

Master Thesis

Barnehagepedagogikk

June 2022

IS SELF-CONTROL (OR SELF-REGULATION) AMONG CHILDREN AT
THREE AND FIVE YEARS OF AGE ASSOCIATED WITH PROCESS QUALITY
IN NORWEGIAN ECEC?

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Is self-control (or self-regulation) among children at three and five years of age associated with process quality in Norwegian ECEC?

Abstract

In this study the association between process quality and the development of self-control among children from age 3 to age 5 in Norwegian Early Childhood Education and Care (ECEC) was investigated. Specifically, associations between interaction quality, measured with the Caregiver Interaction Profile (CIP), and self-control, assessed with the self-control subset in the Lamer Social Competence in Preschool Scale (LSCIP), was investigated. Caretaker-child attachment and relationships is thought to influence social-emotional and cognitive development among children, especially for children at risk. Children at risk are typically children with increased likelihood of low-level regulatory ability. However, the specifics of the associations between process quality and socio-emotional development among children are not obvious. This study aimed to add to the understanding of how different aspects of caretaker-child relationships might contribute to socio-emotional and cognitive development among children, in the Norwegian ECEC tradition.

The results showed that interaction quality was not associated with self-control development among children at 3 and 5 years-of age. Self-control at age 3 and 5, assessed with LSCIP, seems not to be associated with ECEC interaction quality measured with CIP, in a Norwegian sample.

Acknowledgments

This study was made possible due to granted access to CIP data from the large-scale studies: Better Provision for Norway's Children in ECEC [BePro/ GoBan] and Searching for Quality (SfQ/ Blikk for barn) and LSCIP data from BePro. Ellen Os has, through her guidance and supervision, been of great help and support throughout the writing process. Erik Eliassen has helped me understand the basics of statistics and provided insights to quantitative studies. They both have my sincere gratitude. Also, Elisabeth Bjørnstad, Key investigator on the BePro/GoBan project, has been both positive, patient, and helpful regarding my many inquiries concerning access to data, log in processes and retrieving data outputs. Thank you!

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Introduction

Childhood development of self-control or self-regulation has significant impact on later well-being. Low level self-control, in early childhood, correlates with later negative outcomes regarding health, wealth, substance abuse and crime (Moffitt et al., 2011; OECD, 2020). Self-control or self-regulation is also thought to affect school readiness, and educational outcomes (Rege et al., 2019). Self-control outcomes seems to be partially predicted by genes and socio-economic status. However, the nature of relationship and interactions between primary caretaker (mother) and child are considered to play an important role in the development of early self-control (Kochanska, Philibert, & Barry, 2009). Also, the content and methods in Early childhood Education and Care (ECEC)-centers might influence the development of self-control or self-regulation (Broekhuizen, Mokrova, Burchinal, & Garrett-Peters, 2016; Moffitt et al., 2011; OECD, 2020) This has brought policy-makers to consider “large scale programs aimed at self-control to improve citizens’ health and wealth and reduce crime” (Moffitt et al., 2011 p 2693). International and domestic research suggest that high quality ECEC programs and interventions can improve both executive functioning (Rege et al., 2019) and cognitive control (A. Diamond, Barnett, Thomas, & Munro, 2007). Common in research regarding many of the programs and interventions is that they, partly, emphasize the importance of self-regulatory abilities (Kirkhaug, Drugli, Lydersen, & Mørch, 2013; Rege, Solli, Størksen, & Votruba, 2018), and that those programs or interventions can aid self-regulatory development.

Implementing structured programs in ECEC, might help improving school readiness and other future outcomes among children (Rege et al., 2019), but the idea of implementing structured curriculums in Norwegian ECEC is not without controversy. The growing influence of interventions, programs, and manuals to improve quality and reduce differences in learning outcomes across centers, is currently challenging the idea of child centered approaches and values in the Norwegian ECEC (Pettersvold & Østrem, 2018; Vik, 2014; Østrem, 2010). Critics fear that increased focus on cognitive and educational outcomes in preschool, enable the weathering of the Norwegian pedagogical tradition. The claim is that this represents a shift in values in Norwegian ECEC, from inclusion, participation, and absence of performance requirements, towards an instrumental approach where the goal is to produce productive and profitable citizens (Pettersvold & Østrem, 2012; Vik, 2014;

Østrem, 2010). The perceived lack of goals in the pedagogical tradition (Oecd, 2006; Rege et al., 2019; Rege et al., 2018) is, in turn, thought to manifest quality differences across centers, and that this suggests missed opportunities to promote school readiness and general well-being. (Oecd, 2006; Rege et al., 2018) The idea that ECEC is a place for either to promote school readiness and future outcomes, or that it is a place free from requirements is a part of a larger debate. Whether childhood should be seen as preparation for adult life or if it should be seen as valuable in its own right has been extensively argued throughout the last decades (Uprichard, 2008). However, individual development is, to some extent, visible in the Norwegian tradition. According to the Framework Plan for Kindergartens (2017), ECEC-centers “shall promote learning and formative development as a basis for all-round development” (p. 7) and one of the objectives is to “enable holistic learning processes that promote the children’s well-being and all-round development” (p. 22). Further, kindergartens are expected to “ensure that the oldest children have acquired experience, knowledge and skills to give them a good foundation and motivation for starting school.” (p. 33/34). This indicates that a level of structure and a gradient of emphasis on future outcomes is expected.

One aspect of this debate, that is seldom addressed, is that implementing programs or interventions because “we know that they work”, might limit the development of high-quality institutions. There are indications that some ECEC-centers applying a traditional pedagogical approach, have better “results” than interventions targeting school readiness. Results from the intervention “Lekbasert læring” or “Play based Learning” show that the positive outcomes are entirely driven by improvement in what they define as “low quality centers” (Rege et al., 2021). The field experiment included 691 five-year-old’s in 71 ECEC centers, in a region of Norway (Agder). Outcomes emphasized in “Play based learning” are language and mathematics skills, and executive functioning, and baseline center quality is determined by scores on tests measuring outcome variables before intervention (Rege et al., 2018). Results suggests that there are approaches that are more effective, which still can be considered to exist within the Norwegian pedagogical tradition.

Dion Sommer (2015) has reviewed international research and found that evidence that propound a child centered approach, that emphasizes free play, guided play and a playful approach to learning activities, an approach that presupposes that children’s emotions is

recognized, surpasses the structured, academical approach when measuring the long-term learning effects. Sommer proposes that emphasis should not be on what children learn, but how they get to approach learning. Arguing that the structured approach might limit early learning, he advocates that a more free, child centered approach should be emphasized (Sommer, 2015). However, he does not address the argument that the pedagogical tradition might engender quality differences.

The Norwegian, relatively unstructured curriculum, does seem to manifest in quality disparities (Oecd, 2006). Large scale studies of ECEC-quality in Norway reveal large quality differences on both a structural and a processual level (E. Bjørnstad, Broekhuizen, Os, & Baustad, 2019; Elisabeth Bjørnstad & Os, 2017; Rege et al., 2018). If reducing these inequalities is necessary, then we should at least use the best quality centers for aspiration. Although, quality measurements used as base for programs and interventions are not randomly selected, they are not necessarily based in the philosophical and ethical foundations for Norwegian ECEC. Developing a minimum quality baseline should consider the democratic pedagogical tradition when outlining outcome goals. In this thesis I investigate the association between process quality and the development of self-control, in kindergartens that, presumably, work according to the Framework plan (2017).

Secure attachment to caretakers and the quality of the relationship between caretaker and child is thought to influence the development of regulatory capacities (Kochanska et al., 2009). Norwegian ECEC-teachers responsibility includes to facilitate learning and friendships (Ministry of Education, 2017), but the Norwegian ECEC tradition does not include structured programs. To address the gap between the emphasis of cognitive development and future learning in the structured programs, and the child centered, on-the-spot approach of the Norwegian pedagogical tradition I will investigate if **the development of self-control is associated with process quality in Norwegian ECEC.**

Since there are many factors determining early childhood development of self-control (Kochanska et al., 2009), the association is expected to be moderate. However, research investigating effects of childcare on, among other aspects, cognitive development among children find that the positive effects are most prevalent among children with low base level (Rege et al., 2019) or children at risk, entering high quality ECEC-centers (Solheim, 2013). Also, internationally, interventions aimed at improving cognitive and behavioral

development, with self-regulation as an important aspect, focus on areas with low socio-economic status (SES)(Bierman et al., 2014), Children from low SES families, tend to have more externalizing behavioral problems and lower self-regulatory ability (Moffitt et al., 2011). Secure attachment to caretaker and the nature of interactions between caretaker and child moderate the effects of low SES. Other factors also seem to predict self-control. Investigating the interplay of genes and caretaker-child attachment and relationships, Kochanska et al. (2009) found that secure attachment predicts positive self-control outcomes even after accounting for genetic dispositions. Hence a separate analysis will be conducted measuring association between process quality and the development of self-control, in children with low self-control at age 3.

As measurement of interaction-quality the Caregiver Interaction Profile (CIP) is used. Professional observers assess caretaker-child interactions in different situations in ECEC based on criteria in the CIP-scale. Many or most of the interaction variables in the Caregiver Interaction Profile, I believe are in line with the basic values of the Framework Plan. For example, the scale “Sensitive responsiveness” in CIP correspond with the chapter “Kindergartens shall meet the children’s need for care” in the Framework Plan (p 19), and the scale “Fostering positive peer interaction” correspond to the chapter “Kindergartens shall promote friendship and community” (p 22). Self-control outcomes are assessed with the Lamer Social Competence in Preschool (LSCIP) scale. The scale is an observational tool developed by Kari Lamer to give a measure of overall social competence among children. The scale is composed of six-factors describing different aspects of social competence, and self-control is one of the factors (Zachrisson, Janson, & Lamer, 2019). In the development, considerations were made to accommodate the Norwegian and Nordic ECEC tradition (Zachrisson et al., 2019). Hence, an investigation of associations between quality, measured with CIP, and self-control measured with LSCIP, should provide a description of development of self-control within the Norwegian ECEC tradition. A more extensive description of the variables follows later in this thesis.

Hypotheses

The relations between center quality and various cognitive and socio/emotional outcomes have, been examined extensively. (Broekhuizen et al., 2016; Eliassen, Zachrisson, & Melhuish, 2018; Kochanska et al., 2009; Løkken, Broekhuizen, Barnes, Moser, & Bjørnstad, 2018) but to my knowledge the association between the process quality criteria in CIP and the development of self-control is not investigated.

My hypotheses are:

- 1. Interaction quality in ECEC measured with CIP at age 3 is associated with self-control at age 3 and 5**
- 2. Interaction quality in ECEC measured with CIP at age 3 is associated with development of self- control from age 3 to age 5.**
- 3. The development (of self-control) among children with low baseline self-control is associated with experienced interaction quality in ECEC.**

Background

In this chapter the definitions, and the significance of early self-control ability will be further investigated. Also, earlier research from the Norwegian ECEC, exploring association between process quality and cognitive outcomes, will be reviewed.

Definition

“Self-control is among the most widely studied constructs in the social sciences” (Duckworth, 2011 p 2639), and “interest in self-control unites all the social and behavioral sciences.” (Moffitt et al., 2011 p 2693) Recent years, a whole range of studies and articles about self-regulation or self control among children, and its long-term significance have been published. A wide range of researchers within different professions and traditions has completed the studies. There seems to be consensus that self-regulation at an early age predicts positive outcomes both individually and for the society as a whole. (Angela L Duckworth, 2011; Kochanska, Coy, & Murray, 2001; Lenex, McClelland, ten Braak, Idsøe, & Størksen, 2020; Moffitt et al., 2011). Self-regulation measured at an early age is linked to school readiness and later well-being, health, academic achievements, wealth, crime

convictions and the use of substances.(Bierman et al., 2008; Angela L Duckworth, 2011; OECD, 2020; Rege et al., 2018)

Even though self-regulation and self-control is frequently used terms, it is not quite clear what it means. In the article: "On the Meanings of Self-Regulation: Digital humanities in Service of Conceptual clarity" (Burman, D. Green, & Shanker, 2015) the authors show that the concept of self-regulation is "extremely popular, but its definition is ambiguous..." (p 1507). The multiple discursive meanings of the concept creates a challenge for students and scientists, as well as for teachers who wants to apply ideas and methods to support the development of self-regulation in their work. (Burman et al., 2015). Different writers use different terms to describe similar phenomena, and same phenomena is described in different terms. The terms "self-regulation" and "self-control" is sometimes connected to emotional-regulation, impulse control, delay of gratification and/or response inhibition (Burman et al., 2015; Angela L Duckworth, 2011; Mischel, Shoda, & Rodriguez, 1989; Moffitt et al., 2011; Rege et al., 2019; Schel & Crone, 2013). Others use the, term more or less, synonymously with executive functioning, or describe it as an important feature of executive functions (OECD, 2020; Rege et al., 2019).

The term "self-regulation" was first introduced in official educational documents in Norway by "Ludviksenutvalget" (2015). In NOU 2015:8 (Ludvigsen et al., 2015), the authors themselves define self-regulation in several different ways. Self-regulation as the ability to *regulate* thoughts, actions, and feelings (p 10), self-regulation as related to *control* thoughts, actions and feelings and self-regulation as the ability to work goal-oriented, resist distractions and adapt in social settings (p 20). They also connect self-regulation to the ability to act responsibly and to be reliable (p 20), and the ability to plan, implement and evaluate learning processes (p 85).

In the study "Antecedents of Self-Regulation. A Developmental Perspective" Kopp differentiates between self-control and self-regulation. According to Kopp (1982) self-control is the precursor to self-regulation and describe the ability to control behavior based on information or monitoring from caretakers. Self-regulation is when behavior is controlled without external monitoring. Outcomes in this study are assessed by an observer; hence it is difficult to know if the behavior is internally or externally regulated. This means that Kopp's (1982) definition cannot be applied directly. Nevertheless, there are several of the outcome

variables, that could be defined as self-regulation. For example, the ability to control expression of anger is assessed. Expression of anger can be related to controlling emotional and behavioral impulses (Angela L Duckworth, 2011). Ability to compromise in conflict situations and acceptance of unfulfilled wishes might require emotional regulation and therefore be related to self-regulation (Calkins & Williford, 2009). Both aspects of behavior assessed in this thesis. However, identifying observed behavior as either self-control or self-regulation might not be possible in this thesis, as it is a “difference in degree, not kind” (Kopp 1982 p. 9). It is possible that some reactions are regulated by perceived monitoring by caretakers, and therefore would be considered self-control, or the same reactions could be regulated without external aid and consequently be considered self-regulation. Also, the first assessment of self-regulatory ability in this thesis is performed approximately the same age as the shift from external to internal regulation emerges (Kopp, 1982). This adds to the unreliability of defining the phenomena measured as either self-control or self-regulation. However, in the data material collected for this thesis the term “self-control” is used. Hence, I will use the term “self-control” when referring to my own research. When referring to literature I will use the term used in said documents. A more extensive discussion of the variables is to be found in the “Outcomes” chapter.

Development of self-control

Emerging self-control, understood the ability to control or regulate emotions and behavior, is observable at around 2 years of age (Allan et al, 2019). However, the foundation for the development of self-regulatory behavior is observable in the first months of life. Biological reflexes are thought to constitute the beginning of what later will manifest as self-regulation or self-control (Calkins & Williford, 2009). Throughout the first two years of life a gradual development of willful control is observable. External regulation and support from caretakers are necessary, but performing simple tasks that require self-regulatory skills, are becoming visible within the first two years of life. Emerging impulse-control develops when the child is a toddler (1-2 years)(Kopp, 1982). At approximately 24 months the ability to regulate behavior and act in correspondence with social expectations, without being monitored, emerges. Within the next 1-2 years, internal self-regulation develops. The ability to regulate behaviors, absent external monitoring and instruction, and the capacity to adapt control-processes to situational demand gradually emerges (Kopp, 1982). This shift, from

external to emerging internal regulation is one of the fundamental questions of socialization (Kochanska et al., 2001)

The age between 3 and 6 years is considered to be a key period in the development of self-regulation or self-control. Children develop the ability to express emotions verbally, and the capacity to think and evaluate appropriate reactions are showing. Impulse control and the ability to regulate emotions and emotional reactions, develops rapidly at this age (Kopp, 1982). The capacity for self-control continues to develop over the life span (Angela L Duckworth, 2011). Even so, early childhood levels correlate with self-control outcomes in young adulthood (Moffitt et al., 2011), and the implications of self-control in childhood are observable throughout life (Richmond-Rakerd et al., 2021).

The development of self-regulatory ability or self-control among children appears to be influenced by various factors. The family's socio-economic background and status seem to predict self-control. (OECD, 2020; Rege et al., 2019). There are some variations between countries but overall, children from low SES background display more externalizing behavior and less self-control. Also, self-control is partially hereditary with both genes and IQ as powerful predictors (Kochanska et al., 2009; Moffitt et al., 2011). However, the nature of interactions between caretaker and child seems to have a mediating effect on the development of self-control independent of all other factors (Kochanska et al., 2009; Rege et al., 2019; Zambrana, Ogden, & Zachrisson, 2020)

The significance of self-control

Children's early skills in self-regulation or self-control is considered to be of critical importance for later development and well-being (OECD, 2020). This is an agreed upon assumption (Moffitt et al., 2011). Although the ability to control impulses and regulate emotions continues to develop throughout life, the OECD report "Early Learning and Child Well-being. A study of five-year-olds in England, Estonia and The United States" (2020), states that:

"The benefits of strong early learning are clearly evident at school entry, at the end of compulsory schooling and later in adulthood. Children who do not develop critical early skills such as emergent literacy or self-regulation, however, face enormous challenges in

achieving well at school and in having positive outcomes during adulthood.” (OECD, 2020. P.19)

If research demonstrate this strong association, no wonder policymakers want to implement programs to aid in the development of self-control or self-regulation. However, situation is somewhat more nuanced. In the report used to verify the claim made by OECD; “The Power and Promise of Early Learning” (Shuey & Kankaraš, 2018), there are listed several positive outcomes correlated with high level of self-regulation and negative outcomes correlated with low levels of self-regulation but the studies are observational “and cannot address the causal influence of early learning on later outcomes” (p 19). There is little documentation supporting the idea that children who do not develop early self-regulatory skills will not succeed later in life. However, low level self-control seems to predict a higher risk of negative outcomes. Another way of expressing it is: “adult anti-social behavior virtually requires childhood anti-social behavior [yet] most antisocial children do not become anti-social adults” (Robins, 1978, p.611). The distinction between causality and statistical association should matter when determining future policy of ECEC.

Self-control and early childhood benefits

Long term benefits of emerging self-control in childhood are often outlined as one of the main reasons for implementing programs or interventions at an early age (Angela L Duckworth, 2011; Lenos et al., 2020; Mischel et al., 1989; Moffitt et al., 2011). However, a gradient of self-control is beneficial already in early childhood. In an the article “Friendship and Popularity in Preschool Classrooms” (Walden, Lemerise, & Smith, 1999) the association between emotional and behavioral regulation, and the development of early childhood friendships was investigated. In this one-year study of 59, 3 to 5 year-old children, associations between social- emotional development and peer relations were analyzed. Peer relations and social- emotional development (emotional and behavioral regulation) was assessed early in the year. At the end of the year peer relations were assessed once more. Walden, Lemerise & Smith (1999) found that popularity among young children was not associated with emotional regulation. However behavioral regulations skills showed to be important in determining the child’s attractiveness in peer groups at preschool age. Emotional regulations predicted friendships later in the year independent of popularity.

Walden et al. (1999), speculate that emotional regulation is of importance in establishing friendships. In turn, lack of friendship and/or social exclusion seem to hamper the development of self-regulation (Stenseng, Belsky, Skalicka, & Wichstrøm, 2015). Socially excluded children exhibit impaired development of self-regulatory abilities from the age of 4 to the age of 6. Further, children with poor self-regulatory abilities in preschool experienced exclusion two years later, in school. Social exclusion is stable throughout childhood, despite opportunities of new relationships when changing or shuffling of the social groups. (Stenseng et al., 2015 p 216-217) This supports the findings of Coie & Dodge (1998). Children that are not able to express emotions in and socially acceptable manner and control their behavior, tend to display increased aggressivity for the rest of their life (Coie & Dodge, 1998). Being a part of a social group and participating in age-adequate play, such as rough and tumble activities, at an early age, both requires and helps the development of appropriate emotional expressions (Peterson & Fladers, 2005). Peterson and Fladers note that the regulation of aggression in play might not be due to aggression inhibition, but more due to mutual adaption of reactions. Children's (friend's) actions and expressions are modulated by the others. Nevertheless, regulation of the expression of emotions is important in the development of friendships, and friendships are important in the development of emotional and behavioral regulation. Hence, caretakers' ability to foster peer interactions, and thereby to support the development of friendships might have a positive influence on the development of self-control. Also, supporting the development of self-control might influence the development of friendships and positive relationships in ECEC.

[Self-control in childhood predicts later health, wealth, and well-being](#)

The association between self-regulatory ability and future positive outcomes, often provide the rationale for emphasis on self-control development in ECEC (Moffitt et al., 2011; Oecd, 2006) The long-term effects of childhood self-control has been extensively studied (Caspi, Moffitt, & Poulton, 2013; Angela L Duckworth, 2011; Angela Lee Duckworth, Grant, Loew, Oettingen, & Gollwitzer, 2011; Moffitt et al., 2011; Piquero & E. Moffitt, 2014), and result show significant association with later well-being. Self-regulation or self-control is considered a key element in school readiness (Rege et al., 2021), and also seem to predict academic performance (Mischel et al., 1989; Zambrana et al., 2020). Researchers have also

found associations with interpersonal relations (Coie & Dodge, 1998) and physical health and overweight (Angela L. Duckworth, Tsukayama, & Geier, 2010; Tsukayama, Toomey, Faith, & Duckworth, 2010)

Based on data following 1037 children, born in the same year, from birth to age 32, Moffit et al., (2011) assessed the association between self-regulatory ability at an early age, and later health, wealth, and public safety. Self-control was assessed several times between the age of 3 and 11. Accounting for social status and IQ, they found that childhood self-control associated with, among other things, later alcohol and drug abuse, periodontal disease, and sexually transmitted diseases.

The evident impact of childhood self-control or self-regulation on later well-being, makes it understandable that policy makers consider ECEC-interventions or curriculums that stimulates the development of self-control. However, as outlined in the introduction of this study, it is not obvious that interventions or curriculums targeting children is the best approach. In the following paragraphs the associations between nonparental childcare and child development, and association between interaction quality in ECEC and self-control in childhood will be investigated.

[Effects of Child Care on Socio/emotional Development in Norway](#)

Internationally, the association between ECEC quality and socio/emotional and cognitive development has been thoroughly examined, with main body of research originating from the United States (Solheim, 2013). Originating from another social, and educational, tradition, it is not obvious that results from those studies are transferable to a Norwegian context (Eliassen et al., 2018). Until recently, the effects of ECEC have not been extensively examined in the Norwegian ECEC tradition (Løkken, Broekhuizen, Barnes, et al., 2018; Rege et al., 2021; Solheim, 2013). However, a growing body of research is broadening the understanding of associations between process quality in ECEC, and socio/emotional and cognitive development among children in Norway. Process quality describe aspects of ECEC directly affecting children's everyday life. Pedagogical approach, curriculum, available material, and caretaker-child interactions are characteristics of process quality (OECD, 2015).

Results vary across studies. As in international research's, it is not obvious that there are positive effects of ECEC on socio/emotional and cognitive development (Solheim, 2013), however, there are indications that high process quality is positively affecting child

development. In the report «Skoleferdigheter og psykisk helse hos 8-åringer. Betydningen av pedagogisk praksis i barnehagen og læringsmiljø i skolen» (Helland et al., 2019), the association between ECEC quality and school functioning and mental health among 8-year-olds was investigated. This study found correlations between a positive caretaker-child relation in ECEC and less externalizing behavior at 8. Also, later school adeptness and level of conflict was correlated with emotional connectedness and level of conflict between professional caretakers and child in ECEC. Poor caretaker-child relationship in childcare centers correlated with more internalizing difficulties and externalizing behavior in school. However, this study is correlational. The causal explanation for conflicts and externalizing behavior in school, could also be the root of the behavior and conflicts in ECEC (Helland et al., 2019). For example, time spent in professional childcare the first 4,5 year of life is positively associated with caretaker-child conflicts, although effect sizes are small. However, there seems to be no association between time spent in childcare and externalizing behavior (Solheim, Wichstrøm, Belsky, & Berg-Nielsen, 2013).

In the article “Can Pre-Academic Activities in Norway’s Early Childhood Education and Care Program Boost Later Academic Achievements in Preschoolers at Risk?” Zambrana, Ogden and Zachrisson (2020) looked at the pedagogical approach aspect of process quality and assessed associations between emphasis on pre-academic activities and the development of school readiness among children. Among other components, externalizing behavior and low levels of effortful control were assessed as risk factors. Teachers reported frequency of activities emphasizing reading and letters, play writing, amount, number and shapes and language stimulations determined the level of pre-academic activities. Zambrana et al., (2020) found that pre-academic activities improved reading for children assessed with low level effortful control or that showed externalizing behavior (Zambrana et al., 2020). Even so, socio-emotional development was not affected by focus on pre-academic activities in ECEC. Also, the effects of the pre-academic activities for children at risk did not persist into the second school year. The results from Zambrana et al., (2020) indicates that training academic competencies in preschool, can aid the development of school readiness across several variables despite challenges with externalizing behavior and effortful control. However, it does not necessarily address the cause of the reduced school readiness among some children.

The intervention “Play based learning”, also known as the “Agder project” addressed process quality aspects believed to cause disparities in school readiness among children in ECEC (Rege et al., 2021). Attempting to improve mathematic and language skills and executive functioning among children a comprehensive structured curriculum, including games and activities designed to develop among other skills, self-regulation, and cooperation among children, was implemented. Before and during implementation teacher training was administered. Teacher training emphasized the importance of responsive and warm caretaker-child interactions. Accounting for various factors thought to affect school readiness and self-regulatory development (SES, home environment including parents’ education, age, and gender) Rege et al., (2021) found that the intervention had a positive effect on the development of executive functioning. Effects were most prevalent in centers assessed as low quality prior to intervention, also effects diminished rapidly, and no effects were found in the one year follow up assessment. However, only effects of the whole intervention were assessed, hence no associations between interaction quality and the development of self-regulation or executive functioning are possible to derive from the Agder project.

Similar to the effects of pre-academic activities (Zambrana et al., 2020), it is possible that the positive development in children participating in “the Agder project” is “indicating that one gets better at what one practice.” (Zambrana et al., 2020 p. 451). However, both studies shows that there is an associations between process quality and the development of self-regulation (Rege et al., 2021) and school readiness (Rege et al., 2021; Zambrana et al., 2020), even if pre-academic activities improve school readiness despite self-regulatory challenges.

Attempting to identify specific process quality aspects associated with socio-emotional competence in Norwegian ECEC, Løkken et al., (2018) investigated if interaction quality could predict the development of social competence. Emphasizing international research showing that staff-child interactions in ECEC appear to have significant impact on the development of social competence among children, positive associations between ECEC quality and child development was expected. Caretaker-child interaction quality was measured with the interaction scale from ITERS-R, in toddler groups, and social competence outcomes, using LSCIP, was assessed when children were 3 and 5 years old. Analysis yielded few results.

Interaction quality was associated with empathy at age 3, but no other significant associations were identified.

Attempting a somewhat wider approach, Eliassen, Zachrisson and Melhuish (2018) investigated associations between ECEC quality, assessed with the whole ITERS-R-scale, and cognitive development among three-year old's in Norway. ITERS-R measures are including both processual and structural aspects of ECEC quality (Løkken, Broekhuizen, Barnes, et al., 2018). Subsets of the British Ability Scales (BAS) were used to test both verbal and non-verbal abilities (Eliassen et al., 2018). However, as in the case of Løkken et al., (2018) no significant associations between ECEC quality and cognitive development among children was found. As both studies used data gathered and assessed through the Bepro project, this raises the question if international quality measurements (ITERS-R) are fit to assess ECEC quality in a Norwegian setting.

Caregiver-child interaction. Association with socio-emotional development.

The association between caretaker-child relationships and the socio-emotional and cognitive development among children has been extensively examined. Research suggests that secure attachments between child and primary caretakers associates with positive socio-emotional development (Belsky & Fearon, 2002; Hatfield, Burchinal, Pianta, & Sideris, 2016; Kochanska et al., 2009). Also, international research indicates that the relationships, and interactions between professional caretaker and children influences the development of self-regulatory ability (Hamre, Hatfield, Pianta, & Jamil, 2014), and that children with poor self-regulatory ability benefits from interactions with warm and patient teachers (Day, Connor, & McClelland, 2015).

Though other aspects of process quality show to render positive effects on social emotional development (Helland et al., 2019; Rege et al., 2021; Zambrana et al., 2020), there is limited evidence that interaction in a Norwegian ECEC setting plays a role in socio-emotional development among children (Løkken, Broekhuizen, Barnes, et al., 2018). However, as high-quality interactions and relationships in ECEC seem to compensate for insecure child-parent attachment (Goossens & van Ijzendoorn, 1990), and caretaker-child relationships is linked to school readiness (Goble, Sandilos, & Pianta, 2019; Hatfield et al., 2016) and socio-emotional development internationally (Broekhuizen et al., 2016; Goble et al., 2019), investigating the

association with assessment tools customized to the Norwegian tradition might expand our knowledge.

Current Study

In the current study, emphasis is on associations between caretaker-child interaction at age 3, and the development of self-regulation among children. There is substantial evidence pointing towards the positive mediating effects of high-quality interactions and secure attachment, on the development of self-control (Kochanska et al., 2009). The effects of early childhood self-control are evident throughout life. However, interventions deployed in late preschool age, seems to have limited long lasting effects on the development and level of self-control (Rege et al., 2019; Zambrana et al., 2020). Studies showing long term association between self-control or self-regulation and later outcomes, typically show predictors measured at an earlier age (Kochanska et al., 2009; Mischel et al., 1989; Moffitt et al., 2011; Richmond-Rakerd et al., 2021). Some of the variables that are thought to influence the development of self-control are not affected by interactions and relations between caretaker and child, like genes, SES, IQ, and parents' education. However, accounting for those variables, attachment and interaction has shown to have a positive effect on cognitive development (Adele Diamond & Lee, 2011; Kochanska et al., 2009) This might indicate that there is no "quick fix" to administer to ensure positive self-control outcomes. Hence, understanding how interaction quality in ECEC, from an early age, and over time, affects the development of self-control, would be useful for policymakers when outlining ECEC curriculum.

The CIP scale is designed to assess individual caretakers' ability to divide attention between children in a group over across four short periods (8-10 min). Studies have shown that caretakers display different quality attachments across different children in a group. (Goossens & van Ijzendoorn, 1990). CIP addresses this problem by assessing one caretakes interactions with several children. Hence this study might provide important insight to add to the expanding pool of knowledge on the subject.

Method

Participants

The data presented in this thesis is drawn from the research projects “Better Provision for Norway’s Children in Early Childhood Education and Care (BePro/ GoBan) and the Searching for Qualities (SfQ /Blikk for Barn) study. According to information on their webpage (www.goban.no) the BePro study is a large-scale longitudinal project that was initiated because of the demand for additional research-based knowledge on ECEC-quality in Norway. BePro and SfQ are cooperating on collecting data used as predictor variables in this thesis. ECEC-centers located close to universities and university colleges across seven municipalities throughout Norway, was approached and invited to participate in the project. Parents, with children born in 2011 and 2012, that wanted to participate in the studies provided informed written consent (Eliassen et al., 2018). Participants in the BePro project includes a total 1203 children attending 94 different centers. The number of children enrolled in each group varies with age, center size and organizing. A more limited selection accepted to be assessed with the observational tools in this thesis. Predictor variables are drawn from the selection groups where enough caregivers and parents consented to video recordings made as part of the assessment. (Bjørnstad et.al. 2020, p 906). Outcome data is drawn from a selection of the items in the LSCIP-scale. Selection will be described later.

Ethics

The BePro and SfQ projects are approved by The National Committee for Research Ethics in the Social Sciences and the Humanities (NESH). Both the BePro and the SfQ studies are approved by The Norwegian Data Protection Authority and Norwegian center for Research Data (NSD). This approval is part of the authorization for use of the BePro material. No information about individual participants is to be sold, or to be used for purposes not described in the project. Data is securely stored.

Staff and parents, on behalf of their children, was informed and all participants signed consent before initiation. All parties were informed that they could withdraw from the study at any time, without providing explanation.

Some of the data acquired in this thesis was collected through video recordings. This requires special consideration, especially when recording children (Befring, 2002).

Researchers are expected to respect the autonomy, freedom, and integrity of participants. Since videorecording not necessarily involves direct contact with participants, considerations should be taken to avoid gathering, use and dissemination of data that in any way is damaging or inconvenient to participants (*Forskningsetiske retningslinjer for samfunnsvitenskap, humaniora, juss og teologi*, 2016) All recordings were made by experienced researchers, or by assistants taught and instructed by responsible researchers. Before data was made available for this study, all information was deidentified. No information making it possible to identify individuals, ECEC-centers or geographical areas is used in this thesis.

Considerations are made that data received is reproduced correctly. Other studies, and literature used in this thesis, are referred honestly and all contributors are accredited. Information about data, data analysis, and results are provided, and the process should be possible to replicate.

Measures

Predictor variables, Interaction quality

Assessing interaction quality, The Caregiver Interaction Profile (CIP) was used. The CIP- scale was originally developed in the Netherlands as a tool to measure relevant aspects of interaction between caregiver and child. It is designed to measure caregivers ability to divide their attention between different children in a group and to assess the interaction quality (Helmerhorst, Riksen-Walraven, Vermeer, Fukkink, & Tavecchio, 2014). The CIP-scale is “theory based and supported by empirical evidence underscoring that the relevant aspects of caregiver-child interaction contribute to the well-being and development of 0- to 4- year-old children” (ibid p 772). It was translated from Dutch to Norwegian by Norwegian researchers in cooperation with the developers of the scale, NCKO (E. Bjørnstad et al., 2019).

The Caregiver interaction Profile scales consists of six broad caregiver interaction skills that is essential for high quality interactions. These are behaviors that play an important role in the development and well-being of children aged 0-4 years (Helmerhorst et al., 2014). Teacher-

child interaction is rated on a 7-point scale where 1-3,4 =inadequate, 3,5-4,4= moderate, and 4,5-7 adequate to good.

Interaction skills are measured on the following broad caregiver categories

1. Sensitive responsiveness refers to the caregiver's ability to recognize and respond appropriately to children's individual physical and emotional needs. This is considered, in attachment theory, "as the most basic aspect of caregiver behavior in interactions with children from birth onward." (Helmerhorst et.al, 2014 p 772). Caregivers' sensitive response is associated to secure attachment between caregiver and child. This is thought to be essential in fostering children's ego resilience and it is linked to children's cognitive development, prosocial behavior, and empathy. (Helmerhorst et al., 2014)
2. Respect for autonomy refers to caregivers' ability to communicate respect for children's perspectives and intentions in a nonintrusive way. The sense of autonomy, from an early age, is considered an important developmental issue (SROUFE 79), and lack of respect for children's autonomy has been shown to negatively influence child development and functioning at an early age. Intrusive behavior on behalf of caretakers/parents has also been shown to have negative impact on cognitive development. Parental respect for children's autonomy predicts positive developmental outcomes (Helmerhorst et.al, 2014 p 773)
3. Structure and limit setting measure the caregiver's ability to establish an understandable and clear structure and to communicate boundaries and limits for children's behavior in a clear and consistent manner. As children's autonomy increases the limits and structures provide predictability. This aids in the development of competence and security. Lack of structure and limits is associated with noncompliance. (p.773)
4. Verbal communication refers to the verbal interaction between caretaker and child. The quality and frequency of well-adjusted verbal interactions have shown to accelerate children's verbal acquisition (p 773-774)
5. Developmental stimulation describes caretakers deliberate support to foster physical, cognitive, and creative development. The right level of developmental stimulation (providing learning opportunities and stimulating children's focus in an

age adequate manner) can be a positive contribution to cognitive development from infancy. (P. 774)

6. Fostering positive peer interaction refers to caregivers' ability to manage and scaffold peer-interactions. Positive peer interactions in ECEC predicts well-being and positive social- emotional development. (Helmerhorst et al., 2014 p 774)

General definitions of the interaction skills are provided by the coding manual. For example, the scale "sensitive responsiveness" is described as follows:

A caregiver scoring in the high (6, 7) range:

shows warm and genuine interest in the children and provides emotional support when needed. In general, the caregiver responds promptly and appropriately to the children's signals, thereby functioning as a "secure base" for the children. If unable to respond, she acknowledges having noticed the signal and provides a more complete response as soon as possible.

A caregiver scoring in the middle range (3, 4, 5):

provides emotional support to the children, but her support is inconsistent. The emotional support she provides may vary across children and/or across time. She sometimes misses signals, and her reactions are not always adequate.

A caregiver scoring in the low (1, 2) range:

hardly provides emotional support to the children. She misses many signals, or her reactions are too slow or inadequate. She may show indifferent or detached behavior. (Helmerhorst et al., 2014 p.778)

The scale provides more detailed descriptions of behaviors within the seven scale points. The first three skills are considered as indication of universal aspects of care, and the last three skills have emphasis on educational aspects (E. Bjørnstad et al., 2019).

An observer (trained by the developers of the CIP scale) or an assistant (instructed by the researchers) visited the groups to record four 8-10 minutes (totally approximately 40 minutes) sequences for later evaluation. Recordings were made of four different, naturally occurring situations (free play, transition between group activities, diapering and meal) (E.

Bjørnstad et al., 2019). Diapering is described as care in data and analysis. Apart for written information about the situations that would be recorded and encouragement to act like usual, the caregivers were not given instructions. Observers also recorded adult led and outdoor activities. This is not a part of the original CIP material but was considered by the Norwegian researchers as interesting. However, due to the nature of adult led- and outdoor activities (difficult to record without including children not participating in the research)¹, and limited opportunities to record these activities, missing data is 49,7% and 73,7% respectively. The situations were chosen to illuminate variations and to give valid estimations of the quality of interactions on a daily basis (E. Bjørnstad et al., 2019). Due to the large number of missing data the adult led, and outdoor activities variables will not be included in this thesis.

Four researchers, trained and certified by the CIP developers (NCKO), rated caretaker interaction quality, based on the video recordings. Researchers did not rate videos they had recorded themselves. Interrater reliability, controlled for 10% of the videos, showed intra-class-correlation with absolute agreement, 0.94 for structure and limit-setting, 0.90 for respect for autonomy, 0.85 for sensitive responsiveness, 0.78 for fostering positive peer interactions, 0.91 for developmental stimulation and 0.91 for verbal communication. (E. Bjørnstad et al., 2019 p 909)

CIP- descriptives

Descriptive statistics (Table 1) reveal substantial differences in interaction quality across caretakers. For example, “sensitive response” score varies from 1,00 to 6,50 on the 7-point scale. Means score is 4.11 and standard deviation (SD) is 1.11. CIP scores are higher in the variables describing aspects of care (Sensitive responsiveness, Respect for autonomy, and Structure and limit setting), than in the variables describing aspects of educational support (Verbal communication, Developmental stimulation and Fostering peer interaction). Staff receive the highest score on “structure and limit setting” with mean score 4.88. “Fostering peer interaction” is scored at an average of 1.55 out of a maximum 7 points. Overall CIP quality is ranging from 1.67 for the caretaker displaying the lowest mean interaction quality,

¹ Oral information provided by Ellen Os, one of the researchers recording and assessing CIP data

to 5.67 for the caretaker with the highest score. Mean score across all caretakers was 3,67, with a standard deviation (SD) of 0.78.

Table 1. Descriptive Statistics CIP

	N	Minimum	Maximum	Mean	Std. Deviation
Mean_sensitive_respons	167	1,00	6,50	4,11	1,11977
Mean_respect	167	1,50	7,00	4,51	1,05044
Mean_stucture_limit	167	2,50	7,00	4,88	,98938
Mean_verbal_com	167	1,67	6,00	3,71	,91834
Mean_development_stim	167	1,00	6,25	3,08	1,04891
Mean_forstering_peer	167	1,00	3,50	1,55	,49516
Mean_CIP	167	1,67	5,67	3,67	,78227
Valid N (listwise)	167				

Self-control outcomes

As mentioned earlier there is no agreed upon definition of the concept of self-regulation/ self-control. In this paper the definition of self-control is based on variables in the Lamer Social Competence in Preschool (LSCIP) scale. This is not exhaustive. Other variables could be added to further elaborate the concept. Variables from the LSCIP scale correspond with other literature on the subject. For example, the ability to control or express anger in a socially acceptable manner is recognized as an important feature of self-control. That is to say that children can to an extent control their behavior, and display emotions in a socially acceptable manner (Peterson & Fladers, 2005).

LSCIP is an observation-based assessment tool widely used by both researchers and teachers to measure social competence in children in Norwegian ECEC (Zachrisson et al., 2019). The scale was developed by Kari Lamer to evaluate the implementation of the program “You and Me and The Two of Us”, a program developed to increase children’s social competence in ECEC centers (Lamer & Dang Van, 1997)

Items are designed to measure different aspects of social competence. Developing the scale, Lamer was inspired mainly by the Social Skills Rating System (SSRS) developed by Grisham and Elliot (1990) because of its user friendliness and strong theoretical background. (Lamer

& Dang Van, 1997). However, the SSRS is developed in the United States, hence the conceptualization of social competences embraces other values than the Norwegian tradition. LSCIP is processed to be more adapt to the Nordic ECEC setting (Zachrisson et al., 2019).

Teachers report the frequency of specific behaviors in six sub-domains. Each domain consists of 5-6 items, and behavior is rated using a five-point Likert scale (1. Very seldom, 2. Seldom, 3. Occasionally, 4. Often and 5. Very often). The sub-domains are Assertiveness, Prosocial behavior, Self-control, Empathy and role-taking, Play, joy and humor and Adjustment. In this study the sample of the items sorting under self-control will be used. The self-control variables describe children's ability to await their turn, handle conflicts and control desires (Lamer, 1997).

In the article "Evaluation of the Lamer Social Competence in Preschool Scale" (Løkken, Broekhuizen, Moser, Bjørnstad, & Hegna, 2018), data from the BePro project was used to validate the scale. Løkken et.al (2018) found, using exploratory factor analysis, six items sorting under the self-control category. Variables are translated from Norwegian to English by Løkken et al. (2018)

Self-control variables:

Aksepterer at egne ønsker ikke alltid blir oppfylt	Accepts that his/her wishes will not always be fulfilled
Kan styre sinnet sitt i konflikter med de andre barna	Can control anger in conflicts with other children
Inngår kompromisser i konfliktsituasjoner, f.eks. ved å endre på egne meninger e.l.	Compromises in conflict situations e.g. by changing own opinions or adjusting own wishes
Kan styre sinnet sitt i konflikter med voksne	Can control his/her anger in conflicts with adults
Venter på tur i spill og andre aktiviteter	Waits for his/her turn in games and other activities
Kan dele leker og ting med andre	Can share toys and stuff with others

Løkken et al, (2018) conclude that their version “work as research tools for producing reliable and valid knowledge on children’s social competence and can be used in both the BePro project and other research projects, as well as in practice.” (p 14).

Data related to children’s self-control skills was collected at two times (T1 and T2). T1 was conducted as close to the children’s 3rd birthday as possible. Mean age of participants at T1 were 3,21 years, with a standard deviation (SD) of approximately 0,45. The youngest child participating was 1,88 years, and the oldest 4,84. T2 was conducted when the children were 5 years old, or as close to five years as possible. The mean age of participants was at that point 5,21 years with a SD of 0,36. The youngest participant was 4,06 and the oldest 6,95. There is no concurrence between the age of individual children at T1 and T2 (Table 2).

Table 2. Age T1 and T2

	N	Minimum	Maximum	Mean	Std. Deviation
AgeT1	889	1,88	4,84	3,21	,44851
AgeT2	886	4,06	6,95	5,22	,35915
Valid N (listwise)	885				

Scores on items measuring self-control are ranging from 1 to 5 on the 5-point scale all but one (Share T2) items measured (Table 3 and 4). Mean scores across variables between 2.93 and 3.64 at T1 and 3.37 and 4.25 at T2. Standard deviation is ranging from .736 to .926

Table 3. Descriptive Statistics LSCIP T1

	N	Minimum	Maximum	Mean	Std. Deviation
Accepts_wishes_not_fulfilled	866	1	5	3,40	,801
Awaits_turn	885	1	5	3,64	,825
Control_anger_child	889	1	5	3,40	,890
Compromizes	831	1	5	2,93	,869
Control_anger_adult	883	1	5	3,49	,926
Share	884	1	5	3,57	,803
Valid N (listwise)	792				

Table 4. Descriptive Statistics LSCIP T2

	N	Minimum	Maximum	Mean	Std. Deviation
Accepts_wishes_not_fulfill edT2	885	1	5	3,80	,826
Awaits_turnT2	887	1	5	4,25	,736
Control_anger_childT2	886	1	5	3,90	,931
CompromizesT2	879	1	5	3,37	,872
Control_anger_adultT2	881	1	5	4,00	,894
ShareT2	887	2	5	4,12	,752
Valid N (listwise)	872				

Children score on average highest on the ability to await turn (3,64 at T1 and 4,25 at T2), and lowest on the ability to compromise in conflict situations (2.93 at T1 and 4.25 at T2).

Preliminary Analysis

As mentioned, performing CIP analysis requires video recordings, and consent of parents and staff is necessary. According to Bjørnstad et al. (2019), staff and parents in 206 groups was approached. In 111 groups in 66 centers enough parents and caretakers agreed to participate. Both teachers and assistants are considered caretakers. However, data I received from the BePro /SfQ contains observations of 110 groups in 66 centers. A total of 167 caretakers were assessed with CIP.

LSCIP was completed in 191 groups in 87 centers, producing data on a total of 890 children T1 and 887 children T2

Missing data

Missing data was assessed using “missing data analysis” in SPSS. In the CIP dataset (Appendix 1), most variables were missing data in the 0-10% range. Five variables were missing 11-13 % and one variable was missing in 37,1 % of the cases. Some of the missing data is due to the number of situations each caretaker was recorded. 129 caretakers were recorded in four situations, 33 in three situations and for six caretakers there were two episodes (E. Bjørnstad et al., 2019). The variable missing most data is “fostering peer relations” in care/diapering situation. This might be due to center organization and possibility for peer

interaction. Interaction between peers might be limited during diapering, as many centers have separate areas for this.² No variable was systematically missing, and according to Little's MCAR test data was missing completely at random (Chi-Square= 268,686, p = .091.) Data imputation was performed using expectation maximization (EM) in SPSS.

LSCIP data is missing in the range of 0-7% across all variables (Appendix 2). Little's MCAR test (Chi-Square = 142-710, p = .515) show data missing completely at random and data imputation were performed. Outliers were calculated using 2,2 IQR (Hoaglin & Iglewicz, 1987). A total of seven outliers were identified. Three at T1 and four at T2. Winsorizing (Dixon, 1980), was used to adjust outliers. Extreme values were replaced with the nearest observed value, not considered outlier.

Merging

Before merging data from CIP and LSCIP an average CIP-score for each group was calculated. Since there is no data specifying interaction between individual caretakers and individual children, mean group CIP score is used as indication of interaction quality as experienced by children. In centers where only one teacher is scored, that score will be used as an indication of interaction quality across all caretakers in the group. Where more than one caretaker is scored mean score between caretakers is calculated.

Merging CIP and LSCIP- one to many- excluding centers where LSCIP is not performed and excluding LSCIP where interaction quality is not calculated- leave 542 children (50,3% boys) across 101 groups in 66 centers.

CIP

To investigate if there are underlying structures explaining the variation in the CIP material, exploratory factor analysis, and reliability analysis was performed. Exploratory factor analysis using oblique rotation yielded a two-factor solution, where one factor explains 66,5% of the variance (Table 5) Cronbach's alpha for all six variables is .895.

Two factors explain 83,5 %. To identify variables in the two factors exploratory factor analysis was repeated with a fixed number of factors (2) to extract. Cronbach's Alpha for the two factors is .912 and .807 respectively. The factor with the highest alpha consists of the three variables describing aspects of care, and the factor with the lower Alpha consists of the

² Oral information provided by Ellen Os

variables describing educational aspects (E. Bjørnstad et al., 2019). One new variable called “CiP_mean” will be applied to investigate the relationship between the nature of interactions and the development of self-control. However, as in the studies of Helmerhorst et al. (2014) and Bjørnstad et al. (2019) several correlations are below 50 % (Appendix 3) it remains important to investigate the care aspects and the educational aspects independently.

Table 5. Total Variance Explained CIP

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings ^a
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	3,991	66,514	66,514	3,991	66,514	66,514	3,613
2	1,016	16,935	83,449	1,016	16,935	83,449	2,456
3	,428	7,125	90,575				
4	,240	4,008	94,582				
5	,188	3,137	97,719				
6	,137	2,281	100,000				

Extraction Method: Principal Component Analysis.

a. When components are correlated, sums of squared loadings cannot be added to obtain a total variance.

LSCIP

Exploratory factor analysis yielded a one factor solution at both T1 (Table 6) and T2 (Table 7), explaining 60,8% and 61,5% respectively. Cronbach’s alpha was .861 at T1 and .873 at T2. Variables are merged into one variable T1 and one T2, called Self-Control (SCT1 and SCT2). Most correlations at T1 are moderate to high, .50 to .80. Correlations at T2 are mostly moderate, .50 to .60. (Appendix 4)

Table 6. Total Variance Explained LSCIP T1

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3,039	60,778	60,778	3,039	60,778	60,778
2	,597	11,936	72,714			
3	,563	11,256	83,970			
4	,459	9,177	93,147			
5	,343	6,853	100,000			

Extraction Method: Principal Component Analysis.

Table 7. Total Variance Explained LSCIP T2

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3,689	61,478	61,478	3,689	61,478	61,478
2	,669	11,154	72,631			
3	,513	8,553	81,184			
4	,448	7,464	88,649			
5	,407	6,787	95,436			
6	,274	4,564	100,000			

Extraction Method: Principal Component Analysis.

Girls show a negligibly higher level of self-control than boys both at T1 and T2 (Table 8). At T1 girls score are .09 points higher than boys. At T2 the difference is .05 points, on the 5-point scale.

Table 8. Self-control by gender

gender		SCT1	SCT2
Girls	Mean	3,4626	3,9420
	N	269	269
	Std. Deviation	,63948	,66877
boys	Mean	3,3752	3,8895
	N	273	273
	Std. Deviation	,63772	,63685
Total	Mean	3,4186	3,9155
	N	542	542
	Std. Deviation	,63950	,65281

There is a very low positive correlation ($r = .134$) between self-control and age at T1. The ability to share and the ability to compromise in conflict situation show very low ($r = .147$ and $r = .145$ respectively), but significant correlation with age at T1 (Table 9). Other correlations are negligible and not significant. At T2, correlations with age are negligible, and none are significant.

Table 9. Correlations LSCIP T1

		1	2	3	4	5	6	SCT 1	AgeT1
Accepts_wishes_not_fulfill ed	Pearson Correlation	--							
	N	542							
Awaits_turn	Pearson Correlation	,503**	--						
	Sig. (2-tailed)	,000							
	N	542	542						
Control_anger_child	Pearson Correlation	,541**	,485*	--					
	Sig. (2-tailed)	,000	,000						
	N	542	542	542					
Compromizes	Pearson Correlation	,485**	,439*	,526**	--				
	Sig. (2-tailed)	,000	,000	,000					
	N	542	542	542	542				
Control_anger_adult	Pearson Correlation	,574**	,439*	,636**	,454**	--			
	Sig. (2-tailed)	,000	,000	,000	,000				
	N	542	542	542	542	542			
Share	Pearson Correlation	,529**	,515*	,494**	,470**	,535**	--		
	Sig. (2-tailed)	,000	,000	,000	,000	,000			
	N	542	542	542	542	542	542		
SCT1	Pearson Correlation	,781**	,730*	,805**	,730**	,798**	,760**	--	
	Sig. (2-tailed)	,000	,000	,000	,000	,000	,000		
	N	542	542	542	542	542	542	542	
AgeT1	Pearson Correlation	,076	,060	,103*	,147**	,091*	,145**	,134**	--
	Sig. (2-tailed)	,075	,161	,016	,001	,034	,001	,002	
	N	542	542	542	542	542	542	542	542

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

Interaction quality and the development of self-control.

Testing the hypotheses that interaction quality predicts the development of self-control among children, multilevel analyses (Schroeder, Stephan, & Sjoquist, 2017) was applied. Cross sectional effects at T1 and longitudinal effects, controlling for self-control ability at T1, was investigated.

Initially I looked at the correlations between interaction quality (CIP_mean) and the self-control outcomes at T1 and T2. To investigate the effects of interaction quality, regression analysis with CIP_mean as predictor variable and SCT1 and SCT2 as dependent variable, was performed.

However, both age at T2 and level of self-control at T1 might influence the self-control outcomes at T2, hence multiple regression analysis, stepwise method, was performed. As predictor variables SCT1, age T2 and CIP_mean was used, SCT2 was the outcome variable.

Analysis was repeated with the sample of children with a low baseline self-control. (Children scoring within the 20 percentiles at T1 was identified as low.) Adding correlations between the two subcategories of interaction quality and self-control at T1 and T2. Also, correlations between CIP_mean and individual self-control variables was investigated.

Also, gender distribution in the 20 percentile was slightly different from the distributions in the whole group (Total 50,4 % boys, 20 percentile 53,7% boys). Hence, associations between interaction quality and self-control across genders was analyzed.

As interactions between individuals are affected by self-regulation (Peterson & Fladers, 2005; Walden et al., 1999) interaction quality might be influenced by the level self-control displayed at T1. Hence a multiple regression analysis, combining the effects of self-control at T1 and the CIP quality was performed. Multiplying SCT1 and CIP mean score into a variable called SCT1_CIP, regression analysis with SCT1, CIP_mean and SCT1_CIP as independent variables and SCT2 as dependent variable, divided by gender, was attempted. This method was only applied to the 20-percentile selection. Children with low level self-control are expected to benefit more from high quality interaction (Kochanska et al., 2009; Solheim, 2013), hence a more in-depth analysis was performed for this group.

Finally, association between the two subcategories of interaction quality and self-control at T1 and T2 was assessed. Also, correlations between CIP_mean and individual self-control variables was investigated.

Results

Correlation analysis between CIP_mean and SCT1+SCT2 (Table 11) revealed negligible association between interaction quality and the level of self-control. Both correlations were below the .10 level, and none were significant.

Table 10 Correlations CIP-LSCIP

		Mean_CIP	SCT1	SCT2
Mean_CIP	Pearson Correlation	--		
	N	542		
SCT1	Pearson Correlation	,031	--	
	Sig. (2-tailed)	,469		
	N	542	542	
SCT2	Pearson Correlation	,045	,096*	--
	Sig. (2-tailed)	,301	,025	
	N	542	542	542

*. Correlation is significant at the 0.05 level (2-tailed).

Regression analysis using CIP_mean as predictor variable and SCT2 as dependent variable yielded no concurrence, with adjusted R square at .000 (Table 11). Indicating that this model has no predictive value.

Table 11. Regression analysis

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,045 ^a	,002	,000	,65277

a. Predictors: (Constant), Mean_CIP

b. Dependent Variable: SCT2

Regression analysis with CIP_mean as predictor and T1 and T2 as outcome variables, reveal no association between interaction quality and self-control at age 3 and 5. Also, investigating if either of the sub-factors (provide care and educational support) is associated with the development of self-control at T1 or T2 showed no significant association. Regression analysis revealed no significant association between interaction quality on the level of self-control at T2. Only the level of self-control at T1 showed negligible association with self-control at T2. (Adjusted R square= .007) (Table 12)

Table 12. Regression analysis

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,096 ^a	,009	,007	,65037

a. Predictors: (Constant), SCT1

b. Dependent Variable: SCT2

Investigating if children with low baseline self-control would benefit more from high quality interactions, analysis was repeated with the 20-percentile selection.

There is a negligible negative ($r = -.073$), not significant, correlations between self-control at T1 and interaction quality, also there is a very small positive ($r = .152$), not significant, correlations between interaction and self-control outcomes at T2. (Appendix 4)

Table 13. Regression analysis 20-percentile

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,137 ^a	,019	,010	,62514

a. Predictors: (Constant), Mean_CIP

b. Dependent Variable: SCT2

Regression analysis with CIP_mean as predictor and SCT2 as outcome variable indicates that self-control at T2 is slightly associated with interaction quality (Adjusted R Square .01) for children with a low baseline self-control ability (20 percentile) at T1 (Table 13). However, controlling for gender reveals a negative association between interaction quality experienced at three years and self-control at five years (Adjusted R Square= - .013) for girls, and a small positive association for boys (Adj R Squared= .014). (Table 14).

Table 14. Regression analysis 20-percentile, split by gender.

gender	Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
Girls	1	,088 ^a	,008	-,013	,62515
Boys	1	,177 ^a	,031	,014	,62768

a. Predictors: (Constant), Mean_CIP

b. Dependent Variable: SCT2

Stepwise method including SCT1, age T2 and CIP_mean as independent variables and SCT2 as dependent variable, yielded no result as no variables were entered into the equation in SPSS. Attempting multiple regression analysis with SCT1, age T2 and CIP-mean as predictors and SCT2 as dependent variable, (Table 15) confirmed that there are no identifiable associations (Adjusted R Square= -.001)

Table 15. Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,165 ^a	,027	-,001	,62842

a. Predictors: (Constant), Mean_CIP, SCT1, AgeT2

b. Dependent Variable: SCT2

Self-control at T2 slightly more correlated with the “learning stimulation” dimension than the “emotional support” dimension. However, both correlations were very low ($r = .152$ and $r = .100$ respectively) and not significant. (Table 16)

Table 16. Correlations 20-percentile

		SCT2	Emotional_sup port	Learning_stim	Mean_CIP
Pearson Correlation	SCT2	1,000	,100	,152	,137
	Emotional_support	,100	1,000	,552	,920
	Learning_stim	,152	,552	1,000	,835
	Mean_CIP	,137	,920	,835	1,000
Sig. (1-tailed)	SCT2	.	,152	,058	,078
	Emotional_support	,152	.	,000	,000
	Learning_stim	,058	,000	.	,000
	Mean_CIP	,078	,000	,000	.
N	SCT2	108	108	108	108
	Emotional_support	108	108	108	108
	Learning_stim	108	108	108	108
	Mean_CIP	108	108	108	108

Assessing the combined effects of self-control at T1 and interaction quality, a small positive association was identified for girls (Adj R Square= .042) in the 20-percentile selection, and a small negative association for boys (Adj R Square= -.019)

Table 17. Combined effect of SCT1 and Mean_CIP, 20-percentile

gender	Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
Girls	1	,317 ^a	,101	,042	,60800
Boys	1	,186 ^c	,034	-,019	,63818

a. Predictors: (Constant), SCT1_CIP, Mean_CIP, SCT1

b. Dependent Variable: SCT2

c. Predictors: (Constant), SCT1_CIP, SCT1, Mean_CIP

However, in this analysis multicollinearity was detected (Table 18), in dimension 4 for both boys and girls. Values above .9 in more than one variable in the Variance Proportions (VP) signify that there is a collinearity problem (Hair, Black, Babin, & Anderson, 2013). Multicollinearity indicates that one or more values are redundant (Løvås, 2018).

Table 18. Collinearity Diagnostics^a

gender	Model	Dimension	Eigenvalue	Condition Index	(Constant)	Variance Proportions		
						SCT1	Mean_CIP	SCT1_CIP
1,00	1	1	3,953	1,000	,00	,00	,00	,00
		2	,024	12,832	,00	,01	,01	,00
		3	,022	13,271	,01	,00	,00	,01
		4	,000	167,062	,99	,99	,99	,99
2,00	1	1	3,951	1,000	,00	,00	,00	,00
		2	,029	11,687	,00	,01	,01	,00
		3	,020	14,199	,01	,00	,00	,01
		4	,000	184,569	,99	,99	,99	,99

a. Dependent Variable: SCT2

To reduce structural multicollinearity, centered values was created. Subtracting the mean from predictor values, creates centered product terms. A new multiple regression analysis

using centered values was performed (Table 19.) However, analysis yielded identical results with centered values (Table 19)

Table 19. Combined effect of SCT1 and CIP_mean, 20-percentile-centered values

gender	Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1,00	1	,317 ^a	,101	,042	,60800
2,00	1	,186 ^a	,034	-,019	,63818

a. Predictors: (Constant), SCT1_CiP_centered, SCT1_centered, CiP_centered

b. Dependent Variable: SCT2

Discussion

This study investigated associations between interaction quality measured with the CIP-scale and self-control measured with selected items in the LSCIP-scale. No significant associations between interaction quality, and the level of self-control at 3 or 5 years was revealed. Also, no associations between interaction quality and the development of self-control from age 3 to age 5 was found. As expected, there are some indications that the interaction quality is of greater significance for children with a low baseline self-control. A small positive association was found among girls with low level self-control at age 3. The level of self-control at age 5, was associated with the combined effect of self-control at T1 and the quality of interactions assessed with CIP. However, this should be interpreted with caution as effect size is very small (Adjusted R Square .042). Also, the same analysis revealed a negative association for boys with low level self-control at T1 (Adjusted R Square -.019). As it is unlikely that high quality interactions associate with negative self-control development (even low quality childcare does not associate with negative effects on social-emotional development (Melhuish et al., 2015)), these results might be due to other factors, not accounted for in this study. Also, no correlations between interaction quality and self-control outcomes are significant, rendering results inadequate for further interpretation.

As no significant associations were found, there are multiple possible ways of entry when trying to explain the results. I will carefully address some possible explanations, delineated by theory outlined in the “Background” chapter in this thesis. Also, a cautious look at the data material and statistical approach will be attempted. The explanations provided will simultaneously address some of the weaknesses of this study.

It is possible that there is no association between interaction quality and the level, and development, of self-control among children in Norwegian ECEC. Some studies investigating social/emotional and cognitive development have achieved somewhat similar results (Eliassen et al., 2018; Løkken, Broekhuizen, Barnes, et al., 2018). However, this is contrasted by earlier research emphasizing the association between the quality of caretaker-child relations and social-emotional and cognitive development among children. (Helland et al., 2019; Melhuish et al., 2015)

A possible explanation for the lack of results in this study is that the CIP-scale is not designed to specifically assess aspects of interaction that are important in developing self-control. CIP

measures are designed to assess aspects of interaction empirically linked to children's development and well-being and to measure caregivers' ability to divide their attention between different children in a group. (Helmerhorst et al., 2014). There might be other characteristics that are more adept to predict self-control development. Emotional attachment, closeness, and caretaker-child conflicts (Hamre et al., 2014) might be of higher importance than the quality of interaction assessed with CIP

Presumably, there are several other factors, not accounted for in this thesis, moderating the effects of interaction. Attachment to primary caretakers (mother, father)(Kochanska et al., 2009) , children's socio/economic background (OECD, 2020; Rege et al., 2021), or hereditary factors (Kochanska et al., 2009; Moffitt et al., 2011) have all shown to partially predict the development of self-control. Also, peer relation is thought to influence the socio-emotional development (Coie & Dodge, 1998; Stenseng et al., 2015). Further studies on the association between caretaker-child interaction measured with CIP, and socio-emotional and cognitive development, should consider these factors.

There is also a possibility that there is not sufficient variation in the data on caretaker-child interaction (mean 3.67 SD .78) to show significant effect in the statistical analysis. Also, the fact that mean score is just within the range assessed as "moderate quality" might provide an explanation for the lack of results. There are indications that much of the positive associations between ECEC quality and child development is explained by centers providing care in the upper quality range (Hatfield et al., 2016).

It is possible, and maybe probable, that averaging CIP scores across groups does not correctly replicate the interaction quality experienced by children. The effects of high-quality interactions by one caretaker, could be mediated by low quality interactions by another. Further studies could, though it would be time consuming, emphasize interaction quality as experienced by children, throughout the day. This might provide more accurate data on the aspects of caretaker-child interactions important for the development of self-control.

Another aspect that might provide explanation for the lack of result, is that all data are observational. The relatively high interrater reliability for the CIP-assessments (E. Bjørnstad et al., 2019), increases the possibility of unbiased assessment. However, it is possible that self-control aspects, assessed by teachers, are susceptible to rater bias (Waterman, McDermott, Fantuzzo, & Gadsden, 2012). Self-control was assessed by different teachers at

T1 and T2, and many children were moved from toddler groups to groups for older children (3-6 years) between assessments. The fact that self-control was assessed by different teachers might affect scores (Løkken, Broekhuizen, Barnes, et al., 2018). Also, the change of environment may have affected, among other aspects, children's peer relations (Stenseng et al., 2015), moderating the impact of interaction quality measured at T1. In other studies, identifying positive association between process quality and development of self-regulatory ability in a Norwegian ECEC setting (Rege et al., 2021; Zambrana et al., 2020), specific tests were administered to assess various cognitive outcomes among children, minimizing the probability of bias.

Road ahead

The goal of this study was to identify aspects of process quality important in the development of self-control. As almost all tests yielded no result, it might be more useful for excluding associations than explaining. However, the strong theoretical foundations for associations between aspects of process quality and self-control inspires to further investigations. This might also be the strengths of this study.

The intervention «Play Based Learning», resulted in significant improvement of executive functions and self-regulation among children participating (Rege et al., 2021). This indicates that there are aspects of process quality influencing that development. However, Rege et al. (2021) did not differentiate between the different modulations in process quality but evaluated the results of the complete intervention. Also, the intervention did not achieve long term improvement in self-regulation. Still, the association between early childhood and later life level of self-regulation (Moffitt et al., 2011), and the fact that some centers achieve better “results” without participating in the intervention (Rege et al., 2021), indicates that there are pathways for ECEC-centers to aid in the development of long term improvement of self-control, within the Norwegian tradition.

In the article “Time spent outdoors during preschool: Links with children's cognitive and behavioral development” (Ulset, Vitaro, Brendgen, Bekkhus, & Borge, 2017) time spent outdoors in ECEC, was found to associate with school readiness, self-control and cognitive development. Accounting for, among other factors, ECEC-quality, SES, parents' psychological

functioning and family harmony, time spent outdoors were identified as the determining factor. Effects in this study persevered into the second year of school indicating a more long lasting effect than achieved by “Play based learning” (Rege et al., 2021) and pre academic activities in ECEC (Zambrana et al., 2020). Quality measurements in this study were mostly structural. Center quality was determined by staff education level, employment stability, child-caregiver ratio and child group size (Ulset et al., 2017). “Staff sensitivity towards children” (p. 73) was also included in quality assessment. However, staff was considered sensitive if caretaker sensitivity was mentioned in the interview conducted to assess structural quality, leaving aspects of process quality virtually unanalyzed. It would be interesting to investigate if there are processual aspects influencing socio-emotional development, facilitated by the everyday structure of centers spending substantial parts of the year outdoors.

Also, a more in-depth investigation as to if interactions in specific situations are more important than overall interaction quality in predicting child development would be interesting. Learning and understanding emotions and impulses in situations where this is an important factor might be effective. Rege et al., (2021) “staged” those situations through games and activities, making children (playfully) practice coping with arising emotions and urges. However, from the moment children start interacting with other people, situations evoking emotions and demanding behavioral control arises. Studies of associations between self-control development and interaction in emotionally engaging situations, might yield interesting results.

Conclusion

In summary, no significant associations between interaction quality measured with CIP and self-control assessed with LSCIP, was found. No associations between interaction quality and self-control at age 3 and 5 was identified. Further no association between the development of self-control from age 3 to age 5, and interaction quality was found. However, a small, not significant effect was identified in the development of self-control among girls with low baseline self-control. There are strong empirical and theoretical link associating interaction quality and the development of self-control. However, data material, measures and analytical approach in this study was not sufficient to confirm my suppositions.

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Appendix

Appendix 1

Missing data CIP

	N	Mean	Std. Deviation	Missing		No. of Extremes ^a	
				Count	Percent	Low	High
Sensitive_freeplay	158	4,2405	1,34700	9	5,4	0	0
Sensitive_transition	148	3,8514	1,36708	19	11,4	0	0
Sensitive_care	155	4,6065	1,53105	12	7,2	0	0
Sensitive_meal	162	3,76	1,308	5	3,0	0	0
Freeplay_respect	158	4,9684	1,24880	9	5,4	1	0
Transition_respect	147	4,1905	1,41098	20	12,0	0	0
Care_respect	155	4,1871	1,32306	12	7,2	0	0
Meal_respect	162	4,64	1,284	5	3,0	10	16
Free_play_structure_limit	158	4,7532	1,53800	9	5,4	2	0
Transition_structure_limit	148	4,5608	1,43440	19	11,4	0	0
Care_stucture_limit	155	5,1290	1,26239	12	7,2	1	0
Meal_stucture_limit	162	5,04	1,351	5	3,0	1	0
Free_play_verbal_com	158	4,1329	1,13488	9	5,4	0	0
Transition_verbal_com	148	3,2838	1,11295	19	11,4	0	1
Care_verbal_com	155	3,8581	1,18672	12	7,2	0	0
Meal_verbal_com	162	3,54	1,175	5	3,0	3	8
Free_play_development_stim	158	3,70	1,310	9	5,4	0	0
Transition_development_stim	148	2,70	1,244	19	11,4	0	0
Care_development_stim	155	3,03	1,301	12	7,2	0	0
Meal_development_stim	162	2,90	1,363	5	3,0	0	1
Free_play_forstering_peer	158	1,92	,987	9	5,4	0	15
Transition_forstering_peer	146	1,32	,560	21	12,6	0	1
Care_forstering_peer	114	1,40	,634	53	31,7	0	2
Meal_fostering_peer	162	1,49	,724	5	3,0	0	3

a. Number of cases outside the range (Q1 - 1.5*IQR, Q3 + 1.5*IQR).

Appendix 2

Missing data LSCIP

	N	Missing	
		Count	Percent
Accepts_wishes_not_fulfill ed	866	24	2,7
Awaits_turn	885	5	,6
Control_anger_child	889	1	,1
Compromizes	831	59	6,6
Control_anger_adult	883	7	,8
Share	884	6	,7
Accepts_wishes_not_fulfill edT2	885	5	,6
Awaits_turnT2	887	3	,3
Control_anger_childT2	886	4	,4
CompromizesT2	879	11	1,2
Control_anger_adultT2	881	9	1,0
ShareT2	887	3	,3

Appendix 3

Inter-Item Correlation Matrix CIP

	Sensitive_respons_mean	Respect_mean	Structure_limit_mean	Verbal_com_mean	Development_stim_mean	Forstering_peer_mean
Sensitive_respons_mean	1,000	,823	,767	,749	,623	,346
Respect_mean	,823	1,000	,742	,691	,592	,336
Structure_limit_mean	,767	,742	1,000	,561	,483	,154
Verbal_com_mean	,749	,691	,561	1,000	,816	,558
Development_stim_mean	,623	,592	,483	,816	1,000	,502
Forstering_peer_mean	,346	,336	,154	,558	,502	1,000

Appendix 4

Correlations 20 percentile

		SCT1	SCT2	2	3	4	5	6	7	CIP_total	Mean_provide_care
SCT2	Pearson Correlation	,077									
	Sig. (2-tailed)	,428									
	N	108									
Sensitive_respons_mean	Pearson Correlation	-,060	,150								
	Sig. (2-tailed)	,538	,122								
	N	108	108								
Respect_mean	Pearson Correlation	-,019	,074	,829**							
	Sig. (2-tailed)	,842	,449	,000							
	N	108	108	108							
Structure_limit_mean	Pearson Correlation	,043	,052	,835**	,788**						
	Sig. (2-tailed)	,658	,593	,000	,000						
	N	108	108	108	108						
Verbal_com_mean	Pearson Correlation	-,113	,176	,654**	,625**	,499**					
	Sig. (2-tailed)	,243	,069	,000	,000	,000					
	N	108	108	108	108	108					
Development_stim_mean	Pearson Correlation	-,097	,166	,555**	,493**	,427**	,867**				
	Sig. (2-tailed)	,317	,086	,000	,000	,000	,000				
	N	108	108	108	108	108	108				
Forstering_peer_mean	Pearson Correlation	-,179	-,022	,149	,100	,063	,403**	,418**			
	Sig. (2-tailed)	,064	,823	,124	,302	,520	,000	,000			
	N	108	108	108	108	108	108	108			
CIP_total	Pearson Correlation	-,073	,137	,901**	,863**	,819**	,860**	,797**	,353**		
	Sig. (2-tailed)	,454	,157	,000	,000	,000	,000	,000	,000		
	N	108	108	108	108	108	108	108	108		
Mean_provide_care	Pearson Correlation	-,014	,100	,950**	,930**	,931**	,634**	,526**	,112	,920**	
	Sig. (2-tailed)	,882	,305	,000	,000	,000	,000	,000	,247	,000	
	N	108	108	108	108	108	108	108	108	108	
Mean_educational_support	Pearson Correlation	-,134	,152	,583**	,528**	,436**	,938**	,956**	,593**	,835**	,552**
	Sig. (2-tailed)	,165	,117	,000	,000	,000	,000	,000	,000	,000	,000
	N	108	108	108	108	108	108	108	108	108	108

**. Correlation is significant at the 0.01 level (2-tailed).

Appendix 5

Inter-Item Correlation Matrix LSCIP T1

	Accepts_wishes_not_fulfilled	Awaits_turn	Control_anger_child	Compromizes	Control_anger_adult	Share
Accepts_wishes_not_fulfilled	1,000	,503	,541	,485	,574	,529
Awaits_turn	,503	1,000	,485	,439	,439	,515
Control_anger_child	,541	,485	1,000	,526	,636	,494
Compromizes	,485	,439	,526	1,000	,454	,470
Control_anger_adult	,574	,439	,636	,454	1,000	,535
Share	,529	,515	,494	,470	,535	1,000

Inter-Item Correlation Matrix LSCIP T2

	Accepts_wishes_not_fulfilledT2	Awaits_turnT2	Control_anger_childT2	CompromizesT2	Control_anger_adultT2	ShareT2
Accepts_wishes_not_fulfilledT2	1,000	,472	,583	,539	,543	,573
Awaits_turnT2	,472	1,000	,457	,404	,412	,530
Control_anger_childT2	,583	,457	1,000	,568	,722	,591
CompromizesT2	,539	,404	,568	1,000	,531	,534
Control_anger_adultT2	,543	,412	,722	,531	1,000	,570
ShareT2	,573	,530	,591	,534	,570	1,000