children's social-emotional competence. The aim of the study is to address this gap, by investigating the relationship between interaction quality in Norwegian toddler groups when children are age three and children's social-emotional competence.

The research question is whether interaction quality in toddler groups is associated with children's concurrent level of social-emotional competence and changes in children's social-emotional competence, from age three to age five. The hypotheses, based on earlier studies (Shonkoff & Phillips, 2000), are that there is a positive relationship between interaction quality and social-emotional competence, both concurrently and longitudinally.

## **Method**

### **The Norwegian context**

Norway has a highly developed ECEC system for children from one to five years of age (OECD, 2015) and there has been a large expansion of ECEC in the last decade, especially for toddlers (Vassenden, Thygesen, Brosvik, Alvestad, & Abrahamsen, 2011). In Norway there is a statutory right for all children to attend ECEC on a full-time basis from one year of age, and until children start at school at age six. Of children between one to two years of age, 82,5% attend ECEC, and 97% of children between three and five years (SSB,



2018). Both public and private ECEC settings are central service providers in Norway and are regulated in the same way through the Framework plan for the content and tasks of kindergartens, which is binding for all ECEC settings. The framework plan provides guidelines for the curriculum content and emphasizes the children's need for care and belonging, and that the children feel that they are important for the group and engage in positive interactions with both children and staff. A key factor in staffs' work is to focus on children's social-emotional competence (The Norwegian Ministry for Education and Research, 2011).

### **Participants and procedure**

The participants in the current study are 1199 children (52.7% boys) from 93 ECEC settings, out of the 158 that were approached to participate. The children were spread over 206 groups. Kindergartens from both rural and urban areas in Norway are included, and both municipal (59,6%) and private (34,4%) centres. The sampling procedure used was Probability Proportional to Size Selection (Bjørnstad, Gulbrandsen, Johansson & Os., 2013). The BePro project was approved by the Norwegian Centre for Research Data and the Norwegian Data Protection Authority, and ethical guidelines were followed (e.g., use of informed consent procedures, ensured confidentiality of the participants and the safe storage of data). The ECEC settings approved their own participation, and the parents approved participation on behalf of the children.

The participating children's family background, i.e. educational level and their country of birth are included in the analysis; the family's educational level was categorized as either high or low. A high educational level was used if one or both parents had a bachelor's degree (82%), and low was used when neither parent had a bachelor's degree e.g. only primary school or a high school qualification (18%). For 94% of the children, both parents were born in Norway or other Western countries like Iceland, the United States, Canada, Australia, and the rest (6%) had parents that were both born in a non-Western European country (e.g., Africa, Bulgaria, Macedonia, Poland, Turkey).

Data related to children's social-emotional competence presented in this study were collected at two times (T1 and T2) and collected as near as possible to the children's third and fifth birthdays. The children's mean age at the first measurement time (T1) was 3.17 years. In the follow-up measurement (T2) the children's mean age was 5.22 years. The social-emotional competence assessments were conducted by the teacher in the children's group through an online survey. The observational data measured with ITERS-R was collected in the fall related to measurement point 1 in social-emotional competence data, when children were aged three. The data collectors aimed to be "a fly

on the wall” and not to disturb the group when following their daily routines and practices. This was achieved by the observer sitting close to the group but not with the children and moving around in the group to see different situations, observing all children in the group. Some toddlers were curious about the new person in their group. In these cases, the observer responded briefly to the child by stating that “I want to see what you play with and what you do in the day”. If a child got very distracted by the observer’s presence, the observer moved away from the child to another part of the room. While non-involved in interactions, the observer would intervene during the observation if a dangerous situation occurred.

## Measures

### *Interaction quality*

The ITERS-R (Harms, Cryer, & Clifford, 2006) was used to assess the interaction quality of the groups of children experienced at age three. The researchers completing the ITERS-R were certified through an online course (ersi.info), and then they received training in ECEC settings in Norway. They needed to have established an inter-rater agreement of 85% before they could collect ITERS-R data in the ECEC settings. The researchers spent four hours in the settings, starting at 08:30 in the morning.

Some scales in the ITERS-R cover aspects of structural quality such as provision of materials, adequacy of rooms or outdoor space and aspects of the timetable. The scale *Interaction* in ITERS-R was used in this study to document process quality. This scale consists of four items: *Supervision of play and learning*, *Peer interaction*, *Staff-child interaction* and *Discipline*. Through several yes/no indicators, each item is rated on a seven-point scale, where 1 and 2 are inadequate, 3 and 4 are minimal, 5 and 6 are good and 7 is excellent. The item *Supervision of play and learning* assesses whether staff have the children within sight, are comforting, supportive, show interest, play with, help and encourage the children. The staff’s focus is on caregiving, both individualized and for the whole group. An inadequate indicator for this item is ‘Insufficient supervision to protect safety’ and an excellent indicator is ‘Staff watch carefully and usually act to avoid problems before they occur’ which means that staff are vigilant and alert to the children’s needs’.

*Peer interaction* includes the staff’s ability to facilitate and make positive peer interaction possible among all children most of the day, the staff model positive interactions, and explain actions, intentions, and feelings and talk about interaction. An inadequate indicator for this item is ‘Negative peer interaction either ignored or handled harshly’ and an excellent indicator is ‘Staff point out and talk about instances of positive social interaction among children or between adults and children’. *Staff-child interaction*



is the extent to which the staff show children affection, have frequent positive interactions, talk to the children, give appropriate sympathy and physical warm responses, and are responsive to each child's mood, needs, feelings and reactions. An inadequate indicator for this item is 'Interaction is impersonal or negative' and an excellent indicator is 'responsive to each child's mood and needs'. *Discipline* addresses the staff's ability to maintain control, to have realistic expectations, to set up programs to promote positive interactions and prevent conflicts, to give attention to positive behavior and react consistently, and help children understand the effects of their own actions and learn to use communication to solve problems. An inadequate indicator for this item is 'Discipline is either so strict that children are punished or restricted often or so lax that there is little order or control' and an excellent indicator is 'Staff help children learn to use communication rather than aggression to solve problems' (Harms, Cryer and Clifford, 2006).

### ***Social-emotional competence***

To measure children's social-emotional competence, the Norwegian Lamer Social Competence in Preschool scale (LSCIP; Lamer, 2006; Zachrisson, Janson, & Lamer, 2018) was used. This scale is based on Gresham and Elliot's (1990) Social Skills Rating System (SSRS). The LSCIP includes six subscales: *Empathy and role-taking*, *Prosocial behaviour*, *Self-control*, *Adjustment*, *Assertiveness* and *Play, joy and humour* (Lamer, 2006; Zachrisson, Janson, & Lamer, 2018). A recent study has evaluated the applicability of these proposed six subscales (Løkken, Broekhuizen, Bjørnstad, Moser, & Hegna, 2018). Based on exploratory and confirmatory factor analyses, this study discovered a different distribution of the items and an improved six-factor model (CFI =0.92, TLI = 0.91, RMSEA= 0.05) compared to the original six-factor model of the LSCIP (CFI=0.90, TLI = 0.88 RMSEA=0.06). In this paper we use this revised distribution of the items, leading to the following six sub-scales, *Prosocial behaviour* (5 items), *Self-control* (6 items), *Empathy and role-taking* (5 items), *Adjustment* (4 items), *Assertiveness* (8 items), and *Fairness* (3 items). (Løkken, Broekhuizen, Bjørnstad, Moser & Hegna, 2018).

Note that, although the names of five out of six scales remained the same, the items are somewhat reorganized (for some scales more than others), the items of the *Play, joy and humour* scale were distributed over the other scales, and one new scale labelled *Fairness* appeared. Sample items for *Assertiveness* are 'Initiates play' and 'Speaks when several others are present (in an OK manner)'. *Prosocial behaviour* includes items like 'Helps you without being asked' and 'Supports and encourages the other children'. Sample items for *Self-control* are 'Accept that his/her wishes will not always be fulfilled' and 'Waits for his/ her turn in games and other activities'. *Empathy and role-taking* is measured by items such as 'Recognizes, and can express in words, others' feelings' and 'Shows that he/she sees that others are afraid'. *Adjustment* includes 'Complete tasks he/she is given

within the designated time' and 'Cleans up after him/herself when play/activities are terminated'. And sample items of *Fairness* are 'Reacts critically to rules that are perceived as unfair' and 'Can resist group pressure'. The children were rated on the items by their teachers on a five-point Likert scale indicating frequency ranging from 1 to 5 (*Very seldom* (1), *Seldom* (2), *Occasionally* (3), *Often* (4) and *Very often* (5)). The ratings are based on teachers' observations of the children's behaviour in their group over the past two months. Cronbach alphas for the subscales at T1 were: .87 for Prosocial behaviour, .86 for Self-control, .88 for Assertiveness, .78 for Adjustment, .87 for Empathy and role-taking, and .59 for Fairness. At T2 the Cronbach alphas were: .88 for Prosocial behavior, .88 for Self-control, .88 for Assertiveness, .86 for Adjustment, .80 for Empathy and role taking, and .65 for Fairness.

## Analysis

Multilevel analysis (Hox, 2002; Raudenbush et al., 2003) in Mplus (Muthèn & Muthèn, 2013) was used to investigate the associations between interaction quality and different domains of children's social-emotional competence. Both cross-sectional effects at T1 and longitudinal effects at T2 were investigated while controlling for social-emotional competence at T1 (i.e., residualized change).

The data have a two-level structure with child characteristics as level 1 and ECEC interaction quality as level 2 variables. All six social-emotional competence dimensions were included in the model simultaneously, controlling for gender and family education.

In the current study, missing data varied depending on the specific variables. Interaction quality measured with the mean score of the *ITERS-R Interaction* subscale was missing for 1.9%. Observations were not conducted for children in a group with too few study children (at least three participating children were required). For the social-emotional competence ratings, the missing data at T1 and T2 were respectively 15.9% and 16.5%. In some cases, the initial teacher of the child no longer worked in the ECEC setting or was on long-term sick leave and the new teacher felt unable to report on the child's development. Missing data on children's gender was 1.2%, their ethnic background (Western or not) 0.3% and families' education level 9.7%. A Maximum Likelihood Estimator (MLR) was used to address possible non-normality in the data, and to address the missing data with Full Information Maximum Likelihood (FIML) (Enders, 2010). The children included in the analysis in the current study had data on the social-emotional competence at T1 (N= 887) or T2 (N= 881).

## Results

The descriptive statistics and correlations among the main predictor and outcome variables are presented in appendix A1. The correlations among different social-emotional competences at T1 and T2 indicate moderate stability over time, ranging from .22 (empathy) to .41 (assertiveness). In addition, there were small but significant associations between interaction quality and prosocial behaviour ( $r = .09$ ), self-control (.07), assertiveness (.06), adjustment (.012), empathy (.12) and fairness (.07) at T1. There were no significant correlations with interaction quality and any of the social-emotional competence dimensions at T2.

### Null Model

A null model was specified to estimate the variance at the child and group level to calculate Intraclass Correlations (ICC;  $\sigma_{\text{group}} / (\sigma_{\text{child}} + \sigma_{\text{group}})$ ) for the dependent variables at time 1 (T1) and time 2 (T2). See Table 1 for all child-level and group-level variance components per dependent variable. These results show that between 6% and 19% of the variance resided at the group level. In the following full models, the group-level ITERS-R Interaction scale variable was included into the models to determine if it could explain any of the group-level variance.

TABLE 1 Null model and Intraclass Correlations (ICC) of outcome variables at time 1 (T1) and time 2 (T2).

	<i>PS1</i>	<i>PS2</i>	<i>SC1</i>	<i>SC2</i>	<i>AS1</i>	<i>AS2</i>	<i>AD1</i>	<i>AD2</i>	<i>EM1</i>	<i>EM2</i>	<i>FA1</i>	<i>FA2</i>
Variance components												
Level 1-child	.480	.489	.373	.397	.379	.329	.327	.413	.419	.417	.367	.450
Level 2-center	.078	.077	.057	.039	.036	.025	.061	.075	.069	.096	.065	.027
ICC	.140	.136	.133	.089	.087	.071	.157	.154	.141	.187	.158	.057
AIC	10680.948	(T1)										
	10873.195	(T2)										

Note: PS= Prosocial, SC=Self-control, AS=Assertiveness, AD=Adjustment, EM=Empathy, FA=Fairness.

### Full model

The full model was used to investigate the associations between the ITERS-R Interaction scale and the six dimensions of social-emotional competence. Table 2 shows the results for children's social-emotional competence at T1 (age 3). One positive and significant

association was found between interaction quality and toddler's empathy, and no significant associations between interaction quality and any of the other social-emotional competence dimensions. Table 3 shows the results for children's social-emotional competence at T2. The positive association between T1 and T2 for the six dimensions of social-emotional competence again indicate moderate stability. In addition, a marginally significant relation was found between interaction quality and children's self-control. However, no relations between interaction quality and the other social-emotional competence dimensions at T2 were found. Social-emotional competence was significantly higher for girls at both T1 and T2 for dimensions, except for self-control at T2.

TABLE 2 Full model. Predicting teacher-rated social-emotional competence at T1

	<i>Pro-social T1</i>		<i>Self-Control T1</i>		<i>Assertiveness T1</i>		<i>Adjustment T1</i>		<i>Empathy T1</i>		<i>Fairness T1</i>	
	<i>Beta</i>	<i>SE</i>	<i>Beta</i>	<i>SE</i>	<i>Beta</i>	<i>SE</i>	<i>Beta</i>	<i>SE</i>	<i>Beta</i>	<i>SE</i>	<i>Beta</i>	<i>SE</i>
<b>Level 1-Child</b>												
Gender (1=boy)	-0.245**	0.036	-0.112**	0.035	-0.159**	0.034	-0.162**	0.034	-0.172**	0.035	-0.098**	0.031
Family education (1 = high)	0.069	0.036	0.042	0.039	0.094	0.037	0.110	0.040	0.028	0.039	0.021	0.036
<b>Level 2-Center</b>												
Interaction quality	0.179	0.125	0.113	0.123	0.144	0.131	0.142	0.111	0.272*	0.112	0.102	0.112

Note. B=standardized regression coefficient; SE = standard error of B. \*\*p<0.01; \*p<0.05

TABLE 3. Full model. Predicting teacher-rated social-emotional competence at T2

	<i>Pro-social T2</i>		<i>Self-Control T2</i>		<i>Assertiveness T2</i>		<i>Adjustment T2</i>		<i>Empathy T2</i>		<i>Fairness T2</i>	
	<i>Beta</i>	<i>SE</i>	<i>Beta</i>	<i>SE</i>	<i>Beta</i>	<i>SE</i>	<i>Beta</i>	<i>SE</i>	<i>Beta</i>	<i>SE</i>	<i>Beta</i>	<i>SE</i>
<b>Level 1-Child</b>												
Social-emotional competence T1 <sup>a</sup>	0.259**	0.032	0.299**	0.030	0.271**	0.036	0.296**	0.033	0.183**	0.030	0.137**	0.033
Gender (1 = boy)	-0.205**	0.037	-0.068	0.038	-0.091*	0.036	-0.173**	0.036	-0.160**	0.040	-0.127**	0.039
High family education	0.048	0.040	0.058	0.040	0.056	0.042	0.074†	0.039	0.066	0.044	0.024	0.040
<b>Level 2-Center</b>												
Interaction quality	-0.011	0.102	0.246†	0.151	-0.107	0.128	0.172	0.115	-0.026	0.106	0.040	0.135

Note. Beta=standardized regression coefficient; SE = standard error of Beta. \*\*p<0.01; \*p<0.05 †p<.10.

<sup>a</sup> For each social-emotional competence dimension at T2, we included the same social-emotional competence dimension assessed at

## Discussion

The current study investigated the relationship between interaction quality measured in Norwegian toddler groups, and six dimensions of children's social-emotional competence, both at age three (T1) and age five (T2). This study found an association between interaction quality and empathy at T1, but not for any of the other dimensions of social-emotional competence. No significant associations between interaction quality, and children's social-emotional competence at age five were found, except for a marginally significant finding for children's self-control, which should be interpreted with caution. There could be different explanations for why interaction quality in the context of the BePro study was not a relevant factor for most of the dimensions in social-emotional competence. These explanations will here be carefully addressed and discussed.

This study shows that interaction quality in toddler groups matters for children's empathy when they are three, and as such can impact their well-being, becoming and feeling of belonging. For older children, by the age of five, further development of empathy may be more strongly associated with the nature of peer interactions than interactions with adults, as they learn to respond to peers and engage in more collaborative play. The marginal association with children's self-control could imply that interaction quality is of importance for self-control. It could be that there is no relation between interaction quality and the other dimensions of social-emotional competence, but this would contradict earlier research studies that highlight the importance of interaction quality and its impact on children's social-emotional competence (Burchinal et al., 1996; ECCRN, 2006; Melhuish et al., 2015; Shonkoff & Phillips, 2000). It would, however, be in line with work from the UK, which found that at age three (Barnes et al., 2010) and close to five years (Stein et al., 2013) the quality of the child care was not a significant factor in social-emotional problems. In these studies, it was the quality of interactions in the home that were most relevant, which were not available in the current study. Attachment theory would predict that the most important interactions are with the adults perceived to be the most important ones in a child's life. If this leads to predominantly secure attachment, it is unlikely that poor quality ECEC interactions would lead to adverse outcomes. It would have been a useful (but costly) addition to the study to conduct 'strange situation' (Ainsworth & Bell, 1970) assessments of the children with a parental caregiver so that the extent of secure or insecure attachment could have been included in the statistical analyses. Possibly this could be achieved in a smaller, more detailed study. Alternatively, it could be hypothesized that high quality staff-child interactions may only be of significance for children with substantially disadvantaged home backgrounds typified by lack of sensitive responsive interactions.

It would be interesting to follow up studies and assess children's social-emotional competence in schools. It could be that no effects at these early ages might be identifiable at a later stage (i.e., so-called ' sleeper effects ', when children are at school), when children have more autonomy and there are fewer adults to supervise and intervene in the children's behavior. The results indicates gender differences, reflecting other studies on children's competences (Meland, Kaltvedt & Reikerås, 2016; Moser & Reikerås, 2016), and gender may interact with factors such as the home environment or disadvantage with respect to the relevance of ECEC interaction quality, which could be explored further in future studies.

Another possibility for the many non-significant associations is that the ITERS-R interaction scale did not have sufficient variability to be able to detect associations with children's social-emotional competence. There is variance in the sample, with a mean of 4.84 and a standard deviation of 1.49 on a seven-point scale, but it maybe not enough to predict children's outcomes. A further explanation for finding no associations, which is related to the earlier explanation on children's attachment security, could be the high proportion of highly educated parents in this study. Higher parental education is often related to higher social-emotional competence in children (Melhuish et al., 2015). Some UK research has also found that it was the family factors that had most relevance for children's social-emotional development compared to the quality of ECEC, although a large amount of experienced ECEC from an early age was relevant (Barnes et al., 2010; Stein et al, 2013). It could therefore be that the families and the interactions and other experiences that they provided in the home environment mattered most for children's social-emotional competence in this study's sample. The sample includes a higher proportion of high educated parents than in the population, and it could be that their social-emotional competence was already highly stimulated by their home environment.

The lack of significant effects could also be explained by the fact that different teachers rated children at T1 and T2, which introduced some measurement error into the model. Other reasons for not finding any associations could be related to the design of the study. The ECEC settings were assessed at T1 in toddler groups, after which many of the participants moved into groups for children between three and six years of age. That is, they spent the years between T1 and T2 predominantly in a different group with different staff and other children, not necessarily similar to the groups measured at T1. This new environment may have moderated any impact of quality at T1.

Another possibility is that the measure of quality may not have been able to identify the aspects of interactions that are most likely to influence social-emotional competence. When looking in detail at the items of the subscale Interaction of the ITERS-R, it is clear that there are some conceptual differences between the items. While 'Supervision of



play and learning' and 'Discipline' are more structural aspects of interactions, 'Staff-child interaction' and 'Peer- interaction' are more about process aspects of interactions. As Mathers et al. (2012) pointed out, it could be that even the ITERS-R scales that supposedly assess process quality are too structural in content and do not measure process quality in sufficient depth. Based on previous research, it seems that the process characteristics of interaction quality are most important for the development of children's social-emotional competence (Burchinal, 2018; Melhuish, et al., 2015). In addition, the children form relationships with peers as well as the staff, and peer relationships are likely to have impact on social-emotional competence (Maccoby and Lewis, 2003; Schaik, Leseman, and de Haan, 2018). This dimension is not included as a measure in this study, but the relevance of peer interactions could be investigated in future studies.

Finally, there could also be cultural reasons for the lack of findings in this Norwegian study. The ITERS-R was developed in the United States, at a time when quality in many settings was poor, and the intention of the scale was mainly to identify poor-quality centers (Early, Sideris, Neitzel, LaForett, & Nehler, 2018) rather than to assess the whole range of higher quality. Moreover, the scale has not been validated in Norway, which is a context with more regulation on the quality of ECEC compared to many other countries. As such, it is not clear whether the current structure of the measure captures the specific aspects of Norwegian ECEC that would be predictive of children's social-emotional competence. In other research, possibilities to restructure the ITERS-R and ECERS-R scales are being examined to make them more suitable to children's experiences in Norwegian ECEC settings (Hegna et al., 2017).

Even though this study did not find associations between interaction quality and the different dimensions of social-emotional competence on most of the scales, the insights gained can contribute to further methodological developments, and contribute to planning smaller scale studies that are able to include more information about the parent child interactions and relationships. Ideally, studies should collect information about interaction quality in home settings in addition to ECEC, so that the relevant contribution of each to children's development can be evaluate. Also, it is recommended that further studies investigate process quality with more context sensitive measures that measure interactions in more depth. It may also be useful to focus more on the quality of peer interactions in ECEC as they are likely to be of increasing importance for young children's development with increase in peer-peer play in group settings as children move from the toddler to the preschool stage, more typical of older pre-schoolers (Schaik, Leseman, and de Haan, 2018).

## Conclusions

This study did not provide convincing evidence for positive associations between interaction quality in Norwegian ECEC provisions for toddlers and children's social-emotional competence, neither in a cross-sectional perspective in three years olds, nor in a longitudinal perspective when predicting from ECEC quality at age three to children's social-emotional competence at age five. Except from the association with empathy at age three, and the marginally significant association with self-control at age five, this could mean that interaction quality is not a major factor predicting social-emotional competence in Norwegian ECEC settings. Future studies should pay more attention to contextually sensitive and ecologically valid assessment instruments that (a) specifically depict the quality of Norwegian ECEC institutions for toddlers and (b) are better suited for measuring young children's social-emotional competence. With regard to (a), a greater orientation towards process quality is recommended. Related to (b) direct observations of children's social-emotional behavior through researchers or a measure of children's social-emotional competence under more standardized conditions could be promising ways to go for future research.

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## Appendix

A1 Descriptive statistics and correlations (r) between main predictor and outcome variables

	M	SD	range	1	2	3	4	5	6	7	8	9	10	11	12	13
<b>Child level (level 1)</b>																
1.Prosocial T1	3.15	0.75	1.00-5.00	-												
2.Self-control T1	3.41	0.66	1.00-5.00	.41**	-											
3.Assertiveness T1	3.98	0.64	1.25-5.00	.67**	.34**	-										
4.Adjustment T1	3.42	0.62	1.21-5.00	.55**	.62**	.39**	-									
5.Empathy T1	3.56	0.70	1.00-5.00	.69**	.45**	.55**	.51**	-								
6.Fairness T1	3.42	0.66	1.00-5.00	.36**	-.01	.39**	.16**	.38**	-							
7.Prosocial T2	3.59	0.75	1.00-5.00	.37**	.19**	.36**	.25**	.27**	.18**	-						
8.Self-control T2	3.91	0.66	1.17-5.00	.15**	.38**	.11**	.28**	.13**	-.04	.53**	-					
9.Assertiveness T2	4.28	0.60	2.00-5.00	.30**	.13**	.41**	.18**	.22**	.18**	.64**	.39**	-				
10. Adjustment T2	3.94	0.70	1.25-5.00	.23**	.27**	.19**	.37**	.18**	.07	.56**	.67**	.41**	-			
11.Empathy T2	3.80	0.71	1.20-5.00	.25**	.18**	.25**	.17**	.22**	.13**	.74**	.51**	.54**	.44**	-		
12.Fairness T2	3.73	0.70	1.00-5.00	.21**	-.06	.28**	.03	.19**	.26**	.35**	-.38	.43**	.10**	.40**	-	
<b>Center level (level 2)</b>																
13.Interaction quality	4.84	1.49	1-7	.09**	.07*	.06	.09*	.12**	.07*	-.00	.07	-.02	.10	-.03	-.02	-

Note: Social-emotional competence items were rated on a scale ranging from 1-5. Interaction quality was rated on a scale ranging from 1-7.

\* $p < .05$ . \*\* $p < .01$ .