Measurement of Child Engagement in Early Childhood Education and Care

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Abstract

Children's engagement is a widely studied concept in the field of education, early interventions, and disability research. High engagement among children is consistently associated with desired academic, social, and emotional outcomes. However, the engagement of young children in Early Childhood Education and Care (ECEC) settings has received less systematic attention. The aim of this thesis is to investigate the measurement of child engagement in ECEC and related conceptualizations of the construct. The thesis includes two empirical studies and two literature reviews on child engagement in ECEC.

The first empirical study validates the Engagement Versus Disaffection with Learning: Teacher Report questionnaire in a Swedish preschool class. The relationship between a questionnaire of school engagement and questionnaire of child engagement was also investigated. Second study is a scoping literature review exploring how child engagement is conceptualized and operationalized in ECEC settings. For the third study, a subset of the identified studies using two or more measures of child engagement was included in an in-depth review exploring how multimethod measurement of child engagement is implemented in ECEC settings and what are the associations between different measures of child engagement. Lastly, a profile analysis of observed momentary engagement and global engagement was performed among a sample of preschool children in Sweden to investigate typical and atypical engagement profiles.

Findings show that observations are the dominant method for measuring young children’s engagement in ECEC, while teacher questionnaires are mostly used for assessing academic engagement in kindergarten classes in US. Self-reports where young children can report about their own engagement are extremely rare. Child engagement can be rated as low and high in value, as a category that either is or is not present, or as a variable that can be qualitatively described and coded on mutually exclusive categories, even within a same study.
Although we discovered a strong correlation between child engagement and school engagement in the Swedish preschool class, suggesting that these constructs are highly similar, literature review indicates that the conceptualization and measurement of school engagement and engagement of young children in ECEC differ in several aspects. Child engagement is dominantly associated with behaviors and seen as contextual, whereas school engagement includes internal aspects and can be seen as a stable tendency or even a trait of the child. Results from empirical studies and the in-depth literature review show that teacher questionnaires of child engagement, even if they nominally assess different aspects of engagement, tend to correlate higher than questionnaires and observations of child engagement. This indicates that questionnaires and observations of child engagement tap into qualitatively different aspects of what is considered engagement. Low global engagement in children is rare and probably more indicative of problems in functioning than low observed engagement. On the other hand, high observed engagement can indicate child’s potential for high engagement within a certain context, partly independent of child’s global engagement. Observations of child engagement are more sensitive to changes induced by interventions, whereas teacher-rated global engagement serves as a stronger predictor of future outcome.
Original papers

The following papers are enclosed as appendices.

Paper 1


Andrea Ritosa, Henrik Danielsson, Madeleine Sjöman, Lena Almqvist & Mats Granlund

Paper 2


Andrea Ritosa, Frida Åström, Eva Björck, Lisa Borglund, Elin Karlsson, Elaine McHugh & Elisabeth Nylander

Paper 3

Multimethod measurement of child engagement in ECEC – use and association between different measures: A scoping literature review. Manuscript.

Andrea Ritosa

Paper 4


Andrea Ritosa, Henrik Danielsson, Lena Almqvist & Mats Granlund
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1. Introduction

Children’s engagement is a widely studied concept in the field of education, early interventions, and disability research (Fredricks et al., 2004; Imms et al., 2017; McWilliam & Bailey, 1995; Reschly & Christenson, 2012). High engagement among children is consistently associated with desired academic, social, and emotional outcomes, making it an indirect indicator of well-being, mental health, and overall functioning (Adolfsson, 2018; Finn, 1989; Klem & Connell, 2004; Wolery et al., 1994). Whereas the conceptualization and measurement of school engagement have received substantial attention (Christenson et al., 2012; Eccles, 2016; Fredricks et al., 2004), the engagement of young children attending Early Childhood Education and Care (ECEC) settings has been given less systematic attention. The overarching aim of this thesis is to investigate the measurement of child engagement in ECEC and related conceptualizations of the child engagement construct. This will be accomplished by presenting findings from two empirical studies and two literature reviews on child engagement in ECEC. Throughout this work, I will primarily use the terms children’s preschool engagement or engagement in preschool to refer to the concept of children's active participation, interaction, and involvement in early education and care (ECEC) settings. The term children’s preschool engagement will be the primary term used but it encompasses the collective experiences of young children in diverse ECEC environments including preschools, kindergartens, nurseries, and other educational and childcare programs before starting the schools.

In the upcoming chapters, I will describe my initial conceptions about the concept of engagement, starting very general and narrowing towards the concept of young children’s engagement in ECEC settings, or children’s preschool engagement. I will start by presenting definitions of ‘engagement’ in everyday language and reflect on the engagement construct from a disability research perspective. Given that the extensive literature on school engagement has undeniably influenced the conceptualization and measurement of preschool engagement, I will provide a brief summary of school engagement research. Subsequently, I will narrow the focus to the topic
of young children’s engagement in preschool. Furthermore, to establish a relevant framework for addressing the complexities associated with measuring preschool engagement, I will provide additional context on the measurement of social constructs in general. This foundation will facilitate an examination of the challenges and nuances inherent in the measurement of preschool engagement.

1.1. Defining child engagement in ECEC

1.1.1. Definitions of the word ‘engagement’

Outside the educational context, the word engagement can refer to the agreement to marry someone, to the act of beginning to fight someone, to the fact of employing someone, or to any arrangement to do something or meet someone at a particular time and place (Cambridge dictionary, 1995). Engagement can also be defined as a state of being emotionally involved or committed (Merriam-Webster dictionary, 1995), which more closely corresponds with how engagement is understood in educational, early intervention, and disability research.

1.1.2. A disability research perspective on engagement

Participation is the central concept and the primary outcome of interest in the field of disability research, whereas engagement is considered its subdimension encompassing the subjective experiences of participation (Adair et al., 2018; Imms et al., 2017; Steinhardt et al., 2022). In the field of disability research, where subjects can be both children and adults, engagement can be understood and studied at different ecological levels (Imms et al., 2017). On the personal level engagement refers to an internal state of focus, presence, or investing effort in a learning activity. On the micro level, engagement refers to connections between the person and the context (Imms et al., 2017). Within the classroom, children can be engaged in learning activities, socially engaged with teachers and peers as well as in extracurricular activities, sports, and student governance (Skinner & Pitzer, 2012). Engagement can also refer to active involvement in other prosocial
institutions in the community, and at the most general level, in a democratic society. In that sense, engagement happens between the person and the macroenvironment (Imms et al., 2017). Capturing several ecological levels of engagement is valuable for obtaining a holistic view of functioning and well-being, but it is also challenging, and engagement is likely reduced to only one of these levels in research (Bhaskar & Danermark, 2006).

It was noted that the terms engagement and involvement are often used interchangeably in disability research, and one term is often used when defining the other, even in the World Health Organisation’s International Classification of Functioning, Disability, and Health (Adair et al., 2018; WHO, 2001). The findings from a literature review undertaken by Steinhardt et al. (2022) provide insights into the conceptualization of the terms participation, involvement, and engagement within the domain of pediatric rehabilitation. Their findings suggest that it could be helpful to differentiate between two aspects of participation, where involvement can be seen as a continuous and lasting internal state of interest in an activity, whereas engagement relates to the particular behaviors, emotions, and thoughts displayed when participating in a specific situation. It remains uncertain whether a similar conceptualization of engagement and differentiation between engagement and involvement applies to understanding engagement within educational environments, specifically the engagement of young children in preschool.

This thesis will further explore the conceptualization and measurement of young children’s preschool engagement. As the literature on school engagement could have potentially shaped the way we conceptualize and evaluate the engagement of young children, a brief overview of school engagement literature is provided next.

1.1.3. School engagement

Engagement of school-aged children in educational activities may be termed school engagement, academic engagement, or student engagement (Christenson et al., 2012; Furlong et al., 2003). Interest in the concept of school engagement emerged from the drop-out prevention literature. The
popularity of a positive perspective and focus on protective and promotive influences lead to engagement becoming one of the central interests of educational practitioners and researchers concerned with improving the quality of education (Eccles, 2016; Fredricks et al., 2004).

School engagement encompasses not only observable behavior but also covert emotional and cognitive processes. Finn (1989), one of the earliest researchers on student engagement, discriminated between participatory behaviors and identification with school. More recent conceptualizations include behavioral, cognitive, and emotional aspects of school engagement (Fredricks et al., 2004). Behavioral engagement refers to expressions of investing effort and being on task, adherence, and active participation in educational activities such as asking questions and contributing to class discussions. Behavioral engagement is easier to observe than cognitive and emotional engagement which are internal experiences not always reflected in behavior. Cognitive engagement refers to investing mental effort, being psychologically present, dedicated, and motivated to master new knowledge. Emotional engagement can refer to a general feeling of belonging to school, and to affective reactions in the classroom including positive and negative reactions to teachers, classmates, and schoolwork. Emotional engagement seems to predict cognitive and behavioral engagement (Ladd & Dinella, 2009; Reyes et al., 2012). While some bring out the difficulties in differentiating between these three aspects of engagement (Eccles, 2016), other authors propose additional aspects, such as academic engagement (Appleton et al., 2006) and students’ agency (Reeve & Tseng, 2011). Anderson et al. (2004) differ between academic and social engagement in school and Eccles (2016) considers these two components as orthogonally distinct, each consisting of behavioral, emotional, and cognitive aspects. Skinner et al. (2009) suggest disaffection should be considered distinct from engagement since emotional and behavioral patterns of disaffection are more complex than mere lack of engagement. They proposed a scale that differentiates between engaged behavior, engaged emotions, disaffected behavior, and disaffected emotions to capture different profiles of student functioning in classrooms. Phenomenological studies indicate that the teachers’ understanding of student engagement can be even more complex and layered (Harris, 2008).
While there is agreement that engagement is a promising means for understanding children’s school experiences and outcomes, definitions of engagement vary in how precise they are, and in how much they are related to a certain context (e.g., a classroom or a specific activity). There is no specific definition shared across the growing research community (Christenson et al., 2012). In their attempt to enhance the clarity of what student engagement entails, Christenson et al. (2012) concluded the Handbook of Student Engagement with a definition of student engagement as “the student’s active participation in academic and co-curricular or school-related activities, and commitment to educational goals and learning (p. 816)”. Engaged children enjoy learning and find learning meaningful, invest energy and effort, are persistent, and can self-regulate their behavior toward goals (Klem & Connell, 2004). Child autonomy and curiosity are often considered to be crucial aspects of school engagement (Kohn, 2022).

Whereas variations in understanding of school engagement exist, it can be said that theoretical synthesis and measurement of school engagement have been broadly discussed (Appleton et al., 2008; Christenson et al., 2012; Furlong et al., 2003). However, engagement in learning begins earlier in life, and child engagement is a relevant and popular topic in research set in the ECEC environments.

1.1.4. Child engagement in ECEC

The lack of conceptual clarity of the engagement concept is even more prominent in the ECEC settings. The concept of preschool engagement wasn’t as problematized to the same extent as school engagement, but there are nevertheless numerous empirical studies of young children’s engagement in preschool, especially in the field of early education and early intervention research (McWilliam & Ware, 1994).

Child engagement in preschool is an indicator of educational quality and it’s related to interactions with peers (Diebold & Perren, 2022) and teachers (Pietarinen et al., 2014; Roorda et al., 2017). Increasing child engagement is also a common goal in early interventions (Kishida & Kemp, 2006; Shafer & Wanless, 2022). Engagement of young children is often defined as
developmentally and contextually appropriate interactions between a child and people, materials, and symbols in the child’s environment (McWilliam & Bailey, 1995). In comparison to definitions of school engagement, the conceptualization of young children’s engagement accentuates the dynamic and malleable nature of engagement. Interactions between the child and the environment are of a transactional nature, with the child influencing and evoking reactions from the environment, while people, materials, and symbols in the environment influence and evoke reactions from the developing child (Jaffee & Price, 2008; McWilliam et al., 2003; Sameroff & Fiese, 2000).

Engagement in preschool has also been considered as an example of a pivotal behavior that enables other positive interactions and experiences, including social interactions, and leads to learning other positive behaviors and skills (Chiu et al., 2017; Morales-Murillo et al., 2020). Child engagement in preschool predicts learning achievement (Aydogan, 2012; Langeloo et al., 2020), and well-being (Pietarinen et al., 2014; Roorda et al., 2017). In Swedish studies of preschool engagement, engagement is seen as a “means and an end”, and the research interest is often in reciprocal interactions between the individual child and the environment (Finnman et al., 2021; Sjöman et al., 2016; Sjöman, 2017). In summary, preschool engagement can be seen as a mediator between supportive environments and positive outcomes, or a driving mechanism for learning and development to take place. As such, it has been equated with proximal processes (Skinner et al., 2009; Ponitz et al., 2009).

1.1.5. **Child engagement as a manifestation of proximal processes**

Bronfenbrenner’s bio-ecological systems theory (Bronfenbrenner, 1992; Bronfenbrenner & Ceci, 1994, Bronfenbrenner & Morris, 2006) provides a valuable framework for conceptualizing engagement, as engagement is performed by the child, but it is not an inherent attribute of the child. Child engagement is shaped both by the child’s actions and by the context the child is in. Within the framework of the bio-ecological systems theory (Bronfenbrenner & Ceci, 1994), children learn and develop as they interact
with people, objects, and symbols in their most proximal environment. This perspective underscores the child's active role in shaping their surroundings, which, in turn, affects their engagement. Proximal processes are the mechanisms through which genetic potentials for effective psychological functioning are actualized. Proximal processes are considered a precondition for children's mental health and overall well-being (Ponitz et al., 2009). Their magnitude and effectiveness vary as a joint function of characteristics of the environment in which they take place, the individuals within that environment, and the nature of the developmental outcomes under investigation (Bronfenbrenner & Ceci, 1994). Children’s engagement can be understood as a manifestation of a proximal process (Skinner et al., 2009; Ponitz et al., 2009). By studying how children engage with their environment, it is possible to gain insights into the proximal processes that underpin learning and development (Bronfenbrenner & Ceci, 1994; Ponitz et al., 2009).

1.1.6. Child engagement on the state-trait continuum

Building on the idea of engagement as a proximal process, children’s engagement in an educational setting is seen as a result of dynamic interactions between the characteristics of individual children and their educational environment (Bronfenbrenner & Ceci, 1994; Fredricks, 2013). Observations and experience sampling are suitable for investigating the dynamic nature of engagement (Fredricks et al., 2004). Momentary, or state engagement can be triggered by an external or internal event or stimulus (Symonds et al., 2019). It can thus easily change and fluctuate throughout the day. If we acknowledge that over time, accumulation of experiences can shape into habitual responses or behavioral patterns, engagement can be perceived both as a state and as a behavioral tendency (Fredricks et al., 2004).

In the research about school engagement, some authors recognize engagement as a momentary state, e.g., “a state of being caught and held” (Skinner et al., 2009, p. 495), but at the same time, they expect individual differences in school engagement between children (Skinner et al., 2009). School engagement is often assessed by surveys answered by children themselves, their parents, or their teachers (Fredricks et al., 2004), which indicates that researchers expect a certain stability of engagement which can be summarized
by asking how a certain child usually behaves. It is common to assume that children show a recognizable pattern of engagement within educational contexts (Aguiar & McWilliam, 2013; Fredricks et al., 2004; Vitiello et al., 2012). The complexity of the concept of child engagement and variations in assumptions about the temporality of engagement can present challenges for the operationalization of child engagement in quantitative studies, which are needed to facilitate generalizability and systematic comparison of findings about young children’s engagement in preschool.

1.2. Measuring child engagement in ECEC

The complex, multidimensional nature of engagement, as well as the diversity of approaches to studying it, renders children’s engagement in preschool a challenging construct to assess (Fredricks et al., 2004; Wang et al., 2019; Whiteneck & Dijkers, 2009). To track the developmental pathways of children's engagement in learning and facilitate meaningful comparisons and comprehensive reviews of research on preschool engagement, it becomes crucial to employ valid measures of engagement that are appropriately tailored to children's ages and specific contexts. To set the stage for the exploration of the measurement of preschool engagement and the associated challenges, the next chapter provides an overview of measurement principles applicable to social constructs in general.

1.2.1. Quantification of social constructs

In quantitative research, there are well-established methodological and statistical guidelines that allow for generalizability and systematic comparison of findings. For these reasons, quantitative approaches are often considered more objective, specific, and more scientific than qualitative approaches (Parkash & Kumar, 2016). Good measurement tools for the constructs of interest are a prerequisite for achieving this.

In social sciences, measurement is defined as the assignment of numerals to attributes of objects or events according to rules, where the attribute is an inherent characteristic of an object (Wright & Feinstein, 1992). Weight and
height are examples of easily defined and easily measured attributes of a person, as they can be directly observed by using tools. Cognitive abilities and personality traits are attributes of a person that aren’t tangible. Such concepts are called ‘constructs’ by psychometricians (Wright & Feinstein, 1992).

Psychometrics is a field of study within psychology concerned with the theory and technique of measurement. Psychometric approaches are extensively used to measure latent factors which are relatively stable characteristics of people, for example, their cognitive abilities, personality traits, sensory intensities, and attitudes. Latent factors can’t be directly measured. Instead, researchers come up with observable variables, for example, items on a questionnaire or intelligence tests, that can be scored numerically. A psychometric measure consists of several observable variables, all tapping into the latent factor.

Key concepts in psychometry are reliability and validity. Reliability over time, or test-retest reliability, refers to consistency over repeated measures by the same test and it’s assessed by calculating the Pearson correlation coefficient or Intraclass Correlation Coefficient between two applications of a measure, usually taken a short time apart (Aldridge et al., 2017). Objectivity, as an aspect of reliability (inter-rater reliability), refers to different people interpreting the measure in the same way and assigning the numerals accordingly. Validity has many aspects; content validity refers to a measure representing all of the relevant content in the domain of interest, criterion validity refers to a measure predicting some criteria in the present (concurrent validity) or future measurement (predictive validity), discriminant validity refers to the extent to which a measure can distinguish between different constructs or groups (Campbell & Fiske, 1959), face validity refers to the extent to which a measure appears to measure what it is intended to measure based on a subjective judgment made by individuals who are familiar with the construct being measured (American Psychological Association, 2023). Construct validity is the overarching validity aspect, subsuming all other validity concerns. It refers to measuring the construct that the measure is intended for, relating to other constructs as required by theory but not being confounded by other constructs. A valid measure is both objective and reliable.
While psychometric principles are commonly associated with questionnaire-based measurements, observation techniques are also valuable for measuring and understanding social constructs. Observations in a natural setting also allow quantifying the objects of interest, but they are considered less adequate for assessing traits as the link between a small sample of observed behaviors and a particular dispositional trait is not direct (Parkash & Kumar, 2016). Observations are primarily focused on specific behaviors, events, or situations. As such, they can be accurate, objective, and free of value judgments. But, since behaviors depend on many situational factors, short observations of behavior can also be perceived as arbitrary (Neyer, 2006). The reliability of observations can be investigated by looking into an inter-rater agreement. The validity of observation will depend on the instructions and observer, but also on the observed. Observed subjects can behave differently while they are observed, due to the observer’s presence (personal reactivity) or as a reaction to being observed (procedural reactivity). Observers can be biased, and observation instruments can include instructions and methods that are not comprehensive, and thus not valid. Another drawback of observations is that they tend to be as time-consuming and expensive as qualitative methods.

An alternative to psychometric approaches to measurement is a clinimetric approach (Feinstein, 1983), suitable when interest is in a combination of different attributes that are not necessarily in correlation with each other. In psychometrics, the goal is to tap a latent construct by quantifying its’ attributes. In contrast, the clinimetric approach assumes that the construct of interest is not unidimensional and hierarchical, and thus its components may be uncorrelated. They can still be combined into a meaningful composite score. Dijkers (2010) argues that participation is such a construct. Internal consistency and other validity estimates based on interitem correlations will not be relevant for clinimetric scales (Whiteneck & Dijkers, 2009), as scoring high on one domain might not predict a high score on another domain. Developing clinimetric scales might have to involve panels of experts to ensure all relevant aspects of the construct are included. Item sensitivity to change, responsiveness, objectivity, and reliability over time (test-retest) are
relevant for clinimetric scales, as prerequisites for content validity which is of utmost importance (Whiteneck & Dijkers, 2009).

1.2.2. **Measurement of child engagement in educational settings**

The psychometric approach is valuable for assessing latent traits. If school and preschool engagement are conceptualized as relatively stable characteristics, then the psychometric approach is suitable for measuring them. In children of school age, engagement is commonly measured by surveys where children can report about their own school engagement (Fredricks et al., 2004). Besides children, surveys can be directed to their teachers, or other adults who are well familiar with the child. It is assumed that teachers will be good at rating their student’s motivation and engagement. These traits are valuable to teachers, and it is thus assumed that they are good at noticing and rating children’s school engagement. Surveys often include cognitive or emotional aspects of engagement besides behaviors (Fredricks et al., 2004). In par with theories and phenomenological studies, findings from psychometric investigation can inform about the dimensions of the construct of engagement.

Another common way of assessing school engagement is observation of children’s engagement in natural school environments. Observations can take place over any pre-determined time intervals ranging from seconds to the full length of a preschool activity or a study session in school. Observations are mainly suitable for assessing behavioral engagement (Fredricks et al., 2004).

Assessing children’s engagement validly and reliably is crucial for identifying children who do not learn and benefit from being in their natural environments, for evaluating interventions promoting engagement, and for studying engagement trajectories (Virtanen, 2016). Measurement of child engagement in preschool has been given less systematic attention in comparison to measurement of school engagement. Observations and teacher surveys are expected to be the dominant method of engagement measurement even in the ECEC context. Observations are appropriate for obtaining information about children’s engagement within a specific activity or a situation, whereas surveys can inform about the child’s typical behavior and
experiences (de Kruif & McWilliam, 1999). Preschool teachers are expected to know children well, and teachers are often considered to be good informants about children’s behavior (Neyer, 2006).

1.2.3. Challenges with measuring young children’s preschool engagement

Defining child engagement in concrete and precise terms is a prerequisite to studying it empirically and choosing appropriate indicators of child engagement that can be measured (Bhattacherjee, 2019). Due to the complexity of the construct and ambiguity of the word engagement, there are several challenges with measuring child engagement in preschool. Engagement is experienced by the child with several non-visible elements to it. While behaviors can be observed, cognitive and emotional aspects of school engagement are internal experiences and are best assessed through child self-reports (Appleton et al., 2006). Most school-aged children can report about their thoughts, attitudes, and feelings in engagement measures and self-report measures are typical for the population of school-aged children. Creating and applying self-report measures for young preschool children requires plenty of resources (Varni et al., 2007), and self-reports are likely to be less represented in research set in ECEC. It remains to be seen how internal experiences of preschool engagement are measured in young children.

Assessing the engagement construct without capturing facilitators and outcomes of engagement is another challenge, relevant both for studies evaluating interventions aimed at increasing children’s engagement and for correlational studies where engagement can be studied as a predictor or outcome. Untangling engagement from other intrinsic traits of children and the array of environmental factors that influence engagement can present a challenge. For example, in the measures of school engagement, perceived social support is sometimes used as an indicator of emotional engagement (Appleton et al., 2006) but can also be considered as a contextual facilitator of engagement (Virtanen et al., 2018). Additionally, children’s tendencies towards positive and negative emotions are also sometimes integrated into a measure of school engagement (Skinner et al., 2009), sometimes investigated
as a predictor of engagement (Reschly et al., 2008), and sometimes as outcomes of engagement (Eccles, 2016). Eccles (2016) raises concern about including affect in a measure of school engagement, as it can be hard to differentiate whether positive affect is a part of feeling engaged, a predictor of school engagement, or a consequence of engaging in fulfilling work. While there are findings that tendencies toward positive and negative affect predict global engagement (Reschly et al, 2008), school engagement is often conceptualized as containing an affective component which refers to the feeling of belonging, and appreciating and valuing school (Finn & Zimmer, 2012). Affective engagement is induced by early behavioral patterns and external motivators, and later becomes internalized and reflects on the child’s daily experiences and interactions and drives behavioral engagement (Ladd & Dinella, 2009). If these affective aspects of engagement should be included in an engagement measure, they can easily be confused with more general tendencies towards positive and negative affect. As highlighted by Finn and Zimmer (2012), a common error observed in the development of school engagement scales is the inclusion of students’ self-perceptions regarding their abilities and perceptions of their school environment within the engagement measure. However, these perceptions are clearly contextual factors that might predict engagement but do not constitute engagement. Furthermore, academic achievement and dropping out are outcomes of engagement and do not fall within the scope of the school engagement concept.

Assessments for different age groups also vary a lot since what is considered an indicator of engagement depends on the developmental stage of the individuals being assessed. Disentangling children’s development from concepts such as participation and engagement is shown to be a difficult task. The understanding of what constitutes participation in everyday life situations varies based on the age and developmental stage of children, as noted by Adolfsson et al. (2012). A similar conclusion can be made for child engagement, often defined as developmentally and contextually appropriate interactions between a child and the environment (McWilliam & Bailey, 1995).
Development can be defined as a positive change, or an increase in complexity (van Geert, 2009). Over their life span, humans develop their cognitive, intellectual, emotional, and social capabilities. Typical childhood is characterized by physical growth, and rapid changes in sensorimotor, social, emotional, behavioral, cognitive, and communication skills (Mascolo & Fischer, 2015; McClelland et al., 2015). Children’s play, language, and social interactions become more complex, and their ability to move around, actively change their environment, or choose a preferred environment increases dramatically during preschool age (Montroy et al., 2016).

Although engagement is often described as a sense of belonging and feeling involved in a life situation regardless of age and developmental status, engagement is often related to age (de Kruif & McWilliam, 1999; Sjöman et al., 2016). As children develop and their activity settings change, their experiences and expressions of engagement also evolve. Over time children become better at choosing and manipulating their environments. Their self-regulation skills also develop, and they gain more control over how they will engage in their environments. Since engagement happens in the interaction between the child and their environment, the child’s skills, characteristics, and abilities will greatly influence how children engage with their environment. To investigate engagement trajectories over long periods and across different educational contexts, the assessment needs to be adapted to natural changes in development, competencies, skills, and role expectations (Coelho & Pinto, 2018; de Kruif & McWilliam, 1999; Vitiello et al., 2012).

Given these complexities and a lack of systematic and critical investigation of literature about young children’s engagement in preschool, the focus of this thesis is the investigation of conceptualization and measurement of child engagement in early childhood education and care (ECEC) settings.

1.3. Summary

Although the concept of engagement might be intuitively clear to educators, engagement research is characterized by a lack of conceptual clarity and a diverse array of operationalizations of the concept. The so-called ‘jingle and jangle’ problem, where the same term is used to describe different things and
other terms are used to describe the same thing, presents a challenge for the comparison of different studies on engagement and a systematic overview of engagement research. Although the complexity of the concept of child engagement has been acknowledged, it is rarely discussed how it reflects on the measurement of child engagement. Several measures of children’s engagement in learning exist today, and not many studies explore how they are linked to each other (de Kruif & McWilliam, 1999). To study predictors, outcomes, and trajectories of children’s engagement in learning, valid and reliable measures of engagement that correspond to conceptual understandings of the construct are necessary (Virtanen, 2016). To improve the conceptual clarity of the construct and facilitate research on engagement and interventions that aim to improve children’s engagement, this thesis will provide an overview of the conceptualization and operationalizations of child engagement and investigate how different measures of engagement relate to each other.

1.4. Aim

The general aim of this thesis was to investigate the measurement and the related conceptualization of child engagement in ECEC settings.

In a validation study of a school engagement measure in a Swedish preschool class (Paper I) I checked for associations between two measures of engagement, one a measure of young children’s global engagement (Child Engagement Questionnaire, CEQ; McWilliam, 1991) and one a measure of school engagement intended for middle school children (Engagement vs. Disaffection with Learning: Teacher Report, Skinner et al., 2009). This was followed by a literature review of child engagement measurements in ECEC (Paper II), to investigate how child engagement is conceptualized in ECEC research and provide an overview of the methods for measuring child engagement. An additional review was done on a subset of identified studies to investigate how multimethod measurement of child engagement is implemented in ECEC, and to see how different measures are associated with each other (Paper III). In the final paper (Paper IV), I used a person-oriented approach (Bergman & Wångby-Lundh, 2014) to explore the engagement
profiles of Swedish preschool children based on engagement data from two sources, an observation of momentary engagement and a questionnaire of global engagement.

In this thesis I aim to answer these specific research questions:

1. How does the concept of child engagement in preschool settings compare to the concept of school engagement? (Papers I and II)

2. How is child engagement in preschool studied, conceptualized, and measured? (Papers II and III)

3. What are the associations between different measures of child engagement? (Papers I, III and IV)

The first study explores the dimensions of the school engagement questionnaire (Engagement versus Disaffection with Learning: Teacher Report; Skinner et al., 2009), in the population of children in the Swedish preschool classes (6-7 years of age). This population was chosen for the study so that two measures of engagement can be compared – one intended for preschool children and one for school-aged children. The correlation between these two measures of engagement is also examined to judge the convergent validity of the translated questionnaire, that is, to see if both questionnaires are measuring the same construct.

The second and third studies are literature reviews of child engagement measures in the ECEC setting. The first scoping literature review (Paper II) had the aim of identifying studies where child engagement was quantitatively assessed in ECEC settings and investigating the concept of child engagement and implementation of child engagement measurement. Secondly, a subset of studies was identified where more than one measure of child engagement was used and an additional review (Paper III) therefore had the aim of exploring how is the multimethod measurement of child engagement implemented in ECEC settings and what are the implications from the related findings.
The final paper (Paper IV) is an empirical study using the person-oriented approach for identifying homogeneous child profiles of “state” and “trait” engagement in a Swedish preschool environment.
2. Method

The thesis includes two empirical studies and two literature reviews. The first study (Paper I) is an empirical study including a validation of the questionnaire ‘Engagement Versus Disaffection with Learning: Teacher Report’ (Skinner et al., 2009) which was to be used in the research project Achievement in grade 6 – what is the relation to children’s engagement in preschool? (Granlund et al., 2017). Literature review papers (Paper II and Paper III) resulted from the project Assessing young children’s engagement in preschool - a systematic literature review, registered at OSF (Ritoša et al., 2021). The last study (Paper IV) is an empirical study based on data from two research projects, Early Detection Early Intervention (Granlund et al., 2015) and Participation and Engagement in Preschool International (Coelho et al., 2021).

A more detailed description of the methodology is provided for each paper separately, including descriptions of participants for the two empirical studies, and the literature search and data extraction procedure for the literature review studies. Measures used in the empirical studies are described at the end of the method chapter.

2.1. Ethical considerations

Participation in empirical studies was voluntary for teachers who answered the questionnaires, and for children who were the subjects in the studies. Two research projects, Early Detection Early Intervention (Granlund et al., 2015) and Participation and Engagement in Preschool International (Björck, 2014), were approved by the Regional Ethical Review Board in Linkoping, Sweden (dnr. 2012/199-31 and 2014/479-31, respectively). In both projects, teachers participated voluntarily, and parents of preschool children gave informed consent to have their children included in the research project.

In the more recent research project Achievement in grade 6 – what is the relation to children’s engagement in preschool? (Granlund et al., 2017), teachers participated voluntarily. Children and their parents were informed
about the study. Participation in this research project required passive consent, implying that children and parents who opted out needed to proactively notify researchers and teachers of their decision. For the purpose of the questionnaire validation, no identifying information was collected about the children or teachers included in the study. The procedure for this project was approved by the Regional Ethical Review Board in Linköping, Sweden (dnr. 2018/189-31).

2.2. Paper I – Validation study

Validation of the questionnaire Engagement vs. Disaffection with Learning: Teacher Report (Skinner et al., 2009), translated to Elevernas engagemang i lärande (EEL), consisted of two phases: cognitive interviews and psychometric validation.

Cognitive interviewing is a method of identifying problematic and ambiguous questions and other issues in the questionnaire validity that occur due to response processes. It is used to check the interpretation, cultural relevance of the translation, and ease of comprehension of the items (Willis & Artino, 2013).

To investigate the interpretability and relevance of the EEL items, cognitive interviews took place during the winter of 2018/2019. Participants in the cognitive interviews were recruited by convenience sampling. In total, six teachers participated. Three teachers were teaching 12-year-olds in grade six, and three teachers were teaching six-year-old children in the preschool class. One preschool class teacher was male, while the other five teachers were female. Two researchers independently visited the individual teachers at their workplace, in the cities of Jönköping and Gothenburg. Interviews took place in private, quiet areas of their schools. In agreement with teachers, interviews were audio-recorded. The researcher explained the purpose of the cognitive interviews and instructed the teacher to think aloud while answering the questionnaire. If they perceived a problem with understanding or answering a certain item, they were asked additional questions to clarify what was problematic. After the respondents answered the questionnaire while reading aloud and expressing their thoughts during the process, they were also asked...
to reflect on the questionnaire as a whole and judge if all the items adequately assess the engagement of children in their classes. The interviews were between 15 and 30 minutes long. Teachers’ comments, thoughts and suggestions were summarized after listening to all the recordings.

Data collection for the psychometric validation of the EEL questionnaire took place in the spring term of 2019. Convenience sampling was again used to recruit schools and teachers. Public and private schools in Jönköping and Gothenburg areas were contacted and school principals were asked if the preschool class teachers in their school were willing to participate in the study. Four teachers from four different schools in Jönköping agreed to participate as informants. All four teachers were female. Children’s parents were informed about the study and asked for passive consent either at a parental meeting or via an informing video uploaded to the school’s web platform. Since no parents objected to participation in the study, data were collected for all the children in the targeted classrooms. The teachers’ participation was voluntary, and they could opt to have a substitute teacher in their class during the time they worked on the questionnaires which were organized and financed by Jönköping University. Teachers assessed children’s engagement using EEL (Skinner et al., 2009) on two occasions, with 2 weeks apart. On the first occasion, they also used the questionnaire CEQ (McWilliam, 1991) to assess children’s engagement. Participants in the study were 110 children (57 girls and 53 boys) who attended a preschool class. Their mean age at the time of data collection was 82.38 months ($SD=4.32$, range 70-90 months). They came from four different classes, and each class was in a different school. All the schools were within Jönköping municipality in Sweden, and areas with different socio-economic backgrounds were represented in the sample. The preschool classes differed in size, with 17 children in the smallest class and 42 children in the biggest class. Children’s teachers filled in the questionnaires about children’s engagement.

Psychometric properties of EEL were analyzed via confirmatory and exploratory factor analyses for ordinal data using psych (Revelle, 2019a) and lavaan packages (Rosseel, 2019) in R (R Core Team, 2018). When assessing the goodness of fit of the factor solutions, we have relied on conventional indices such as non-significant chi-square ($x^2$), RMSEA smaller than .06 and
a CFI and TLI larger than .95 (Xia & Yang, 2019). To assess the reliability of each subscale, we calculated the $\Omega$ total coefficient, expecting that values above .8 indicate good reliability (Mcneish, 2018). The test-retest reliability was calculated as the correlation between the scores on EEL obtained two weeks apart (Bolarinwa, 2015). A high Pearson correlation of $r=.7$ was expected to establish good test-retest reliability of EEL. To confirm the convergent validity of EEL, a high Pearson correlation of $r=.7$ was expected between questionnaires EEL and CEQ (Bolarinwa, 2015; Field, 2013; Post, 2016).

2.3. Paper II - Literature review of child engagement measures

A scoping literature review was carried out to identify studies where child engagement was quantitatively assessed in ECEC settings and to analyze the methods of child engagement measurement. Scoping review methodology was chosen for this explorative comprehensive review of measurements of child engagement in ECEC, as it is the most suitable method for mapping a wide range of literature in a complex area not previously given much systematic investigation (Arksey & O’Malley, 2007; Levac et al., 2010, Munn et al., 2018).

A literature search was developed in collaboration with a librarian and conducted in March 2021 in databases ERIC, PsychInfo, Scopus, and Web of Science. The search included terms relating to the concept of engagement, to the population of children attending preschool, and to quantitative assessment. The search string for the database ERIC is presented as Appendix A in Paper II. The search resulted in 10843 hits. After excluding the duplicates, 5965 research papers were included in the title and abstract screening, and 705 papers were included in the full-text screening. Papers were excluded from the review if engagement was not quantitatively assessed, if the population was older children or if engagement was measured for other participants and not children attending ECEC (e.g., their parents), or if the setting was not a natural ECEC setting. The screening was performed by six researchers. A total of 286 papers met the inclusion criteria for the review and information was extracted.
about the study setting, design, participants, and engagement conceptualizations and measurements used in the identified studies.

2.4. Paper III - Literature review of multimethod measurements of child engagement

Among the 286 research papers identified in the above-mentioned review, 21 research papers relied on a multimethod assessment of child engagement, and these studies were included in this review. Information was extracted about how child engagement measures were implemented, how they were used in the analysis of results, the reported associations between different measures of child engagement, and other results related to child engagement, e.g., significant intervention effects on child engagement and associations between child engagement and other measured variables.

2.5. Paper IV - Person-oriented analysis of trait and state engagement profiles

Data collection for this study took place in 2014 and 2015 in preschools located in southern Sweden. Researchers approached the preschools through the preschool principals and teachers, and informed consent was obtained from parents for each child. Preschool teachers participated voluntarily and provided information about the child’s age, gender, and second language learner status. They also completed the Child Engagement Questionnaire (CEQ; McWilliams, 1991) and the Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997) for children whose parents agreed to participate. The data collection also involved structured observations (COP; Farran & Anthony, 2014) conducted by three trained observers during one or two-day visits to preschools.

Participants with a complete CEQ questionnaire and at least 10 observations in COP were included in this study. The final sample consisted of 494 Swedish preschool children with a mean age of 53.44 (SD = 10.64) months, including 229 girls and 265 boys. The sample encompassed 69 preschool groups from a
mix of public and private preschools across 12 municipalities in the southeastern region of Sweden. Seventy-four children (15%) had a right to educational support in their mother tongue, indicating that Swedish was not their primary language and they were assigned the status of a second language learner (SLL). For two children, this information was missing. Furthermore, 21 children (4.3%) officially received special support due to a clinical diagnosis or disability. For five children in the sample, this information was missing.

The mean number of observations per child was 20.03 (SD = 5.35). Mean CEQ scores and involvement dimension ratings in COP were calculated for each participant. COP ratings were included only during group, small group, play center, or playground activities, excluding meal and transition times.

Cluster analysis was performed using ROPstat software (Vargha et al., 2015) following prescribed steps (Vargha et al., 2015). Pearson’s r was used to explore engagement measure associations. A residue analysis with an ASED of 0.45 identified no outliers. Hierarchical classification (Ward’s method) was used to establish the number of clusters based on EESS higher than 67% and HC indexes below 1 in the start solution (Bergman et al., 2003), with subsequent K-means classification for the final solution. Subsequent comparative analysis examined if clusters differed in age, gender, hyperactivity, and SLL status. Cluster solution data was visualized using the R software (R Core Team, 2023) and packages factorextra (Kassambara & Mundt, 2023) and ggpubr (Kassambara, 2023).

2.6. Measures

Engagement Versus Disaffection with Learning: Teacher Report is intended to measure children’s engagement in school activities. In Swedish, the scale is translated to Elevernas engagemang i lärande, or shortly, EEL. The questionnaire consists of 25 items across four subcales that measure behavioral and emotional aspects of children’s engagement and disaffection. The engaged behavior subscale includes five items about effort exertion and persistence but also indicators of mental effort that correspond to cognitive engagement. The engaged emotions subscale includes five items that reflect
enthusiasm, interest, and enjoyment. The disaffected behavior subscale includes five items that capture the lack of effort and withdrawal from learning activities. The disaffected emotions subscale includes 10 items that capture emotional withdrawal, sadness, boredom, frustration, anger, and anxiety. The questionnaire is to be answered by the child’s teacher. In the Swedish version of the questionnaire, answers are given on a four-point Likert-type scale, from 1 (not at all true) to 4 (very true). The administration takes 5-10 minutes per child. The psychometric properties of this questionnaire were investigated in the first paper.

*Child Observation in Preschool* (COP; Farran & Anthony, 2014) is an observation protocol developed for systematic observations of preschool children’s behaviors in a classroom setting. The method involves identifying a child to observe, monitoring their behavior for three seconds, and then coding the observation on eleven dimensions. Observations are then repeated for other children, and this procedure is repeated several times during a day in preschool. Accumulation of observations provides information about how children spend their time in preschool, and data can be analyzed at the child or the group level. Ten COP dimensions are categorical, and the dimension *Involvement* is ordinal and rated on a scale from 1 to 5. A rating of one indicates low involvement, meaning the child is not engaged in the activity and may be off-task or not paying attention. A rating of two indicates medium-low involvement, where the child is not persisting in the activity and may be inconsistently looking at the teacher or materials. A rating of three indicates medium involvement, where the child is on-task but slightly distracted and may be looking around while quickly returning to the task. A rating of four stands for medium-high involvement, where the child is persistent in the activity, attentive to the material, and eager to participate with a positive affect. A rating of five indicates high involvement, where the child is intensely focused on the activity and difficult to distract, seemingly oblivious to noise and other non-related stimuli). In this study, we used the *Involvement* dimension as an indicator of state engagement. A five-point scale was reduced to a three-point scale by merging the ratings for low and medium-low involvement and ratings for medium-high and high involvement to improve indices of inter-rater reliability and internal consistency (Åström et al., 2022).
Cronbach’s alpha for the *Involvement* dimension rated on a three-point scale in the fourth study was 0.86. Dimension *Schedule* was used to exclude sweeps that took place during transition times and meals and the analysis and only sweeps that took place when the child was with the whole group, in the small group, play centers, or the playground were included in the analysis.

*Child Engagement Questionnaire (CEQ)* (McWilliams, 1991) is a measure of a child’s global engagement. The original instrument consists of 32 items that describe behaviors of varying complexity and are answered on a four-point rating scale ranging from (1) “not at all typical” to (4) “very typical”, with “typical” indicating that the child spends a lot of time engaged in a described activity. CEQ was developed in the US and adaptation to the Swedish context includes only 29 items since three items were deemed irrelevant in the Swedish preschool context (Sjöman et al., 2016). The rating scale was also adapted to Swedish by Björck-Åkesson (1994; as cited in Sjöman, 2018), with responses ranging from (1) “almost never happens” to (4) “happens very often”. A four-factor structure of CEQ was reported by US authors, including factors of competence, persistence, undifferentiated behavior, and attention (de Kruif & McWilliam, 1999). No support for this factor structure was found in Swedish studies using the scale (Almqvist, 2006; Sjöman et al., 2016). CEQ was used in both empirical studies as a unidimensional scale. Teachers answered the questionnaire. Cronbach’s alpha for the CEQ in the fourth study was 0.94.

*Strengths and Difficulties Questionnaire (SDQ)* (Goodman, 1997) is a short questionnaire used to screen for mental health problems in children and youths. It consists of 25 items divided into 5 subscales. This study uses only data from the hyperactivity/inattention subscale of the SDQ, which consists of five items that assess the symptoms of inattention (two items), hyperactivity (two items), and impulsiveness (one item). The items are rated on a three-point Likert scale, from 0 to 2, where 0 indicates “not at all”, 1 “only a little”, and 2 “quite a lot”. Scores on the hyperactivity/inattention scale can range from 0 to 10. Scores tend to be positively skewed with only a small number of children obtaining high scores. Those that score in the highest 10% are categorized as ‘highly hyperactive’, those that score one point less are categorized as ‘borderline hyperactive’, and the rest are categorized as ‘low in
hyperactivity’. In the fourth study, a score of 6 or higher on the hyperactivity/inattention subscale was used to indicate high hyperactivity (N=50, 10.4%). This cut-off score was chosen based on previous research in Swedish preschool settings (Gustafsson et al., 2016). Using a higher cut-off score, as suggested in studies from the US (Goodman, 2001; Smedje et al., 1999), would have resulted in a much smaller proportion of children being categorized as “highly hyperactive”. Cronbach’s alpha for the five hyperactivity items in the fourth study was 0.84.

3. Summary of the findings

3.1. Paper I

In this paper we validated the questionnaire ‘Engagement versus Disaffection with Learning: Teacher Report (EEL)’. Several aspects of questionnaire validity were investigated, including face validity and interpretability of the items, score distributions, inter-item correlations, factor structure, internal consistency, test-retest reliability, and convergent validity. In cognitive interviews, it was established that teachers found items understandable, but not all items were deemed suitable for measuring the engagement of children in preschool classes. Items that had an explicit focus on academic tasks and achievement (e.g., “coming prepared to the class”) were not appropriate for this population of children. The majority of the items were skewed indicating most children have very high scores on engagement and very low scores on disaffection items. Confirmatory factor analysis showed that the expected four-factor model (Skinner et al., 2009) differentiating between emotional and behavioral engagement and emotional and behavioral disaffection was not a good fit to our data, $\chi^2 = 375.86, df = 224, p < .001$, and didn’t show acceptable absolute fit index, CFI = 0.99, TLI = 0.99, RMSEA = 0.11, 95% CI [0.10 – 0.12]. Instead, a two-factor solution with behavioral and emotional engagement showed an acceptable fit after adjustments of the model, $\chi^2 = 233.71, df = 201, p = .057$, and good fit indices, CFI = .99, TLI = .99, RMSEA = .039, CI [0.00 - 0.06]. Internal consistency of the subscales was very good, $\Omega = 0.96$ (0.94, 0.97) for the behavioral engagement subscale, and $\Omega = 0.94$
Scores on EEL were in high correlation with children’s scores on the CEQ, $r = .80, p < .001$, indicating good convergent validity. Pearson correlation indicated that test-retest reliability was also good for the emotional engagement subscale, $r = 0.71, p < .001$, as well as for the behavioral engagement subscale, $r = .81, p < .001$. The test-retest reliability additionally involved the computation of Intraclass Correlation Coefficient (ICC) estimates along with their corresponding 95% confidence intervals. This analysis employed a single-rating, absolute-agreement, two-way mixed-effects model. ICC values below 0.5 indicate poor reliability, values falling within the range of 0.5 to 0.75 indicate moderate reliability, values ranging between 0.75 and 0.9 indicate good reliability and values exceeding 0.90 indicate an excellent level of reliability (Koo & Li, 2016). The obtained ICC indicated moderate to good reliability for the emotional engagement subscale, ICC = .702, 95% CI [.59, .78], and moderate to good reliability for the behavioral engagement subscale, ICC = .815, 95% CI [.74, .87].

3.2. Paper II

The purpose of this study was to investigate conceptualizations and measurement of young children’s engagement in ECEC settings. A total of 311 measurements of young children's engagement in ECEC were identified across 286 papers, encompassing 150 correlational studies, 105 intervention studies, 25 validation studies, and six descriptive studies.

Child engagement in ECEC was most often defined as the amount of time children spend interacting with the environment in a developmentally and contextually appropriate manner, a definition proposed by McWilliam and Bailey (1995). Definitions and examples of general child engagement consisted of behavioral indicators. Besides general child engagement, it was also common to define engagement as related to academic activities, especially in kindergarten settings in the US. Conceptualizations of child engagement in academic activities showed variations and included behavioral, cognitive, emotional, and social aspects. It was relatively rare to define young children’s engagement in academic activities as a stable characteristic of a
child, for example as a child’s attitudes or abilities. However, young children’s engagement in academic activities in kindergartens was more likely to include emotional and cognitive aspects besides behaviors, which corresponded to the widely accepted conceptualization of school engagement.

Child involvement was described as a process, activity, or quality of a child's activity, characterized by internal experiences of curiosity, enjoyment, and enthusiasm. In the identified papers, the terms child engagement and involvement were sometimes used interchangeably, and one term could be used to define the other. Whereas no consistencies were identified in definitions that use both terms, when comparing conceptualizations of involvement and engagement separately, an emphasis on behaviors was obvious in definitions of engagement, and internal experiences were emphasized in definitions of involvement.

Other identified conceptualizations of child engagement referred to engagement in other specific activities (task engagement, joint engagement, play engagement, peer engagement) or to negative engagement.

Observations were the most common method for measuring children’s engagement in ECEC settings. The focus of the child engagement measurement was often on behavioral aspects of engagement. However, several variations were noted in operationalizations of observed child engagement. Observations greatly varied in length and frequency. Operational definitions of engagement varied from objective behavioral indicators (e.g., body orientation or eye gaze) to vague behavioral descriptors (e.g., appropriate or relevant behavior). Observed engagement could be rated on different rating scales, as a dichotomy of engaged vs. non-engaged, on a scale from low to high, or as descriptive categories describing what the child is engaged in. Teacher questionnaires were the second most common method for assessing general child engagement, and a dominant method for assessing young children’s academic engagement in ECEC settings such as kindergarten.

Seventy-seven unique citable measures were identified, some of which were used in several studies, and some of which were only used once. The list of
citable child engagement measures included measures of general child engagement, child involvement, academic engagement, social engagement, task engagement, emotional engagement, negative engagement, joint engagement, engagement in reading, engagement in play, engagement in music activities, and engagement in computer activities. A significant proportion of studies relied on measures that were not validated or previously used elsewhere.

3.3. Paper III

This review builds on the literature review described above and investigates the implementation of multimethod measurement of child engagement in ECEC. It includes a subset of 21 articles where at least two child engagement measures were used to study child engagement. The findings showed that child engagement measures were typically combined to tap into different aspects of child engagement. It was most common to combine observations and teacher questionnaires of child engagement. Other implementations of multimethod measurement of child engagement included using two teacher questionnaires, relying on questionnaires answered by different informants, combining measures of individual and group engagement, or using two observational measures. Different engagement measures were typically used as separate indicators of engagement in the result analysis.

Results showed that individual child engagement measurements correlated highly when performed by the same method, either observations or surveys, even when these measures nominally tap into different aspects of engagement. On the other hand, observations and teacher questionnaires of engagement were often in low or moderate correlations, as well as child engagement measures from different informants. Even within the same study child engagement could be rated on different scales, as a behavior that goes from low to high, as descriptive categories describing what is the child engaged in, or as behavior that either is or isn’t present.
3.4. Paper IV

The purpose of this study was to investigate if global engagement assessed via teacher questionnaires and observed momentary engagement can be used to identify engagement profiles by using a person-oriented approach. A preliminary analysis identified a low correlation between children’s global engagement measures by CEQ (McWilliam, 1991) and observed engagement measured by COP (Farran & Anthony, 2014), \( r = .105, 95\%, \) (95% CI [0.02, 0.19]), \( p < .05 \).

Exploratory cluster analysis revealed five distinct profiles of global and momentary engagement. Clusters showed good homogeneity coefficients ranging from 0.43 to 0.88 in the exploratory analysis and the EESS was 67.11%, indicating a good solution. Clusters had significantly different CEQ scores, \( F(4, 489) = 329.17, p < .001, \eta^2 = .73 \), and COP ratings, \( F(4, 489) = 193.59, p < .001, \eta^2 = .61 \).

Four out of five clusters showed discrepancies between global and observed engagement levels and one cluster included children with congruent average engagement ratings on both child engagement measures. Specific engagement profiles were associated with children’s age, \( F(4, 489) = 9.02, p < .001, \eta^2 = .069 \), hyperactivity status, \( \chi^2(4, N = 482) = 18.23, p < .001, \phi = .19 \), and SLL-status, \( \chi^2(4, N = 492) = 20.16, p < .001, \phi = .20 \).

Children in the first and largest cluster had high global engagement but average observed engagement. They were the oldest and less likely to exhibit hyperactivity. Children in the second cluster had low scores on both engagement measures, but they had more extreme scores on the measure of global trait engagement. These children were younger on average and were more likely to be second language learners and high in hyperactivity. Children in the third cluster had high global engagement and low observed engagement. Second-language learners were more likely to be in this cluster. Children in the fourth cluster had an average level of engagement on both engagement measures. Children in the fifth cluster had high observed engagement but average global engagement. Children high in hyperactivity were more likely
to be in this cluster whereas second language learners were less likely to be included in this cluster.

Overall, children high in hyperactivity tended to be in clusters with higher momentary engagement than global engagement, whereas children with SLL status were overrepresented in clusters with lower momentary engagement.

3.5. Additional analysis

While extracting data for Paper II, a trend was noticed where intervention studies seemed to be more likely to rely on non-established observational measures of child engagement. To investigate if the identified methodological variations in the child engagement measurement were indeed related to the study design, associations between the study design and measurement methods were examined using contingency tables and chi-square tests of independence ($\alpha = .05$).

Identified correlational and intervention studies were included in this analysis. In comparison to correlational studies, intervention studies were more likely to rely on observational assessments of children’s engagement than on the child engagement questionnaires, $\chi^2(1, N = 243) = 23.33, p < .001$. Intervention studies were also less likely to rely on established measures of engagement in comparison to correlational studies, $\chi^2(1, N = 255) = 43.71, p < .001$.

The great majority of intervention studies relied on observational measures of child engagement, and two-thirds of correlational studies relied on observational measures. Whereas the majority of the correlational studies relied on established measures of child engagement, only about a third of intervention studies relied on established measures of child engagement. More detailed results are presented in Table 1.
### Table 1

**Study design and the method of child engagement measurement**

<table>
<thead>
<tr>
<th>Study Design</th>
<th>Correlational Studies</th>
<th>Intervention Studies</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Establish measure</td>
<td>116 (77%)</td>
<td>38 (36%)</td>
<td>154 (60%)</td>
</tr>
<tr>
<td>Observational measure</td>
<td>100 (70%)*</td>
<td>95 (95%)*</td>
<td>195 (80%)</td>
</tr>
<tr>
<td>Total</td>
<td>150</td>
<td>105</td>
<td></td>
</tr>
</tbody>
</table>

*Note.* Studies in which more than one measure of child engagement was implemented were grouped as studies using citable measures if at least one of the implemented measures was citable. *Studies where both observations and questionnaires were used to measure children’s engagement were excluded from this analysis due to a low number of such studies (n = 11).
4. Discussion

In this thesis, the concept and measurement of young children’s engagement in ECEC settings was investigated in two empirical studies and two literature reviews. The new knowledge gained through the encompassed findings includes a proposed differentiation between the constructs of young children’s preschool engagement and school engagement, implications for conceptualization and corresponding operationalization of children’s preschool engagement, an overview of associations between different measurements of children’s preschool engagement, and implications for research about children’s preschool engagement.

4.1. Comparison of child engagement in ECEC to school engagement

Results of the first study indicated that the chosen measures of child engagement in preschool and school assess the same concept. The correlation between children’s scores on the two engagement measures, CEQ and EEL, was very high. Results from the second literature review (Paper III) moderated these findings as it is common that questionnaires rated by the same informants correlate highly even when they assess nominally different aspects of engagement, and even other related constructs (e.g., engagement and inattention; Bierman et al., 2008; Nix et al., 2013). A comprehensive overview of the literature (Paper II) shows that conceptualizations of preschool engagement differ from conceptualizations of school engagement.

The most salient distinction between the concepts of preschool engagement and school engagement is the focus on behavioral aspects when defining and measuring the former, and the explicit inclusion of internal aspects of cognition and emotions in the latter (Paper II). Engagement of young preschool children is typically defined as behaviors and interactions with social and physical environments. Positive emotions and investment of cognitive effort are mentioned in operational definitions of involvement, whereas in definitions of children’s preschool engagement, they are
“translated” to observable behaviors. Whereas this might be necessary for an objective operationalization performed by a teacher or external observer, it also leads to reducing the concept of child engagement to what can easily be observed. Internal experiences of engagement are typically left out when measuring children’s engagement in preschool. From a disability research perspective, understanding children’s experiences is crucial for supporting their participation, and simplifying child engagement to observable behaviors is problematic.

School engagement, which is sometimes of interest in more mature ECEC groups (e.g., academically oriented kindergartens), encompasses both overt behaviors and the internal experiences related to cognition and emotions. Internal experiences are a crucial aspect of school engagement, and they are often assessed by self-reports. In young children, self-reports are less common and no quantitative self-report measures of child engagement were identified in our review. The lack of available options for measuring internal aspects of children’s engagement in preschool might be a reason for neglecting them, both in conceptualizations and in the measurement of children’s preschool engagement, as concepts we cannot measure are left out of quantitative studies. An additional reason for this might be that researchers assume young children’s internal experiences will reflect in their behaviors. On one side, this is to be expected given that young children typically possess fewer regulatory abilities compared to older children (McClelland et al., 2015). School-aged children may be motivated and capable of behaving in a socially desirable way when demands conflict with their needs and wants (Skinner et al., 2009). More mature school-aged children have better self-control, and they may adapt to social requirements and behave as highly engaged even when they aren’t internally motivated to do so (McClelland et al., 2015; Montroy et al., 2016). Depending on the demands in ECEC environments, young preschool children might not have the same experiences of dissonance between emotional, cognitive, and behavioral aspects of engagement as school-aged children do (Skinner et al., 2009), but this question deserves further investigation.

In the Swedish preschool class (Paper I), school engagement seems to include behavioral and emotional aspects, with some overlap between the two factors. It was concluded that the distinction between behaviors and emotions might
be more prominent in older children for whom this questionnaire was originally developed. Surprisingly, the same questionnaire in grade six didn’t confirm the differentiation between emotional and behavioral engagement (Ritosa, 2022). It may be that self-reports are required to gain a valid insight into internal aspects of child engagement, both in ECEC and in school settings. It would be valuable to further investigate the relationships between internal and external aspects of engagement in younger children, but this requires developing more appropriate engagement measures adapted to young populations.

Another distinction between child engagement in ECEC and school engagement reflected in conceptualizations and operationalizations of engagement, is the assumed temporality of engagement (Paper II). The literature review shows that in studies of young children’s engagement, the researcher’s interest is mainly in children’s behaviors and interactions with social and physical environments. Observations are mainly used to investigate this. I’d like to argue that this understanding of engagement as behaviors and interactions with the social and non-social aspects of the environment can be described as state engagement and it corresponds to what Imms et al. (2017) described as person-level engagement, e.g., a state of focused attention. Engagement can also be seen as a more permanent agreement or commitment, e.g., as a stable socioemotional relation towards the educational environment, or a positive attitude and enjoyment in a specific activity. Such stable aspects of engagement are mainly assessed via teacher surveys in older preschoolers (Paper II) or self-reports in the literature on school engagement (Fredricks et al., 2004). An example of such a questionnaire is the School Liking and Avoidance Scale (SLAQ; Ladd & Price, 1987; Smith, 2011). Stable aspects of engagement correspond to Finns’ (1989) conceptualization of school engagement which includes feelings of belonging and participatory behaviors. These more stable aspects of engagement appear to be relevant during the kindergarten age, just before children begin formal schooling, and are more likely to be included in the measures of school engagement (Paper II). This aligns with engagement at the micro level, as described by Imms et al. (2017), emphasizing the connections between individuals and their immediate contexts. For school-aged children, these connections may include academic
learning, extracurricular activities, and social connections with teachers and peers (Skinner & Pitzer, 2012).

Given the identified differences between school engagement and the engagement of young children in dimensionality and temporality, it is valuable to further explore the concept of engagement in the context of ECEC as a distinct concept.

4.2. Concept of child engagement in ECEC

The findings from the literature review (Paper II) confirm the central role of child engagement in early childhood research, where engagement is seen as a mediator between environmental changes and a child’s development. While the theoretical connection with Bronfenbrenner’s bio-ecological systems theory (Bronfenbrenner & Ceci, 1994) is often not explicit, the way child engagement is defined and studied reflects the understanding of engagement as a proximal process that is dynamic, can be promoted by the environment, and leads to learning.

When studying young children’s engagement, the focus is typically on children’s behavior and their interactions with social and physical aspects of the environment (Paper II). Behaviors and interactions that constitute child engagement are sometimes described as specific observable behaviors but may also be described as appropriate, meaningful, and leading to learning. Such vague operationalizations leave freedom to researchers to adapt the engagement measures to their context, but can negatively reflect on the objectivity of the child engagement measure.

What makes an interaction and behaviors appropriate and meaningful will necessarily depend on the child and the context (Almqvist et al., 2007). Therefore, a more precise universal definition of child engagement might be unattainable. Recognizing engagement as a process that leads to learning implies that the definition of child engagement will depend on what is considered to be relevant learning in a certain cultural and educational context. In ECEC settings, learning can be defined in many ways, as it is not necessarily tied to academic knowledge. Developing motoric, emotional, and
social skills can be considered major tasks of childhood, and learning how to understand the world can take many forms, many of which are unrelated to academic tasks. How much focus the ECEC settings have on academic tasks will likely influence what is considered learning and reflect on what is considered relevant for defining and measuring child engagement. Not all ECEC environments will recognize the same behaviors as engagement (Coelho et al., 2021). While some researchers equate engagement with being on-task in an academic context, others see possibilities for learning and engagement in free play, explorative activities, and socializing. Compliance with given tasks and passive engrossment in captivating materials are other examples where ratings of engagement are likely not to match depending on the conceptualization and operationalizations of child engagement (Paper II, Kishida & Kemp, 2006).

Various definitions and measurements of child and school engagement reflect different assumptions about the temporality, and specificity or generalizability of child engagement. This is not surprising considering the complexity of the construct and the ambiguity of the word engagement. As discussed in the introduction, engagement can be studied as a momentary state and as a trait-like tendency of a child. The two conceptualizations aren’t necessarily exclusive in theory, as it is possible to see engagement as both a state and a trait. One can assume that, over time, the accumulation of experiences can shape into habitual responses or behavioral patterns, which can be perceived as a behavioral tendency within a certain context. While the role of the environment is recognized both in early childhood research on engagement and in the research on school engagement, identified approaches to measurement in Paper II indicate that implicit assumptions about the temporality of engagement differ between the two traditions. In young preschool children, observations are a dominant method for measuring engagement, and engagement is most often defined as behaviors and interactions. This indicated that preschool engagement is understood as more dynamic and malleable than school engagement. This might be due to the interventionists’ perspective being more prevalent in early childhood research. The malleability of engagement is precisely what makes it an attractive goal in intervention research (Dunst et al., 2001).
In ECEC environments primarily focused on the development of academic skills, particularly within kindergarten classes in the US, the concept of child engagement may be conceptualized as a generalized aptitude of a child (Paper II). Such engagement is related to children's personal attributes, including self-regulation skills (Williford et al., 2013), and social skills (Diebold & Perren, 2022). Children who are better at finding and creating opportunities for engagement will be more engaged across different contexts.

In conclusion, researchers need to recognize their assumptions about temporality and generalizability of engagement to make more sensible decisions when defining and operationalizing engagement.

4.3. Measuring child engagement in ECEC

The measurement method should fit the aspects of the studied behavior (Bakeman and Gniisci, 2006). For measuring engagement, it is important to have measures that correspond to definitions of engagement. In Paper II, a list of 77 identified measures of child engagement in ECEC is provided in Table 4. Other identified measures of child engagement could not be cited as they were scantily described without providing further references. The majority of the identified child engagement measures were observations by external observers. Observations are suitable for studying child behaviors, but short observations are deemed arbitrary for assessing stable traits (Neyer, 2006). This implies that the dominant research interest is in engagement as a behavior. Teacher questionnaires were the second most common method for measuring child engagement, frequently utilized in the correlational studies of child engagement. No self-reports were identified for measuring the engagement of young children, only adaptations of school engagement questionnaires that were suitable for children in US kindergarten settings.

Child engagement conceptualized as a general aptitude of a child may be relevant in academic settings. Identifying and characterizing stable traits and abilities could be more strongly linked to future outcomes, as implied in Paper III, where survey assessments of child engagement exhibited more robust associations with children's social competencies and the quality of teacher-child interactions than direct observations of engagement. However, there is a
risk that while intending to measure child engagement, a broader spectrum of abilities is captured in measures assessing such stable aspects of children’s functioning (Finn and Zimmer, 2012).

Since child engagement is usually not described as a stable latent trait but a more dynamic process happening in the interaction between the child and the environment (Paper II), it can be questioned if the psychometric approach is suitable for assessing the engagement of young children (Fava & Belaise, 2005). If intraindividual changes in engagement are expected to take place over time, methods for assessing engagement must be sensitive to intraindividual change (Schmitt, 2006). Observations might be more suitable for this, as well as questionnaire measures developed to be sensitive to change (Paper III). Interestingly, whereas repeated observations allow for a comparison of engagement across different contexts, it is common to summarize and average short observations to obtain one engagement score per individual (Paper II). This practice should be questioned as, according to Paper IV, averaging several observations barely approaches a trait-like general engagement score.

Measures of young children’s engagement were often contextualized (Paper II). It was common that measures of engagement are intended only for a specific activity (e.g., child engagement in play, reading, or music). Some general child engagement measures contained subscales differentiating between different contexts the child can engage with (e.g., engagement with peers, teachers, and tasks in InCLASS; Downer et al., 2010). Assessing engagement in children across different contexts aligns with the clinimetric perspective (Feinstein, 1983), suitable when dealing with a construct that encompasses a combination of attributes across distinct contexts that may not necessarily be correlated with each other. Excelling in one domain of engagement may not necessarily predict high performance in another. Depending on the study’s purpose, researchers can choose whether to integrate child engagement indicators across domains into a composite score or analyze them as distinct indicators of engagement. The development of clinimetric scales to measure child engagement in different contexts may necessitate careful consideration and planning to ensure a comprehensive inclusion of all relevant domains for child engagement in preschool.
Achieving a comprehensive assessment of child engagement in preschool is sometimes attempted by utilizing multiple methods. Measuring engagement with multiple methods typically involves observations of momentary engagement and questionnaires of general child engagement (Paper III). They are often in low correlations. Investigation of these two sources about engagement with a person-oriented perspective (Paper IV) indicated that these two methods tap into qualitatively different aspects of engagement, as most children show discrepancies between their average observed engagement and general engagement scores. Whereas discrepancies between measures of engagement might present a problem for synthesizing engagement research, a variety of measures available is valuable for capturing all the relevant aspects of engagement.

4.4. Associations between different child engagement measures

After investigating associations between engagement measures in studies where multiple measures were used (Paper III), the conclusion is that measures that rely on the same method and informant are typically in high correlation even if they nominally assess different aspects of engagement, whereas measures that rely on different informants and methods of assessment (e.g., observations and teacher questionnaires) are typically in low to moderate correlations. This corresponds to findings from both empirical studies included in this thesis, where high correlations were identified between measures of global child engagement and school engagement when teachers reported about both (Paper I), and low correlations were identified between a teacher-reported global engagement and observed momentary engagement (Paper IV).

Observed and teacher-reported engagement scores may be discrepant due to subjectivity involved in teacher-rated engagement and teacher bias (Meissel et al., 2017), limited observational periods, and observer effects (Monahan & Fisher, 2010). However, discrepancies between the two methods of child engagement measurement have been consistently reported (Paper III) and in Paper IV, we concluded that observations and questionnaires capture
qualitatively different aspects of child engagement. Averaging observations of state-like engagement does not provide the same picture of child engagement as asking a person well familiar with the child to rate their engagement. Child engagement is a complex multifaceted construct, and it can be valuable to have access to different measures of child engagement that don’t correlate with each other since they can inform us about different aspects of child engagement, can be used for different purposes, and be combined when needed. However, when summarizing findings about child engagement, it is important to have in mind potential biases and know that the findings will depend on the choice of method of measurement.

High correlations between engagement measures that rely on the same informant and method, on the other hand, indicate a risk for common method variance in engagement research. Studies relying solely on questionnaires are particularly vulnerable to spurious and inflated associations due to this methodological issue (Podsakoff et al., 2003).

By considering these methodological challenges, researchers and educators can better understand the limitations and potential biases involved in the measurement of child engagement. This understanding can lead to the refinement of assessment methods, and hopefully, it can result in a more comprehensive understanding and measurement of child engagement in ECEC and other settings.

4.5. Implications for research

Operationalization of child engagement should be carefully considered. Approaches to defining and measuring children’s engagement will inevitably vary depending on the specific cultural and educational context. It is thus essential to provide clear descriptions and justifications for the chosen measures of child engagement to facilitate comparability of findings with other research endeavors. Reflecting on one's cultural values and understanding of learning and engagement, as well as acknowledgment of alternative views, might motivate researchers to elaborate their methodological decisions related to the measurement of child engagement.
The choice of engagement measure will also inevitably depend on the study purpose. As indicated in Paper III, the traditional psychometric properties of measures seem more relevant for investigating associations between engagement and other variables. For evaluating interventions and investigating environmental conditions for engagement, on the other hand, it is essential to use measures sensitive to change. Observational measures of child engagement in preschool are more likely to be implemented in intervention studies.

It is important to note that sensitivity to change can also be a characteristic of questionnaire measures and sensitivity to change can be examined for the questionnaire as a whole and for questionnaire items individually (Vermeersch et al., 2000). Further investigation of item sensitivity to change in the measures of child engagement would be a valuable contribution for researchers studying engagement to evaluate interventions.

Both empirical studies showed skewed distributions of engagement scores on questionnaires of engagement with most children scoring highly (Paper I, Paper IV). This may partly be explained by response biases typical for psychometric assessment which include socially desirable responding, acquiescent responding (agreeing with statements), and tendencies towards extreme responding (Kreitchmann et al., 2019). While it is plausible that these response biases contribute to the skewed distributions of engagement scores, it is important to acknowledge that we didn’t investigate this. Nevertheless, regardless of the underlying causes, the presence of low variations in engagement scores is problematic. This lack of variability can hinder the identification of meaningful associations between engagement and other variables of interest. For example, in a longitudinal study by Kaar (2022), no significant associations were found between preschool engagement measured by CEQ and later school engagement and achievement. Low variations in engagement scores were one of the potential explanations for the lack of expected associations. Thus, selecting measures that differentiate well between children on the high engagement spectrum is important for obtaining accurate and informative results in correlational analyses.
Furthermore, engagement has been associated with many child characteristics, and engagement questionnaires might inadvertently capture more than just engagement (Finn & Zimmer, 2012; Ritosa, 2022). One should be careful not to confound other traits of the child in the measurement of child engagement. Since this might be challenging, controlling for variables such as cognitive abilities, social skills, and self-regulation is desirable in variable-oriented research.

Whereas child engagement measures that focus on behaviors provide opportunities for objective assessment, it is equally crucial to capture the subjective experience of engagement. As highlighted by Whiteneck and Dijkers (2009), in adults, subjective aspects of participation are more closely related to life quality than objective measures alone. Merely observing high levels of engagement or engagement in numerous activities may not necessarily correspond to a genuine sense of belonging and fulfillment. Since there is a lack of engagement measures adapted to young children, their subjective experience of engagement is rarely investigated. To advance the field of child engagement research, more effort should be put into the development of self-report measures specifically designed for young children. Measures should encompass personal preferences and allow children to express their perspectives on their engagement in ECEC. It is essential to incorporate children's perspectives and actively involve them in the process of item development, fostering a collaborative research approach. A notable example from the school context is the work of Wang et al. (2019), where exploratory interviews with school children led to the creation of engagement and disengagement scales.

When it comes to observing child engagement, certain challenges and considerations merit attention. Observations inherently position children as passive participants, which can potentially introduce bias or misinterpretation (Clark, 2010). To enhance the validity of observers' ratings, it may be worthwhile to incorporate a feedback loop involving the children themselves. Seeking feedback from the children about whether their behaviors and emotional states have been accurately interpreted can help ensure the accuracy of the observations. However, this added step could potentially make observations more time-consuming, particularly in settings with multiple
children to monitor, and further complicate the ethical approval procedures related to having children as research subjects (Singh, 2007).

Furthermore, it's essential to recognize that observations, while valuable for capturing dynamic aspects of engagement and exploring how engagement fluctuates in response to environmental changes, are often summarized and averaged into one engagement indicator for each child (Paper II). While this aggregation simplifies data analysis and reporting, it might obscure valuable nuances in individual engagement patterns. Therefore, researchers should carefully consider the value of observational measures and assess the trade-offs between the frequency and the duration of observations, to ensure that the data collection method aligns with their conceptualizations of engagement, specific research purpose, and practical constraints of the study environment.

4.6. Practical implications

Most children score very highly on general engagement questionnaires (Paper I, Paper IV). Whereas engagement questionnaires used in empirical were not good at differentiating between children that score highly due to the ceiling effect, low scores of the minority can indicate they experience problems in everyday functioning due to various reasons. Measuring global engagement can thus be seen as a screening procedure for identifying children who are at risk of falling behind their peers, need support, and could benefit from an early intervention. Such a measure would be valuable for identifying children who may go ‘under the radar’ if they don’t have an established diagnosis and aren’t causing obvious problems in the group (Åström & Almqvist, 2022). For example, it is common that children who show internalized behavioral problems receive less support from teachers in comparison to children with externalized behavioral problems (Henricsson & Rydell, 2004). Also, children high in hyperactivity who show low engagement have worse long-term outcomes in comparison to highly hyperactive children who show high engagement (Sjöman et al., 2016). Low engagement has been associated with many risk factors, such as low cognitive or social skills, problems in executive functions, and disability status (Brock et al., 2009; Lillvist, 2010). Some “at-risk” children are highly engaged (Paper IV) and there may be other numerous
reasons why a child might be unengaged, some of which might go unnoticed. Identifying children who show stable low engagement is important for adapting the environment to their abilities and needs and in this way supports their learning and development. While we didn’t determine any norms for worrisome engagement scores in our studies, it would be meaningful to investigate this further.

Observations of child engagement, on the other hand, show more variety between children (Paper IV). Observations may also provide information about intraindividual fluctuations in engagement, shedding light on the varying degrees of stability in engagement levels among individual children. For instance, some children may exhibit a relatively stable level of engagement, demonstrating a consistent and predictable response across different contexts. On the other hand, other children might display a higher sensitivity to contextual factors, resulting in more pronounced fluctuations in their engagement levels, showcasing the dynamic nature of their responsiveness to different situations. However, it is worth noting that existing research tends to emphasize average engagement scores rather than delving into the nuances of intraindividual engagement dynamics. There appears to be a gap in the literature regarding the exploration of individual variations in engagement and their sensitivity to contextual influences, highlighting the need for further studies that investigate the dynamic nature of engagement within individuals, particularly in diverse contextual settings. Observations can also be used to inform about contextual factors that support or hinder the engagement of individual children and whole groups (Paper II, Paper III). By observing child engagement across different contexts and tasks, one can detect personal preferences and potential challenges or deficits of individual children, as well as environmental barriers and facilitators of individual and group child engagement. Early identification of difficulties, challenges, and barriers to engagement is crucial for timely intervention that can prevent long-term negative consequences of low engagement.

Observations of child engagement can also be useful for planning targeted interventions. The malleability of engagement is precisely what makes engagement an attractive goal in intervention research (Dunst et al., 2001). Observations of engagement are more likely to be used in intervention studies
and they seem more suitable for capturing changes in engagement level (Paper II & Paper III). Depending on the intervention efforts, changes in child engagement might be only related to a certain context (e.g., engagement with specific material, engagement in peer interactions, engagement in play, etc.; Paper II; Kishida & Kemp, 2006), and in such instances, it would be useful to use measures that differentiate between specific contexts.

There is no guarantee that observed changes in momentary engagement lead to permanent changes in behavior (Bailey et al., 2017). Whereas interventions should ideally strive to change a stable pattern of behavior, most measures of global or trait engagement might be developed with test-retest reliability in mind and not be sensitive to intervention changes. When evaluating interventions, it is important to use measures that are valid, and sensitive to change (McConachie, 2015). In Paper III, two questionnaire measures developed specifically for evaluating interventions were identified and they captured the intervention effects (Downer et al., 2018; Nix et al., 2013).

In summary, questionnaire measures sensitive to changes in engagement can be useful for assessing short-term and long-term overall effects of interventions, while observations of engagement can be used to compare engagement levels across different conditions, in relation to various contextual factors e.g., physical environment or instructional strategies.

4.7. Limitations

Paper I was based on a pilot study with a relatively small sample which may be considered insufficient by modern standards. Whereas no power analysis was conducted prior to determining the sample size, the decision was made based on minimal criteria present in the literature where the sample size for factor analysis should be three to six times bigger than the number of variables (Mundfrom et al., 2005).

In the same paper, we intended to investigate how teachers understand the items and whether they find them relevant for assessing the school engagement of the children they teach. By providing more prompts during cognitive interviews, we might have obtained richer information and feedback
from the teachers. However, since we didn’t have any hypothesis about specific items before the interviews and our intention was mainly exploratory, teachers were only asked general questions about their impressions of the questionnaire after filling out the questionnaire while thinking aloud.

Literature review studies were based on a literature search for quantitative studies since our interest was in the measurement of child engagement, and the purpose of Paper II was to investigate the operationalization of child engagement in ECEC in quantitative studies. However, the concept of child engagement might be depicted differently and in a more comprehensive way in qualitative studies. Whereas we acknowledge that qualitative studies could provide immense value when studying young children’s engagement in ECEC, it was out of the scope of the current review to include those when investigating the conceptualization of child engagement.

Both empirical studies reported in Paper I and Paper IV were planned, and data collections were conducted prior to the literature review. For this reason, the selection of measurement methods in empirical studies was not influenced by insights gained from the review. Since we concluded that the choice of measurement method and instrument might influence research findings, it would be valuable to investigate if relying on other questionnaires and observational measures would lead to results congruent with those obtained in Paper I and Paper IV. This investigation would provide valuable insights into the robustness and generalizability of our findings.

5. Conclusions

Young children’s engagement in preschool is dominantly defined as a child’s behaviors and interactions with a physical and social environment. Values and attitudes about childhood, development, learning, and the role of early education and care programs, will determine what behaviors are considered appropriate for children to be engaged in, and consequently, how child engagement is defined and operationalized in research. In preschool-aged children, quantitative self-report measures for assessing internal aspects of
engagement are scarce, potentially contributing to their oversight in both conceptualization and measurement of preschool engagement.

Researchers should be aware of discrepancies in engagement scores obtained through different measurement methods, e.g., observations and teacher reports. Different measures of child engagement can be used for different purposes and be combined as indicators of different aspects of child engagement. Observations are suitable for observing dynamic changes in engagement across contexts and evaluating and tailoring interventions to address individual needs and foster positive engagement experiences. General engagement assessed through comprehensive teacher surveys provide an insight into a children's everyday functioning which is useful for screening purposes and identifying children who show stable low engagement and could benefit from early interventions, regardless of other difficulties that may or may not be identified.

6. Brief summary in Swedish / Svensk sammanfattning


andra studien är en översiktlig litteraturgenomgång som utforskar hur barns engagemang konceptualiseras och operationaliseras inom forskning inom förskolemiljöer. I den tredje studien, en litteraturöversikt, identifierades ett antal studier som använde två eller fler mätmetoder för att mäta barns engagemang. I en fördjupad granskning utforskades hur multimetodmätning av barns engagemang använts inom förskolemiljöer och vilka samband som finns mellan olika mätmetoder för barns engagemang. Slutligen gjordes en profilanalys av observerat engagemang och globalt engagemang i en grupp förskolebarn i Sverige. Syftet var att undersöka variationer i engagemangssprofiler.

Resultaten visar att observationer är den dominerande metoden för att mäta unga barns engagemang inom förskolan, medan lärarenkäter främst används för att bedöma akademiskt engagemang i förskoleklasser i USA. Självrapporter där unga barn kan rapportera om sitt eget engagemang är extremt sällsynta. Barns engagemang kan bedömas som lågt eller högt, antingen som en närvarande eller frånvarande kategori, eller som en variabel som kan beskrivas kvalitativt och kategoriseras i ömsesidigt exklusiva kategorier. Olika typer av bedömningar kan även hittas inom samma studie.

Även om vi fann en stark korrelation mellan barns engagemang och skolengagemang i den svenska förskoleklassen, vilket tyder på att dessa konstruktioner är mycket lika, indikerar litteraturöversikten att konceptualiseringen och mätningen av skolengagemang och engagemang hos unga barn i förskolan skiljer sig åt på flera sätt. Unga barns engagemang är främst associerat med beteenden och ses som kontextuella, medan skolengagemang inkluderar interna aspekter och kan ses som en stabil tendens eller till och med som en egenskap hos barnet. Resultaten från de empiriska studierna och den fördjupade litteraturgenomgången visar att lärarenkäter om barns engagemang, även om de nominellt bedömer olika aspekter av engagemang, tenderar att korrelera högre än frågeformulär och observationer av barns engagemang. Detta indikerar att frågeformulär och observationer av barns engagemang berör kvalitativt olika aspekter av vad som anses vara engagemang.
Lågt globalt engagemang hos barn är sällsynt och indikerar förmodligen fler problem med funktion än lågt observerat engagemang. Å andra sidan kan högt observerat engagemang indikera barnets potential för högt engagemang inom en viss kontext, delvis oberoende av barnets globala engagemang. Observationer av barns engagemang är känsligare för förändringar som följer på insatser, medan lärarbedömte globalt engagemang fungerar som en starkare prediktor för barnens framtida akademiska och sociala kompetenser.
References


Farran, D. C., & Anthony, K. (2014). *Child observation in preschools (COP).* Unpublished instrument, Peabody Research Institute, Vanderbilt University, TN.


Nix, R. L., Bierman, K. L., Domitrovich, C. E., & Gill, S. (2013). Promoting children's social-emotional skills in preschool can enhance academic and


Singh I. (2007). Capacity and competence in children as research participants. Researchers have been reluctant to include children in health research on the basis of potentially naive assumptions. *EMBO reports, 8*(1), 35–39. https://doi.org/10.1038/sj.embor.7401018


and Care, 186(10), 1649-1663. https://doi.org/10.1080/03004430.2015.1121251


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Xia, Y., & Yang, Y. (2019). RMSEA, CFI, and TLI in structural equation modeling with ordered categorical data: The story they tell depends


Measurement of Child Engagement in Early Childhood Education and Care

Child engagement is a complex construct, popular in educational, early intervention, and disability research areas. This dissertation investigates the conceptualization and measurement of child engagement in early childhood education and care (ECEC) settings. The findings were derived from a validation study of a child engagement questionnaire, two literature reviews about child engagement measurement in ECEC, and an empirical study investigating engagement profiles of preschool children.

The findings indicate that the concept of child engagement in ECEC differs from school engagement, with a focus on behavioral aspects in ECEC settings. The measurement of child engagement in ECEC often relies on observations and teacher questionnaires, with observations capturing momentary engagement and questionnaires assessing general engagement. Different measures of child engagement show varying levels of correlation, with measures relying on the same method and informant exhibiting high correlations. Findings highlight the need for more comprehensive and context-specific measures of child engagement and self-reports where children can express their experiences of engagement. Researchers should consider the temporality and generalizability aspects of child engagement and choose measures that align with their understanding of the child engagement concept.