

Kristiina Kurki

YOUNG CHILDREN'S EMOTION
AND BEHAVIOUR REGULATION
IN SOCIO-EMOTIONALLY
CHALLENGING SITUATIONS

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KRISTIINA KURKI

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Abstract

This dissertation focuses on young children's emotion and behaviour regulation in educational settings. The purpose is to explore its emergence in socio-emotionally challenging academic and social activities in order to understand the contributing individual and interactional factors. The dissertation consists of three studies conducted in two contexts, a classroom and an open day-care. The results are reported in three empirical articles. *Study I* explored children's strategic activities and success in regulating emotions in challenging classroom situations. *Studies II* and *III* were performed in a day-care context. *Study II* focused on teachers' perspectives and investigated their use of co-regulation strategies in challenging situations and their awareness of their strategy use. Finally, *Study III* investigated children's use of emotion and behaviour regulation strategies in these same situations and the composition of children's strategic activities in interaction with teachers and peers. Data were collected using video observations, video-stimulated recall interviews and the questionnaire assessing children's social competence.

The results indicate that the children use various emotion and behaviour regulation strategies in socio-emotionally challenging situations. In the day-care context, their strategies were mostly focused on regulating the environment, whereas in the classroom context, their strategies, especially among the more socially skilled children, were focused on regulating themselves. As well, the teachers' co-regulation strategies were focused more on children's activities than their emotions. Moreover, the study indicates that children's regulatory interactions are affected not only by their different skill levels but also by peer interactions and teachers' involvement. The study results contribute to the understanding of young children's processes and abilities to regulate emotions in everyday challenges in educational settings and, thus, increase awareness of how teachers can support these regulatory processes.

Keywords: co-regulation, emotion regulation, socio-emotional challenges, video observation, young children

Kurki, Kristiina, Pienten lasten tunteiden ja käyttäytymisen säätely sosio-emotionaalisesti haasteellisissa tilanteissa.

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Tiivistelmä

Tässä väitöstudiumuksessa tutkitaan päiväkotii- ja peruskouluikäisten lasten tunteiden ja käyttäytymisen säätelyä koulussa ja avoimessa päiväkodissa. Tavoitteena on selvittää erityisesti, miten lasten tunteiden ja käyttäytymisen säätely ilmenee oppimiseen tai sosiaaliin tilanteisiin liittyvissä sosio-emotionaalisissa haasteissa ja ymmärtää lasten tunteiden ja käyttäytymisen säätelyyn vaikuttavia yksilöllisiä ja vuorovaikutuksellisia tekijöitä.

Tutkimus toteutettiin kahdessa kontekstissa: peruskoulussa ja avoimessa päiväkodissa. Se koostuu kolmesta empiirisestä osatutkimuksesta, joiden tulokset on raportoitu kolmessa artikkelissa. *Osatutkimuksessa I* selvitettiin millaisia sosio-emotionaalisia haasteita lapset kokivat peruskoulun luokkahuonetilanteissa ja miten he käyttivät tunnesäätelystrategioita näissä tilanteissa. *Osatutkimus II* tutki, miten opettajat säätelivät lasten tunteita ja käyttäytymistä haasteellisissa tilanteissa avoimessa päiväkodissa ja miten tietoisia he olivat käyttämistään strategioista. *Osatutkimus III* selvitti puolestaan, millaisia säätelystrategioita lapset käyttivät samoissa sosio-emotionaalisesti haastavissa tilanteissa. Osatutkimus selvitti myös, miten lasten käyttämät strategiat olivat yhteydessä vuorovaikutukseen opettajan ja ikätoverien kanssa. Tutkimuksen aineistona käytettiin video-taltiointeja autenttisista koulu- ja päiväkotitilanteista, opettajille järjestettyjä videostimuloituja haastatteluja ja lasten sosiaalista kompetenssia arvioivaa kyselyä.

Tutkimustulokset osoittavat, että lapset käyttävät monenlaisia tunne- ja käyttäytymisen säätelystrategioita haasteellisissa tilanteissa. Päiväkoti-ikäisten lasten säätelystrategiat pyrkivät enimmäkseen vaikuttamaan muiden toimintaan, kun taas kouluikäiset, erityisesti sosiaalisesti taitavat lapset, säatelevät haasteellisissa tilanteissa enemmän itseään kuin ympäristöä. Tulosten mukaan opettajat kohdistavat säätelystrategiansa haasteellisissa tilanteissa enemmän lasten toimintaan kuin heidän tunteisiinsa. Kaiken kaikkiaan tulokset osoittavat, että lasten säätelystrategioihin vaikuttavat sekä heidän omat taitonsa että opettajien aktiivinen puuttuminen ja vuorovaikutus ikätoverien kanssa. Tutkimus korostaa opettajan tuen merkitystä lasten tunteiden säätelyprosesseissa lasten koulun ja varhaiskasvatuksen arjessa.

Asiasanat: pienet lapset, sosio-emotionaaliset haasteet, tunteiden säätely, ulkoinen säätely, video-observaatio

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When my first child, Santeri, was born, I became interested in child development. I wanted to know how to best support my child in growing up to be a decent, happy human being and five children, years of University studies and a PhD later, this is where I am now.

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October 1st 2017

Kristiina Kurki

List of original publications

This thesis is based on the following publications, which are referred throughout the text by their Roman numerals:

- I Kurki K, Järvelä S, Mykkänen A & Määttä E (2014) Investigating children's emotion regulation in socio-emotionally challenging classroom situations. *Early Child Development and Care* 185(8): 1238–1254.
- II Kurki K, Järvenoja H, Järvelä S & Mykkänen A (2016) How teachers co-regulate children's emotions and behaviour in socio-emotionally challenging situations in day-care settings. *International Journal of Educational Research* 76: 76–88.
- III Kurki K, Järvenoja H, Järvelä S & Mykkänen A (2017) Young children's use of emotion and behaviour regulation strategies in socio-emotionally challenging day-care situations. *Early Childhood Research Quarterly* 41: 50–61.

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1 Introduction

In today's rapidly changing world, the environment in which children are growing up poses new challenges and standards for successful participation in society. In the 21st century, individuals must be increasingly flexible, active, responsive and able to deal with uncertainties in life. In addition to cognitive skills, social and emotional skills have been stressed as essential in today's society (Cunha & Heckham 2010). These skills are also increasingly recognised in educational settings, for example, in curriculum reform in Finland (Opetushallitus 2016a, 2016b).

Children's abilities to manage various challenges they face in life and particularly in educational contexts requires attention as earlier research shows that children and adolescents are especially vulnerable and affected by surrounding social and economic stressors (Parker *et al.* 2016, Shaw & Shelleby 2014), which often results in emotional and behavioural problems affecting their academic and social activities (*e.g.* Bishop *et al.* 2009). Studies indicate that a growing number of children and adolescents struggle with the overwhelming demands of the educational environments, even exhibiting signs of depression (Salmela-Aro *et al.* 2016, Tuominen-Soini & Salmela-Aro 2014). Also, in the PISA results, a great number of students score low in academic motivation and confidence measures, as well as measures of well-being in school (OECD 2016). Students' emotional, behavioural and motivational issues clearly need to be considered on multiple levels. The results of PISA 2012 school background questionnaire (OECD 2013), though, indicate that educational practitioners do not yet fully realise the importance of children's socio-emotional development. The educational field has a clear need for consistent, reliable knowledge about the social and emotional factors that affect children's abilities and possibilities to engage in enjoyable, effective social and academic activities.

A strong body of research shows that different levels of the ability to regulate emotions and behaviour begin to affect children's lives at early ages and can lead to different trajectories across the lifespan (Blair & Diamond 2008). Already in early years of children's lives, their ability to successfully form social relationships depends on how able they are to regulate their behaviour when interacting with others in school (Blair & Raver 2015, Denham *et al.* 2003, Trentacosta & Shaw 2009). Not only social relations but also academic activities require self-regulation skills. When facing frustrating and challenging learning situations, children need skills to regulate emotions and motivation during tasks in order to overcome the

obstacles in achieving their learning goals (Boekaerts 2011). These skills are at the core of the theoretical construction of self-regulated learning (SRL), which refers to the processes through which learners regulate their cognitions, affects and behaviours to attain personal goals (Zimmerman & Schunk 2011). Throughout the life course, self-regulation skills continue to affect individuals' life and those surrounding them in social relations, working life and life choices related to well-being (e.g. McClelland *et al.* 2015). It, therefore, is essential to understand how these skills develop and what practices most effectively promote learning them.

Children have inherent differences in the antecedents of self-regulation skills, such as temperamental dispositions, cognitive skills and underlying neural and physiological differences affecting the control system (Eisenberg *et al.* 2010, Fox & Calkins 2003, McClelland *et al.* 2015). Research, though, strongly supports the notion that self-regulation skills can be learned, practiced and taught (Blair & Diamond 2008, Pino-Pasternak *et al.* 2014). In particular, children's interactions at early ages are essential in the acquisition of a basis for self-regulation skills. In fact, self-regulation processes have been described as developing from strong external regulation mostly imposed by parents or teachers to more internalised processes within children (Bernier *et al.* 2010, Hofer 1994). Thus, everyday interactions are the context in which children acquire the foundation for learning to deal with frustrations and disappointments, internalising sophisticated ways of interacting with others and planning actions according to goals (Bodrova & Leong 2007, Colman *et al.* 2006, Fox & Calkins 2003, Gallimore & Tharp 1990, Perry & Rahim 2011, Wertsch *et al.* 1980).

Many children spend much time in day-care and school with professional educators during their early years. In educational settings, teachers play crucial roles in students' wellbeing, including fostering their ability to regulate their motivation and emotions (Boekaerts & Pekrun 2015, Fried 2011). When children encounter social or learning challenges in educational settings, teachers can model, support and coach children in understanding their own and others' emotions, regulate their emotional experiences and expressions and interpret the situation and others' intentions to solve and overcome challenges (Boekaerts & Pekrun 2015, Denham & Kochanoff 2002). Thus, teachers have the potential to support children's development into self-regulated learners who possess a good repertoire of skills to manage the academic and social challenges they face. However, a more precise understanding of what kind of support or co-regulation by teachers is beneficial for children's developing self-regulation is needed. Previous research has found links among different types of parenting, educational practices and children's self-

regulation behaviours. Particularly parents' and educators' negative (authoritarian, punitive and neglecting) interaction styles have been shown to have negative consequences for children's skills to regulate their emotions and behaviour (Jones *et al.* 2002). Positive, sensitive and responsive interactions with parents and educators, in contrast, seem to foster children's learning of controlling their emotions and behaviour (Fox & Calkins 2003, Hamre & Pianta 2005, Rimm-Kaufman *et al.* 2009) and to encourage children to actively regulate their learning processes (Pino-Pasternak *et al.* 2014).

Previous studies related to young children's self-regulation have primarily explored the connections of general self-regulation skills (*e.g.* Howse *et al.* 2003, Penela *et al.* 2015) with the overall qualities of interactions (*e.g.* von Suchodoletz *et al.* 2011), whereas research focused on authentic regulatory interactions in educational settings is scarce (Whitebread & Pino-Pasternak 2013). More process-oriented research is needed to investigate in which particular situations regulation skills are activated and how regulation processes are supported by teachers. Knowledge of these everyday processes is essential for further understanding how support can be provided in a way that it not only ensures that children overcome challenges in order to continue social and learning activities but also offers children opportunities to expand and exercise their self-regulation strategy repertoire and improve abilities to accurately interpret situational cues.

This dissertation adds to previous research by exploring children's emotion and behaviour regulation strategies, the ways that teachers affect children's regulation processes and how they co-regulate children in socio-emotionally challenging, authentic educational situations. The dissertation describes how regulation processes of both children and teachers occur and are affected by different factors. *Study I* focused on the classroom activities of 6–9-year-old children and explored socio-emotionally challenging situations in the educational context of a Finnish primary school. Video analysis of challenging situations was used to examine the challenges children faced and the emotion regulation strategies they used in these situations. *Studies II* and *III* used video analysis to investigate the authentic socio-emotionally challenging situations of 2–5-year-old children and their teachers in a Finnish open day-care setting. *Study II* examined how teachers used co-regulation strategies to regulate children's emotions and behaviour in challenging situations and whether teachers were aware of the strategies they used. *Study III* analysed interactions in challenging situations from children's perspective of how they regulated their behaviour, emotions and the situation and how interactions with peers and teachers affected their strategy use. In addition to these specific strategies,

Study III explored whether 2–5-year-old children showed signs of the ability to monitor their behaviour and its success in challenging situation and to change their actions to meet situational demands.

Methodologically, this dissertation primarily relies on video analysis, considered to be a reliable way to explore young children’s psychological processes (Whitebread *et al.* 2009, Whitebread & Pino-Pasternak 2013). Focusing the research on authentic educational settings makes it possible to detect children’s and teachers’ regulation processes as they occur in reality rather than in an artificial, controlled environment. This research, therefore, is unique in its aim to study emotion and behaviour regulation processes in socio-emotionally challenging educational situations, building on the understanding that these are the contexts where the learning and development of children’s emotion and behaviour regulation occurs.

2 Theoretical framework

The phenomenon of self-regulation has been approached from different research emphases and theoretical perspectives. Developmental research has explored the interactions between children's individual characteristics and environmental influences in the development of self-regulation skills, while the learning sciences have focused on, for example, regulated learning activities, including cognitive, motivational and emotional regulation (McClelland *et al.* 2010, Zimmerman 2008). These different traditions have a common understanding of self-regulation as a process of monitoring and controlling one's thoughts and actions (Dinsmore *et al.* 2008). Some, however, give more emphasis to the metacognitive processes related to self-regulation, and others to the motivational, emotional and behavioural processes of self-regulation, such as personal evaluations, values, attributions and strategic activities (Bronson 2000, Dinsmore *et al.* 2008, McClelland *et al.* 2010, Veenman *et al.* 2006).

This dissertation focuses on the emotion and behaviour regulation activities in which children engage when they encounter challenges in learning and social situations in educational settings. To ground this dissertation, therefore, the role of emotions, particularly in educational settings, is discussed first. When moving to the theoretical discussion on self-regulation, various aspects of it are described, from general self-regulation to emotion regulation in educational settings, which are also elaborated as part of the concept of SRL. In addition, developmental research on the contributions of children's self-regulation skills to various areas of their lives and studies on the interactions contributing to children's self-regulation skills are reviewed. Teachers' role as co-regulators of children's emotion and behaviour is also elaborated, and finally, the appearance of regulatory activities and interactions emerging in socio-emotionally challenging situations are discussed (Cole *et al.* 2009, McClelland *et al.* 2015). Overall, this study's theoretical understanding of children's emotion and behaviour regulation and the related interactional and developmental processes in educational settings is built on socio-cognitive (*e.g.* Boekaerts & Pekrun 2015) and socio-cultural perspectives (McCaslin 2009, Whitebread & Basilio 2012). The study is also based on the body of developmental research on children's developmental trajectories related to early self-regulation skills (*e.g.* Fox & Calkins 2003, McClelland *et al.* 2015).

2.1 Emotions in educational settings

In the past two decades, the role of emotions in education and particularly in learning processes has gained increasing recognition (Boekaerts 2007, Pekrun & Linnenbrink-Garcia 2014). Understanding the effects of emotions on not only physiology but also subjective experience, cognition and information processing has called for extensive research on emotions and emotion regulation in various settings, including academic contexts (Boekaerts & Pekrun 2015, Gross 2014, Meyer & Turner 2007). Special attention has been directed towards the effects of emotions in educational settings on, for example, motivation, attention, memory and problem-solving abilities during learning activities (Boekaerts & Pekrun 2015).

Overall, emotions can be understood as a multifaceted phenomenon with affective, cognitive, physiological, motivational and expressive components (Boekaerts & Pekrun 2015). Theorists of emotions have described emotions by measuring their valence and intensity and have labelled different emotions, such as joy, excitement, boredom and anger (Linnenbrink 2006, Schutz & Pekrun 2007). A popular way of seeing emotions is the appraisal perspective, which highlights the meanings individuals give to particular situations, interactions or inner states (Schutz *et al.* 2006). Following the appraisal perspective of emotions, Gross and his colleagues (2007, 2008, 2014) have presented a modal model of emotions describing the phases of the emotion-generative process, in which they also position different ways to regulate emotions. The model presents the sequence of situation–attention–appraisal–response, where situation refers to psychologically relevant situations (external or internal) that grab attention. Appraisal refers to the meaning of the situation (*i.e.* its familiarity, valence, value relevance) which, then, produces a response to the situation (Gross & Thompson 2007). The response may, in turn, change the situation at hand, creating a new feedback loop of the person–situation transaction. Thus, emotions can change as do situations and appraisals (Frijda *et al.* 2000, Gross 2014, Lazarus 1991).

Understanding the role of emotions, particularly in educational settings, requires comprehending their relations to cognitive and motivational processes. The interactions of cognition and emotion can be seen as reciprocal, as the modal model of emotions suggests. Appraisal theorists see emotions as resulting from the beliefs or cognitive appraisals that individuals assign to situations in relation to their goals (Boekaerts & Pekrun 2015, Frijda *et al.* 2000, Gross 2014, Lazarus 1991, Shuman & Scherer 2014). Especially among young children, appraisals of situations can be affected by a limited ability to interpret others' intentions and

reasons for their actions, which, in turn, influences what emotions children experience (Arsenio & Lover 1997, Ochsner, & Gross 2008). Emotions, in turn, modify and direct cognition, for example attention and memory (Brosch *et al.* 2013, Linnenbrink & Pintrich 2000). In educational settings, the role of emotions in cognitive processes also affects teaching–learning relationships. Teachers’ support of students’ emotions has been recognised as a key to effective teaching (Hargreaves 2001, Meyer & Turner 2007).

Emotion theorists highlight the importance of not only individuals’ appraisals but also their goals to emotions (Frijda *et al.* 2000, Gross & Thompson 2007, Lazarus 1991). Emotions affect and are affected by goals; for example, students’ goals and beliefs in their own agency are strongly affected by their emotions and may shape their motivational patterns as strongly as cognitive processes. Positive emotions, in particular, have been found to enable students to take advantage of learning opportunities (Boekaerts & Pekrun 2015). For example, positive activating academic emotions, such as joy and pride, have associations with interest and intrinsic motivation, whereas negative deactivating emotions have opposite effects (Pekrun 2006, Pekrun *et al.* 2011). In classrooms, different set of goals are present, and along with learning goals, social goals can affect emotional processes. The presence of different goals in the classroom can also lead to goal conflicts and affect learning (Boekaerts 2007, Hofer 2007). Understanding the effects that emotions have on individuals’ everyday functioning requires research on how emotions and their related behaviour can be regulated in such a way that the various goals relevant for each context and for each individual are reached (Gross 2014).

2.2 Self-regulation processes among young children

In general, self-regulation processes can be seen as the basis of human functioning which makes it possible for individuals to adapt to changing conditions. Humans do not simply react to external stimuli but, rather, actively plan, monitor and reflect on their activities in order to learn from their mistakes and create new solutions for adaptation (Bronson 2000, Zimmerman 2000). The body of research dealing with self-regulation processes is broad, fragmented and focused on different areas of life. In this chapter, the theoretical formulations of different aspects of self-regulation are discussed in relation to young children’s emotion and behaviour regulation and their development in general and in educational settings. In addition, empirical findings related to children’s self-regulation are presented to provide the rationale for the present study.

2.2.1 Self-regulation

Various theorists regard self-regulation as a broad, multidimensional concept describing abilities related to cognitive, emotional and behavioural control processes (Baumeister & Vohs 2004, Bronson 2000, Cole *et al.* 2004, Kochanska *et al.* 2000, Neuenschwander *et al.* 2012, Robson 2010, Rueda *et al.* 2005). Self-regulation has been defined as the activities of analysing one's choices and the consequences of one's actions based on the information at hand and adapting one's behaviour to reach a particular goal (McClelland *et al.* 2015, Morris *et al.* 2007, Whitebread & Basilio 2012). Thus, self-regulation encompasses metacognitive and motivational processes, as well as strategic actions (Perry & Winne 2006, Schunk & Zimmerman 2007).

Among young children, self-regulation has been closely related to certain other concepts, such as self-control (Kopp 1982, McCullough & Willoughby 2009) and executive function (McClelland *et al.* 2015, Whitebread & Basilio 2012). Kopp's (1982) definition of self-control highlights the behavioural aspects of self-regulation. She understands self-regulation as internalised processes related to self-control, including young children's ability to behave in conformance with requests and social expectations even without external monitoring. Executive function, on the other hand, has been developed as a concept describing basic cognitive processes: the skills related to the abilities to flexibly shift and control attention, inhibit initial response and activate more adaptive responses (inhibitory control) and process complex information (working memory) (McClelland *et al.* 2015, Whitebread & Basilio 2012). In addition to other related concepts, metacognition has been used as a parallel concept to self-regulation, highlighting the ability to monitor and adapt strategic actions when the initial strategy seems to be ineffective (Bryce *et al.* 2015, Bryce & Whitebread 2012).

Especially among young children, the cognitive, behavioural and emotional aspects of self-regulation are strongly intertwined (Blair & Diamond 2008, Bronson 2000). According to theorists, emotion and cognition are integrated in regulatory behaviour, which, in turn, acts as a determinant of how individuals adapt to the world (McClelland *et al.* 2015). Given the importance of self-regulation processes for overall everyday functioning, various aspects of self-regulation have emerged as an important research topic in various domains, including the learning sciences and, more broadly, in neuropsychology, clinical psychology and developmental psychology (Boekaerts & Corno 2005, Diamond & Aspinwall 2003, McClelland *et al.* 2015, Whitebread & Basilio 2012).

2.2.2 Emotion regulation

Emotion regulation is understood to be one aspect of overall self-regulatory processes (Baumeister & Vohs 2004, Boekaerts & Pekrun 2015, Bronson 2000). The roots of emotion regulation research, though, lie in studies on psychological defences (Freud 1926/97, Gross & Thompson 2007), stress and coping (Lazarus 1966), as well as emotion theory (Frijda 1986). In educational settings, regulation of emotions has become a focus of research along with increasing interest on emotions' effects on learning. The relation of emotion regulation to academic achievement has been acknowledged in the literature (*e.g.* Graziano *et al.* 2007). It has also been connected to the processes of SRL (Boekaerts 2011) and the socially shared regulation of learning (Järvenoja *et al.* 2009).

Definitions of emotion regulation variously highlight its internal processes and behavioural manifestations. For example Eisenberg, Hofer, Sulik and Spinrad (2014: 157) regard emotion regulations as

“The processes used to manage and change if, when and how one experiences emotion and emotion-related motivational and physiological states as well as how emotions are expressed behaviourally.”

Similarly, other theorists have regarded emotion regulation as deliberate efforts to adaptively modify, change or inhibit actions and emotional reactions in accordance with expectations or one's own goals (McClelland *et al.* 2007, Morris *et al.* 2007, Whitebread & Basilio 2012). Whereas these definitions focus on the aspect of control in emotion regulation, learning theorists also regard the monitoring and evaluation of emotional experiences and reactions as part of the processes of emotion regulation (Schutz *et al.* 2006, Wolters 2003).

Among young children, emotion regulation has been seen as the ability to adapt to emotionally challenging situations by inhibiting inappropriate behaviour and, instead, activating behaviours regarded as socially expected (McClelland *et al.* 2015, Whitebread & Basilio 2012). This definition includes a notion of successful emotion regulation determined by social norms. However, Gross and Thompson (2007), theorise that emotion regulation processes cannot be regarded as good or bad per se. Rather, success in emotion regulation depends on the context: emotion regulation should optimally serve the purpose of a particular situation, although it might not seem adaptive or optimal for outside watchers (Gross & Thompson 2007). Likewise, Aldao, Sheppes and Gross (2015) state that the most adaptive form of

emotion regulation involves strategies consistent and effective with the goals of each situation.

Although theorists hold similar conceptual definitions of emotion regulation, differences exist in their views of the awareness of emotion regulation processes. Some theorists stress the need to differentiate between more effortful and reactive control processes (Compas *et al.* 2001, Eisenberg & Sulik 2012), whereas Gross (2014) regards emotion regulation as a continuum of automatic and controlled, conscious and unconscious processes. Boekaerts and Pekrun (2015) point out that a continuous use of relatively more conscious or explicit strategies to regulate emotions may eventually make them more habitual and involuntary. According to this point of view, it can be assumed that effective emotion regulation strategies can be consciously learned and rehearsed, and through this process, they become more automatic and, thus, more easily activated when needed. In the next subchapter, emotion regulation strategies presented in earlier literature are explored in more detail.

Emotion regulation strategies

Various theorists have developed classifications of emotion regulation strategies, focusing on both general strategies and young children's strategies. These classifications reveal that self-regulation strategies encompass not only strategies that directly affect one's internal state but also strategies intended to make changes in the environment and in one's visible expressions or emotional reactions to solve challenges that potentially cause emotional arousal (Eisenberg & Zhou 2000, Gross 2014). For example, in learning research, emotion regulation strategies have been divided into problem-focused strategies and emotion-focused strategies, the first focused on solving the external problems causing challenges and the latter on managing the emotions caused by challenges (Boekaerts 2007). Coping literature presents a similar classification which understands coping as consisting of two main functions: regulation of emotions (emotion-focused coping) and actions altering the environment (problem-focused coping) (Folkman *et al.* 1986).

The classification of emotion regulation strategies developed by Gross and his colleagues (2007, 2008, 2014) has increasingly been applied in studies exploring how children use different strategies (*e.g.* Gunzenhauser *et al.* 2014, Somerville 2016). The strategy families Gross and Thompson (2007) have developed are based on modal model of emotions (described in Subchapter 2.1), which posits that different strategy families affect different points in the emotion generative process.

Antecedent-focused strategies (*i.e.* situation selection, situation modification, cognitive change, attentional deployment) are assumed to occur early in the emotion generative process before the emotional response has fully occurred. Response-focused strategies, in contrast, are aimed at modulating already occurring emotions.

Regarding the emotion and behaviour regulation strategies of young children, it is important to note that various strategies require certain levels of cognitive abilities, which becomes apparent in strategy choice and success in applying strategies (Stansbury & Zimmermann 1999). For example, situation selection has been defined as a strategy, where an individual selects a situation based on the expected desirable or undesirable emotional outcomes (Gross & Thompson 2007). This strategy requires understanding the features of the possible situation, making predictive judgements of one's own ability to manage emotions and considering the emotional consequences for others in the possible situation. However, research shows that even adults tend to be biased and poorly predict the emotional outcomes of situations, which makes it difficult to use situation selection appropriately. For example, they might over-estimate the length of both positive and negative emotional reactions to the possible future outcome (Gross & Thompson 2007, Loewenstein 2007).

Situation modification, in contrast, involves strategies aimed at modifying the situation to change its emotional impact. Research indicates that young children especially seem to rely on strategies to regulate emotionally eliciting situations rather than their own internal emotional states (McCoy & Masters 1985, Pons *et al.* 2004). Gross (2007) points out that situation modification can have overlapping features with other strategy families, not the least because *situation* is a vague term that can refer to both internal and external situations. If situation modification can be limited to mean only the modification of the external physical environments, cognitive reappraisal, in turn, can be regarded as a way to modify internal environments, such as cognitions. Also, emotional expression can serve as a powerful tool to modify others, even though it is normally considered to be a response modulation strategy rather than a situation modification strategy (Gross 2007, Gross & Barrett 2011).

Strategies related to cognitive change, or cognitive reappraisal strategies, are often considered to be adaptive strategies to regulate emotions. They have been widely researched among both children and adults (Gunzenhauser *et al* 2014, McRae *et al.* 2012). Cognitive change refers to changing the appraisals or the emotional significance of a situation. For example, when reappraising a situation,

an individual changes its meaning to modify its emotional impact (Gross 2014). In learning, reappraisal has been seen as an efficient strategy to deal with disappointment or task failure as it can boost positive emotions and diminish negative affect (Loewenstein 2007, Schutz *et al.* 2006). Among school-aged children, reappraisal has been linked to increased memorisation of educational details (Davis & Levine 2012). Research indicates that children younger than 7–8 years old do not fully understand nor use cognitive reappraisal to manage emotions, possibly due to their limited capability for metacognitive thinking (Davis *et al.* 2010, Stansbury & Zimmerman 1999).

Strategies of attention control are the first regulatory processes that start to develop in children (Fox & Calkins 2003, Whitebread & Basilio 2012). Gross and Thompson (2007) define attention deployment as the ways that individuals direct their attention in emotionally eliciting situations in order to influence their emotions. These methods can occur internally or involve physical withdrawal or approach. Within the strategy family of attention deployment, distraction and concentration are the major strategies. When using distraction strategies, attention is moved away from the emotionally eliciting situation, whereas concentrating draws attention to the emotional aspects of the situation. Studies on young children's emotion regulation strategies indicate that children tend to choose distraction and avoidance behaviours in frustrating situations (Boekaerts 2007, Bronson 2000, Op 't Eynde *et al.* 2007). For example redirecting attention away from negative events has been proven to be a means for young children to maintain positive emotional states (Boekaerts 2007, Bronson 2000, Yan 2012).

In academic activities, focusing attention on different aspects of the situation has been an area of interest in research related to emotion regulation in education. For example, Schutz, Hong, Cross and Osbon (2006) argue that task-focusing strategies may distract students from negative emotions, whereas emotion-focused strategies may disengage students from tasks. Considering distraction in learning activities, Bryce, Whitebread and Szűcs (2015) see it as a failure in self-monitoring, manifested in losing track of the task. Overall, attention deployment can serve as an efficient strategy to regulate emotions when it aligns with the nature of the situation and the individual goals (Aldao *et al.* 2015, Sheppes *et al.* 2014). The effectiveness of this strategy can also be dependent on how it is used. In learning activities, flexible shifting of attention back to the relevant aspects of the task when distracted can be seen as effective self-regulation (Whitebread & Basilio 2012).

Gross (2008, 2014) describes response modulation as strategies used late in the emotion generative process to directly influence physiological, experiential or

behavioural responses. Response modulation can manifest as modulating emotion expressive behaviour, such as initiating or inhibiting the expressions of emotions. As stated, expression of emotions can serve as an effective strategy in social situations due to its strong effects on people (Rimé 2007, Yan 2012). Research suggests that increasing emotion expressive behaviour can also intensify the experience of the emotion itself (e.g. Gross 2008, Izard 1990). Inhibiting or hiding one's feelings, in turn, has been proven to negatively affect cognitive resources (Boekaerts 2011, Richards & Gross 1999). Inhibiting can also have mixed effects on the valence of emotion: it may decrease positive emotions but not negative emotion (Gross 2007). In young children's strategies related to response modulation, the earliest emotion-regulation strategies are self-soothing behaviours. Even infants can engage strategically in self-soothing, for example, sucking a pacifier (Bronson 2000).

Seeking help and support in emotionally challenging situations is regarded as an efficient way to extend one's self-regulation resources. This strategy is especially useful for young children, who are often dependent on external help for self-regulation (Boekaerts 2011, Calkins & Hill 2007, Schutz & Pekrun 2007, Thornberg 2006). Newman (2008: 2–3) describes adaptive help-seeking as

“requesting information or emotional support, that maximises the likelihood of two consequences: short-term, situation-specific stress reduction and long-term development of ‘healthy’ intrapersonal and interpersonal self-system resources that are important particular resources for coping with future stressors.”

This definition supports the notion that seeking help can serve a developmental purpose and, at its best, gives children possibilities to adopt more sophisticated regulation strategies to cope with stressful situations.

Newman (2002) argues that the adaptive form of help-seeking requires the cognitive ability to know when one needs help and the social skills to judge who is the best person to approach for help. In addition, it requires personal motivational resources supporting the willingness to express the need for help and contextual motivational resources (e.g. classroom factors, student–teacher interactions) that encourage help-seeking (Newman 2008). Research in academic settings indicates that students who are proactive, resourceful and more likely to also employ other learning strategies especially tend to seek help when needed (Karabenick & Dembo 2011). Regarding seeking help and support for managing emotions, research indicates that seeking emotional support is negatively associated with, for example,

depressive symptoms (Nolen-Hoeksema & Aldao 2011). Young children especially regard seeking support as an efficient strategy in emotionally eliciting situations (Waters & Thompson 2016).

In general, the core of successful emotion regulation consists of awareness of and access to a range of strategies to manage emotions. Successful emotion regulators can choose and implement appropriate strategies to achieve their goal in a situation and assess the efficiency of these strategies (Fox & Calkins 2003, Gross & Thompson 2007).

2.2.3 Self-regulated learning

When it comes to self-regulation in educational settings, learning scientists have connected skills related to it particularly to learning. In these settings, self-regulation processes are referred to with a term self-regulated learning (SRL), which includes the regulation of cognition, emotion and motivations during a learning process with regard of learning goals (Boekaerts 2007, Hofer 2007, Pekrun *et al.* 2002, Whitebread & Basilio 2012, Zimmerman & Schunk 2011).

Distinct from emotion and behaviour regulation, SRL refers to the regulation of the overall learning process and has been described with different models (Boekaerts & Pekrun 2015, Pintrich 2000, Zimmerman 1989). For example, Zimmerman's model (1989) defines SRL as a cyclical process in which feedback on earlier performance directs new efforts. These feedback loops involve processes of monitoring and controlling personal, behavioural and environmental factors that affect one's performance. The personal factors include an individual's beliefs about own agency and goal orientations, whereas the behavioural aspect refers to observing one's own performance and strategic actions. Finally, environmental self-regulation focuses on observing and adapting environmental conditions and outcomes.

In the present understanding, the regulation of emotions and behaviour related to the learning process is seen as an inseparable part of SRL (Boekaerts & Pekrun 2015, Zimmerman & Schunk 2011). In fact, general self-regulation skills have been regarded as prerequisites for effective SRL (O'Malley 2005). In Boekaerts' (2011) dual-processing model of self-regulation, the learner regulates emotions during the learning process to balance between mastery and well-being paths in achieving the learning goal. The model posits that learners who can manage their emotions that arise during the learning process also succeed in achieving their learning goals (Boekaerts & Pekrun 2015). According to Boekaerts (2011), emotion regulation

skills in learning manifest as students' ability to use emotions both as a source of energy and to modify the experiences of emotions that may hinder pursuit of the learning goals.

Among children, skills to regulate learning manifest as awareness of their own strengths and weaknesses in relation to tasks (metacognition) and their motivation for learning, such as a desire for deep understanding and a constructive perception of their own success and failures. In addition, SRL includes an array of effective learning and problem-solving strategies appropriate for both learners and for task purposes (Perry *et al.* 2010, Zimmerman 2008). Earlier research on young children's self-regulation processes has, to an extent, undermined children's abilities to regulate their learning (Perry *et al.* 2010, Whitebread *et al.* 2009). However, as methods taking into account the contextual and non-verbal nature of children's regulatory activities have been increasingly used, researchers have found that even children as young as 3 years old show signs of the ability to monitor and apply strategies to regulate their learning activities (Whitebread *et al.* 2007). Perry Thauberger and Hutchinson (2010) show that 6–7-year-old children can apply SRL strategies in various ways, from monitoring their understanding to evaluating their learning. In addition, research in classroom settings provides evidence that children benefit from appropriate support and opportunities to improve their ability to regulate their own learning processes and the challenges that occur during learning (Perry 1998, Perry *et al.* 2010).

2.2.4 Early development of emotion and behaviour regulation skills

Researchers on young children's self-regulation agree that children's ability to regulate their emotions and behaviour has a relationship with other aspects of self-regulation, particularly the ability to control sensory-motor and cognitive systems (Bronson 2000, Fox & Calkins 2003, McClelland *et al.* 2015). The development of these skills results in changes in external behaviour, internal thought processes and the ability to influence social and physical environments (Bronson 2000). At early ages, children's self-regulation is primarily reactive as external events and internal biological needs and reflexes evoke regulation responses. These emerge as early as 6 months of age. As children grow older, their capacity for proactive, planned and conscious regulation increases. A strong body of research supports the view that individual differences in self-regulation skills are shaped by children's temperamental factors, neurobiological maturation, conceptual understanding development (Fox & Calkins 2003, McClelland *et al.* 2015) and social experiences (Bronson 2000, Calkins & Hill 2007, Thompson & Meyer 2007). Figure 1 demonstrates these connections and the ways regulation skills contribute to different aspects of an individual's life.

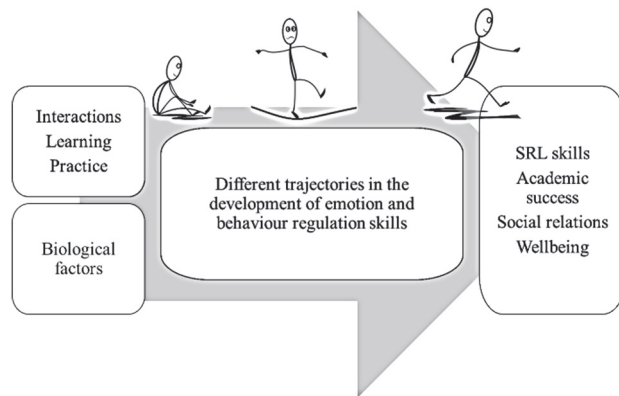


Fig. 1. Contributors and effects of the development of emotion and behaviour regulation skills.

According to Bronson's (2000) and Whitebread and Basilio's (2012) reviews, the development of self-regulation of emotions in the first three years of children's lives manifests as growing abilities of voluntary control (inhibitory and effortful control) and voluntary self-regulation. Starting in the second year of life, children learn to comply with external requests and are increasingly aware of social rules and situational demands. Children acquire understanding of others' feelings and engage in spontaneous helping, sharing and comforting behaviours. Individual differences in these abilities also become clearer. Starting at age 3 years, children continue to develop greater ability to control their emotions, follow rules and refrain from forbidden behaviours. The acquisition of language skills enables new ways of engaging in peer interactions and regulating one's own and others' behaviours. Children learn more effective strategies for interacting with others and increase their ability to understand others' views and feelings. In this age range, children can engage in deliberate helping, sharing and comforting behaviours and have internalised a set of standards of behaviour.

The development of cognitive and attentional processes shapes children's emerging capacities to control emotion-related behaviours (Fox & Calkins 2003, McClelland *et al.* 2015). In the toddler and preschool years, children become increasingly capable of applying strategies to regulate emotions. In particular, situation modification, response modulation and attentional strategies have been regarded as effective and accessible strategies for younger children (McClelland *et al.* 2015, Stansbury & Zimmermann 1999). The strategies of children of this age range include for example help-seeking, social referencing, distraction, avoidance, ignoring salient cues, problem solving, playing with the emotional stimulus and self-soothing (Calkins & Hill 2007, Diener & Mangelsdorf 1999, Yan 2012). Cognitive strategies to regulate emotions, such as cognitive reappraisal, have been assumed to be difficult at this developmental stage, as they require higher level of cognitive abilities (McClelland *et al.* 2015, Stansbury & Zimmermann 1999). Understanding self-regulation as an implicit, non-verbal and context-specific phenomenon, though, has generated findings indicating that children as young as 3 years old show signs of, for example, metacognitive monitoring (Whitebread *et al.* 2009).

When approaching to primary-school age, children begin to show clearer signs of abilities to use internal and cognitive regulation strategies to manage emotions and behaviour (Bronson 2000, Davis *et al.* 2010, Pons *et al.* 2004). Children also display growing abilities to understand others' feelings and perspectives. They can negotiate disputes without adult support and are conscious and aware of their own

regulatory processes and abilities (Bronson 2000). Regarding the development of strategy understanding among young children, Pons, Harris and De Rosnay (2004) explored the different components of emotional understanding among 3–11-year-old children, including regulation of emotions, using story-supported interviews. The study showed that, when presented with suggested strategies during the interviews, children younger than 9 years old tended to choose strategies changing the environment over handling sad feelings by thinking about something else, which, in turn, was more common for older children (Pons *et al.* 2004). Similarly, in McCoy's and Master's study (1985), 5 year olds primarily referred to strategies to change the external environment, whereas 8–12-year-olds described more routinely strategies to change mental states. Waters and Thompson (2016) also used the story-based interview method to study 6 and 9-year-old children's understanding of the effectiveness of different strategies and found that children in this age range perceived strategies such as problem solving, help-seeking and distraction strategies as useful in regulating anger. Moreover, children identified cognitive reappraisal as useful for regulate emotional experiences. In reflective interviews with children, Davis, Levine, Lench and Quas (2010), however, found that, as early as age 3 years, children can recognise the relation between thought and emotions, which is regarded as a prerequisite for metacognitive regulation.

It needs to be noted that these described studies were conducted using interview methods, so their results refer to children's understanding of regulation strategies rather than the actual strategies children can perform when socio-emotional challenges arise. Also, not only the selection of particular strategies to regulate one's emotions and behaviour is essential, but also the ability to consider one's own contextual goals, needs, challenges, strengths and weaknesses when choosing appropriate emotion-regulation strategies is important in children's development of emotional skills (Diamond & Aspinwall 2003, Thompson 2011).

2.2.5 Contributions of self-regulation skills to different aspects of children's lives

Several studies have found links between children's abilities in different aspects of self-regulation and children's outcomes in academic settings (Graziano *et al.* 2007, Neuenschwander *et al.* 2012, Schmitt *et al.* 2015, Valiente *et al.* 2010, von Suchodoletz *et al.* 2013) social relations (Blair & Raver 2015, Denham *et al.* 2003) and well-being (Gross & John 2003, McClelland *et al.* 2010). For example, Schmitt, McClelland, Tominey and Acock (2015) examined the effects of self-regulation

interventions on preschool children's self-regulation and academic achievement using teacher reports on children's self-regulation and assessments of children's academic achievement. They found stronger self-regulation and math skills among children who participated in the intervention than the control group (Schmitt *et al.* 2015). Likewise, Graziano, Reavis, Keane and Calkins (2007) found that kindergarten children's emotion regulation skills, as assessed by parents using the Emotion Regulation (ER) -check-list questionnaire, were positively related to teachers' reports of the children's academic success, classroom productivity and literacy and math achievement scores, even when children's IQ was controlled for the analysis. Similarly, other studies have supported the findings that self-regulation predicts children's school achievement even more than IQ (Blair & Razza 2007, Howse *et al.* 2003). In a study of preschool-aged children, (von Suchodoletz *et al.* 2013) researchers found links between behavioural regulation as assessed by the Head-Toes-Knees-Shoulders (HTKS) test and higher academic skills (K-ABC test of vocabulary, reading and mathematics tests). Neuenschwander, Röthlisberger, Cimeli and Roebbers (2012) explored the effects of different aspects of self-regulation (effortful control and executive function) on children's successful adaptation to school and found that parental reports of effortful control were connected to children's learning-related behaviour and that executive functions predicted achievement on standardised achievement tests. Similar results were reported in the studies by Valiente and his colleagues (2010, 2012).

Children's inability to regulate emotions strategically has been shown to increase problems in social interactions (Cole *et al.* 2004, Eisenberg & Spinrad 2004, Koole 2009). For example, children with poor regulation skills can be influenced by peers to engage in maladaptive behaviour (Prinstein & Dodge 2008) and they are also more like to be rejected by peers (Trentacosta & Shaw 2009). The ability to manage emotions, in contrast, has been regarded as important in the development of prosocial behaviour (Blair *et al.* 2004, Eisenberg *et al.* 1996, Montroy *et al.* 2014). For example, Montroy, Bowles, Skippe and Foster (2014), who used direct measures to assess children's self-regulation and teacher reports of social skills and problem behaviour, found support for the notion that behavioural self-regulation provides a foundation for social functioning in school activities (Bronson 2000). Due to their role in social interactions, emotion and behaviour regulation have also been included in the theoretical construct of social competence, which refers to the abilities to accomplish one's goals in a way that helps maintain positive relations with others (Kaukiainen *et al.* 2005, Salmivalli 2005).

Regarding the effects of self-regulation on well-being, Gross and John (2003), who relied on self- and peer reports of young adults, found that the ability to regulate emotions and behaviour through reappraisal strategies is linked to greater positive affect and less depressiveness. Hofmann, Luhmann, Fischer, Vohs and Baumeister (2014) used self-reports on self-control, life satisfaction, momentary affective well-being and goal conflict to explore the links among trait self-control, affective well-being and life satisfaction. In line with Gross and John (2003), Hofmann, Luhmann, Fischer, Vohs and Baumeister (2014) also found a positive correlation between self-control abilities and aspects of well-being. As well, Berking and Wupperman's (2012) review shows that deficits in emotion regulation abilities are linked to various mental health issues.

2.3 Teachers as co-regulators of children's emotions and behaviour

There is a broad consensus among researchers, that interactional processes play crucial roles in children's internalisation and development of self-regulation skills (Calkins & Hill 2007, Eisenberg & Spinrad 2004, McClelland *et al.* 2015, McCoy & Raver 2011, Whitebread *et al.* 2009). Particularly in educational settings, teachers are the key actors in creating classroom structure that supports SRL and the development of regulation skills. This subchapter discusses how different qualities of interactions influence children's self-regulation skills and how teachers can co-regulate these regulation processes in a way that promotes children's acquisition of self-regulation skills.

2.3.1 Interaction qualities and children's self-regulation skills

Studies indicate that self-regulation skills develop most effectively in home and school contexts, where children are provided with possibilities to reflect their own actions, where they are able to communicate their issues and where supportive and caring relationships provide a safe environment to solve problems effectively (Hutchinson 2013, Rubin *et al.* 2001, Steinberg 2001, Walker 2008). The qualities of parenting practices are widely recognised to shape children's ability to regulate emotions and behaviour. The research indicates that sensitive and responsive interactions (Colman *et al.* 2006, Kopystynska *et al.* 2016, Lengua *et al.* 2013, McCoy & Raver 2011, Rimm-Kaufman *et al.* 2002) and emotionally expressive and collaborative environments that give rise to experiences of belonging

(Eisenberg *et al.* 1998, Fried 2010) have positive relations to children's ability to regulate emotions and behaviour. Some evidence suggests that children with higher negative reactivity seem to be especially affected by caregiving behaviours (Bakermans-Kranenburg & van IJzendoorn 2007) and interventions to support self-regulation skills (Tominey & McClelland 2011). Generally, it is presumed that caretakers' reactions to children's emotions provide children with information about experiencing and expressing emotions. Supportive responses may help children reduce negative emotions and understand and manage emotions. Gentle, positive parental control can also directly teach children regulatory skills (Karreman *et al.* 2008, Kopystynska *et al.* 2016). Non-supportive responses, in contrast, might increase negative emotions and the use of inappropriate and maladaptive strategies to regulate emotions (Jones *et al.* 2002).

Jones, Eisenberg and Fabes (2002) investigated the effects of parental reactions on elementary-school children's emotional responses at school based on parents' reports about their responses to children's emotions, short observations of each child and teacher reports on children's emotional expressivity and socio-emotional competence. The results indicate that punitive and negative parenting increase children's emotional arousal and can result in children avoiding emotions instead of attempting to understand or express them appropriately (Jones *et al.* 2002). Punitive and negative parenting were also connected to inappropriate emotion regulation strategies, such as escape and revenge seeking, and lower levels of socio-emotional competence (Jones *et al.* 2002). Similarly, Denham's (1993) observational study among mothers and 2-year-old children in natural-like laboratory settings showed that parental encouragement and calm and neutral reactions to children's anger are connected with children's high socio-emotional competence and lower levels of expressed anger and fearfulness.

Turning to other aspects of self-regulation, Kopystynska, Spinrad, Seay and Eisenberg (2016) used structured observation and teacher reports to study the relations of maternal sensitivity and gentle control to children's subsequent academic functioning. They found that gentle maternal control predicts higher effortful control abilities, which, in turn, are positively related to children's academic functioning during the transition to elementary school. Colman, Hardy, Albert, Raffaelli and Crockett (2006), who used mothers' self-reports, showed that high levels of maternal warmth and low levels of physically punitive discipline towards 4–5-year-old children are associated with children's ability to regulate their behaviour, attention and affect at 8–9 years old. Also, Lengua, Kiff, Moran, Zalewski, Thompson, Cortes and Rubery (2013) reported that, during children's

preschool years, parenting largely mediates the effects of income and cumulative risk on effortful control. Children with mothers who were assessed high in scaffolding had especially higher levels of executive control.

In addition to effects from parenting, teacher interactions and classroom characteristics have also been found to have connections to the self-regulation skills of children in different age groups, as explored in several studies by Rimm-Kaufman and various colleagues. Rimm-Kaufman, Curby, Grimm, Nathanson and Brock (2009) investigated the relations between 5–6-year-old children's self-regulation at kindergarten enrolment and classroom quality to their adaptive classroom behaviour, using direct assessments (self-regulation tests) of the children, teacher reports on the children's adaptive classroom behaviour and structured observational coding of classroom quality. In this study, self-regulation was regarded as abilities to manage emotions, focus attention and inhibit certain behaviours in favour of others. Rimm-Kaufman Curby, Grimm, Nathanson and Brock (2009) found links of classroom quality, particularly effective classroom management, with children's higher behavioural and cognitive self-control and behavioural engagement and less time spent off-task in classroom among children. Merritt, Wanless, Rimm-Kaufman and Peugh (2012) investigated first graders' social and self-regulatory outcomes in relation to emotionally supportive teacher-child interaction. They used the Classroom Assessment Scoring System (CLASS, Pianta *et al.* 2008) to assess classroom interactions and teacher reports to assess children's social behaviours and behavioural control. Merritt's and her colleagues' study found links of higher teacher emotional support with lower aggression and higher behavioural self-control among children. Mantzicopoulos, Patrick, Strati and Watson (2017) explored the relation of teachers' instructional and emotional support to academic achievement and motivation in kindergarten settings also using the CLASS measure. The study linked both teachers' instructional and emotional support to children's motivation to academic activities (Mantzicopoulos *et al.* 2017).

Children with behavioural problems and academic difficulties, in particular, seem to benefit from interactions with emotionally supportive teachers. Rimm-Kaufman, Pianta, Early, Cox, Saluja, Bradley and Payne (2002) found that children regarded as having problems adapting to classroom rules were positively influenced by a highly sensitive teacher: they showed less off-task behaviour, were more self-reliant and engaged in less negative behaviour. Hamre and Pianta (2005) also found that 5–6-year-old children assessed at having a risk of school failure had improved achievement and less conflict when their teachers gave strong emotional

and instructional support compared to the children with similar risk who had less supportive classroom environments.

2.3.2 Co-regulation of emotions and emotional scaffolding

To understand the mechanisms behind interaction qualities and children's self-regulation skills, it is important to focus on the specific regulatory activities in which caretakers and teachers engage to support children in regulating their emotions and behaviour. In the learning sciences, the concept of co-regulation has been used to describe, for example, a process of social regulation in which one person performs a guiding role for others (Järvenoja *et al.* 2015, Volet *et al.* 2009). Co-regulation has been defined as the act of a more capable person sharing self-regulatory processes and thinking with a less capable person, who gradually internalises these skills (Hadwin & Oshinge 2011). McCaslin (2009: 137) defines co-regulation as

“relationships among cultural, social and personal sources of influence that together challenge, shape and guide emergent identity.”

In this perspective, the concept of co-regulation has been built on Vygotsky's notion of the zone of proximal development (ZPD), referring to the interactions where participants have the roles of experts and novices and are socially and culturally enriched by others' co-regulation (McCaslin 2009). In McCaslin's (2009) view, co-regulation does not merely refer to the dyadic interactions or hierarchical relationships of more and less capable individuals but, rather, includes the notion of a process of emergent interactions of regulation processes, supportive relationships and opportunities situated in a specific social and cultural context.

The notion of scaffolding has been regarded as a more specific form of social interaction that facilitates children's development. Its roots also lie in Vygotsky's theory of ZPD (Meyer & Turner 2007, Vygotsky 1978). Traditionally, teacher support, which is provided only when necessary and which moves from shared responsibility towards students' ownership of activities, has been regarded as scaffolding (Meyer & Turner 2007, Wood *et al.* 1976). Scaffolding has been considered to include actions related to arousing interest, directing children's activities, task-related demonstrating and regulating task-related emotions (Wood *et al.* 1976). Emotional scaffolding, in contrast, has been defined as interactions that support students' positive emotional experiences while achieving classroom goals. This type of scaffolding is intended to, for example, improve students'

understanding, motivation, collaboration, participation and emotional well-being. Emotional scaffolding has found to be critical for students to understand challenging concepts and to demonstrate competences, autonomy, involvement and persistence, as well for students' emotional and personal experiences (Meyer & Turner 2007). In the research literature, co-regulation and scaffolding are used mostly to describe the interactions that support the learning of specific skills. These terms are used less frequently in contexts where the support is also focused on self-regulation of behaviour and emotions. Still, the importance of the scaffolding of self-regulation skills has been acknowledged (Blair & Diamond 2008, Bodrova & Leong 2007).

Regarding the co-regulation and scaffolding of emotions, Eisenberg and Sulik (2012) and Gross and Thompson (2007) understand emotion regulation as both an extrinsic and an intrinsic processes, as individuals not only regulate their own emotions, but their emotions are also regulated by others. Following this understanding, Gulsrud, Jahromi and Kasari (2010), for example, explored co-regulation of emotions among mothers and children with autism, focusing both on mothers' co-regulation strategies and on children's emotion regulation strategies. In this dissertation, co-regulation specifically refers to the ways that early-education teachers regulate children in socio-emotional challenging situations. Co-regulation consists of the strategies that teachers conduct when they support children's interactions and participation in educational activities by attempting to influence their thoughts, behaviour and emotions according to the expectations and values of that particular context (Colman *et al.* 2006, Volet *et al.* 2009). In the next subchapter, research exploring teachers' strategies in the classroom are introduced.

Teachers' strategies to support children's self-regulation

The importance of studying the specific strategies teachers use when interacting with children in socio-emotionally challenging situations becomes clear in research linking the qualities of early childhood interactions to the different levels of children's abilities to regulate their emotions and behaviour (*e.g.* Colman *et al.* 2006, Jones *et al.* 2002, McCoy & Raver 2011, Rimm-Kaufman *et al.* 2002). The quality of interaction matters to children's socio-emotional development, so it is essential to deeply analyse what these interactions look like.

Among particular strategies to support children's self-regulation, offering children verbal tools for self-regulation and increasing their awareness and knowledge of emotional expressions, situations and moods have been seen as

effective ways to scaffold children's self-regulation skills (Denham & Kochanoff 2002). Verbally labelling and validating children's emotions and helping them problem solve can aid children in understanding emotions and reducing negative emotions (Eisenberg *et al.* 1998, Morris *et al.* 2011). In situations when children have already experienced negative emotions, reacting to children in a calm, neutral manner has been proven to lessen their levels of expressed anger and fearfulness and has been connected to children's favourable socio-emotional development (Denham 1993, Morris *et al.* 2007). Morris, Silk, Morris, Steinberg, Aucoin and Keyes (2011) also showed that attempts to refocus joint attention and cognitively reframe situations have associations with lower levels of anger and sadness when negative emotions arise. In addition, choosing or avoiding emotionally provoking situations (*e.g.* niche picking, situation selection) can serve as a tool for parents to regulate children's experiences of emotions (Gross & Thompson 2007, Morris *et al.* 2007). However, if taken too far, this method can lead to over-protection, which does not support emotion regulation skills (Morris *et al.* 2007).

Research on teachers' co-regulation strategies related to children's emotions and behaviour in classroom or day-care settings is rare. A few studies, though, have explored similar processes. For example, Ritz, Noltemeyer, Davis and Green (2014) examined teachers' verbal strategies for dealing with noncompliance in the classroom, and Clunies-Ross, Little and Kienhuis (2008) explored general classroom management strategies to reduce students' misbehaviour. Ritz, Noltemeyer, Davis and Green (2014) used both interviews and observational methods to study teachers' preventive and reactive strategies for noncompliant behaviour by 3–6-year-old children. The study compared the strategies teachers reported using in interviews and those they were observed using in authentic classroom settings. The strategies identified in both interviews and observations were choice-giving, guided compliance and time-outs, while the strategies identified only in the observation were warnings, proximity praise and verbal reprimands. In the interviews, teachers also reported using preventive strategies, such as regular reviews of rules and positive reinforcement of appropriate behaviour. However, only a few teachers mentioned using ignoring, giving warnings about transitions, acknowledging children's feelings and clear forbidding of behaviour. Clunies-Ross, Little and Kienhuis (2008) used similar methods to Ritz, Noltemeyer, Davis and Green's (2014) study and *Study II* in this compilation of studies. Clunies-Ross, Little and Kienhuis (2008) combined observation and self-reports of teachers' proactive and reactive classroom management strategies. Their study showed that especially reactive classroom management, including

strategies such as lectures, threats, rewards and punishments, were connected to decreased on-task behaviour among students.

2.4 Socio-emotionally challenging situations as a context for emotion and behaviour regulation

Children's everyday interactions can develop into situations where emotions arise. These challenging situations in, for example, peer interactions have been described in earlier literature using the term *conflict*. Conflicts in dyadic relations have been defined as events in which an individual verbally or physically protests, opposes, resists or retaliates against the actions of another individual, who responds in kind (Spivak 2014). Malloy and McMurray (1996) describe conflict as a relationship in which two people have incompatible goals and use a variety of strategies to affect each other's behaviour. In educational settings, these challenging situations can involve opposite or variant goals or interpretations of a situation held by children and teachers (Arsenio & Lover 1997, Järvenoja *et al.* 2012). Naturally, situations that demand emotion and behaviour regulation are not limited to conflicts with others. In educational settings, emotionally eliciting situations can also involve frustrating learning or general classroom situations. For example, in the classroom, a person's learning and social goals might conflict (Boekaerts 2007, Hofer 2007).

Research shows that, in educational settings, preschool children with low emotion regulation skills have more conflict with their teachers (Rudasill & Rimm-Kaufman 2009). Likewise, among adults, a tendency to get into conflicts can be seen as a sign of a lack of emotion and behaviour regulation skills (Hofmann *et al.* 2014). However, challenging situations can also serve as an arena for rehearsing appropriate ways to self-regulate. For example, it has been claimed that non-aggressive conflicts among children can promote social abilities from role taking to negotiation strategies, whereas aggressive conflicts indicate failed conflict management (Arsenio & Lover 1997, Hartup & Laursen 1993). It is at this point that parents' and teachers' roles need to be acknowledged. Some evidence, for example, shows that, when facing peer conflict, children with parents who show supportive parental reactions, such as encouraging problem- and emotion-focused strategies, experience lower levels of anger intensity (Eisenberg & Fabes 1994, Jones *et al.* 2002).

As learning becomes increasingly interactional in nature, the ability to cope and to regulate one's emotions and behaviour to ensure productive learning in socio-emotionally challenging situations becomes even more crucial. While

constructively solved cognitive conflicts can lead to better learning outcomes, less constructive resolutions may be detrimental to learning (Darnon *et al.* 2007, Näykki *et al.* 2014). Thus, the ability to detect and solve challenges, whether they occur in learning, social situations or both, are essential, particularly in the school context. In challenging situations, children benefit from support at many levels: they may need help in correctly interpreting situations and situational cues and in understanding the behavioural expectations in the situation. Children also need support to both use and rehearse sophisticated strategies for dealing with situations and their emotions (Bronson 2000, Lemerise & Arsenio 2000, Morris *et al.* 2007).

To conclude, the role of emotions in educational settings and strategies to regulate them are important areas of research and have significant effects on children's lives both inside and outside educational contexts. In particular, focusing on situations that are conflictual or otherwise stressful can provide deeper insight into children's emotional and social processes (Wilton *et al.* 2000). Children's ability to effectively regulate emotions and the relevant support they receive in regulation activities can improve their success in managing emotionally challenging situations (see Cole *et al.* 2009). In this dissertation, emotion and behaviour regulation are explored by focusing on situations in educational settings when conflicting goals or interpretations arise or emotional reactions are visible (Arsenio & Lover 1997, Järvenoja *et al.* 2012). It is assumed that socio-emotionally challenging situations call for 1) children's engagement in emotion and behaviour regulation and 2) teachers' support of children's regulation activities. These challenging situations form a context in which emotion and behavioural regulation skills are especially needed and can be supported and rehearsed (Bronson 2000, Kurki *et al.* 2016, McClelland & Cameron 2011).

3 Aims of the study

The overall aim of this study is to investigate how young children's emotion and behaviour regulation manifests and how teachers support children's regulation activities in authentic socio-emotionally challenging social and academic situations in educational settings. It is assumed that emotion and behaviour regulation strategies are needed and potentially activated in socio-emotionally challenging situations.

The three main aims of this study are the following:

1. To explore how young children's emotion and behaviour regulation manifests in socio-emotionally challenging situations in authentic educational settings (*Studies I and III*)
2. To examine how teachers support children in regulating their emotions and behaviour in challenging situations (*Study II*)
3. To investigate the different factors affecting children's emotion and behaviour regulation activities in challenging situations (*Studies I and III*)

Specific video analysis methods were implemented to capture regulation processes and the interactions related to it. The video data analysed in this study were collected from two different educational contexts: classroom activities in a primary school (*Study I*) and open day-care activities among under school-aged children (*Studies II and III*). The first main aim of this dissertation was met by investigating children's strategies to regulate their emotions and behaviour in socio-emotionally challenging situations in a classroom (*Study I*) and a day-care (*Study III*). Following the second study aim, teachers' use of co-regulation strategies to support children in challenging day-care situations were investigated (*Study II*). The third main aim was fulfilled by investigating how children's different social skill levels affect their strategy use and success in emotion regulation (*Study I*) and how interactions with teachers and peers contribute to children's strategy use (*Study III*).

4 Methods

In research on young children's regulation processes, the methodological choices need to take into account the nature of the researched phenomenon and the specific constraints of the participants (Whitebread *et al.* 2009). In particular, when studying the self-regulation activities of young children, their verbal abilities and the meaningfulness of the context for children need to be carefully considered in research designs (Whitebread *et al.* 2009). In this dissertation, children's emotion and behaviour regulation and teachers' co-regulation in authentic educational situations were investigated using video observations, measures of children's skills in social competence and video-stimulated recall interviews (VSRI) with the teachers. These methodological decisions were made with the intent to reach a broader picture of children's and teachers' regulatory interactions. This chapter discusses the methodological choices and describes the data collection and analysis procedures used in this study. Also, the ethical considerations and limitations of the method and analyses are elaborated.

4.1 Video observation

The choice of video observations as a tool to study young children and their regulatory interactions in educational settings arises from the limitations of gathering information about children's mental processes (Flewitt 2006, Whitebread *et al.* 2009). When studying young children's self-regulation, data are often collected from parents' and teachers' evaluations (*e.g.* Child Behaviour Rating Scale, CBRS, Bronson *et al.* 1990, Children's Behaviour Questionnaire, CBQ, Rothbart *et al.* 2001). However, in these methods, the interpretations of children's behaviour vary depending on the context and the respondents' abilities to reflect on others' behaviour (Flewitt 2006, Whitebread *et al.* 2009). Methods relying on self-report measures and interviews with children have similar limitations as young children are still developing the ability to reflect on and verbally describe their own activities (Bryce & Whitebread 2012, Whitebread & Pino-Pasternak 2013). Based on video observation studies of young children's metacognitive and self-regulatory activities, Whitebread and his colleagues (2009, 2013) argue that children's regulatory efforts are often non-verbal. Second, they state that contextual factors, such as the presence or an absence of an adult and the social context and nature of a task, affect children's self-regulatory behaviours. Thus, video observations in

authentic settings may serve as a more reliable tool to study self-regulation, especially among young children.

A general advantage of video observations for researching human behaviour is that they catch elements of interaction that other methods cannot, such as gestures, expressions and gazes (Derry *et al.* 2010, Jordan & Henderson 1995). Powell, Fransisco and Maher (2003) state that video observation offers the possibility to both capture a broad picture of interactions and conduct a detailed analysis of unfolding sequences of behaviours with subtle verbal and non-verbal nuances. Similarly, Flewitt (2006) argues that video observations make it possible to explore the multimodal dynamics of interactions as this method does not depend only on spoken or written language. Researchers studying, for example, learning among young children have acknowledged the advantages of video research (Flewitt 2006, Morgan 2007, Pino-Pasternak *et al.* 2014). It has been considered to be a suitable method for example for in-depth analyses of teaching and learning environments (Derry *et al.* 2010).

A common problem in video analysis is handling excessive amounts of data. Derry, Pea, Barron, Engle, Erickson, Goldman, Hall, Koschmann, Lemke, Gamoran Sherin and Sherin (2010) define *data selection* to refer to the process of zooming in to explore particular information within the complex video corpora. Jordan and Henderson (1995) use the word *event* to refer to meaningful episodes in interactions which have identified beginnings and endings. The selected video clips for video analysis can be regarded as events reflecting the researcher's specific interest. Thus, the criteria for an event varies according to the theoretical frameworks, research interest and questions (Derry *et al.* 2010). Jordan and Henderson (1995) see selectively employed video analysis as especially useful when studying authentic learning activities and work practices in complex, real-world settings. In practice, data selection often already happens in the decision on what to record (Derry *et al.* 2010). For example, Robson (2016) explored metacognitive and self-regulatory behaviour among 3–4-year-old children by focusing analysis on adult- or child-initiated play situations and exploring indications of metacognitive knowledge, metacognitive regulation and emotional and motivational regulation from them. Pino-Pasternak, Whitebread and Tolmie (2010), in turn, studied parent–child interactions in homework-like situations, zooming in the analysis particularly on parents' socio-emotional or instructional behaviours and describing those interactions in depth.

The analysis of video data has been conducted in various ways, ranging from coding of the amount or length of certain gestures (*e.g.* Woodward & Guajardo

2002) to thick, qualitative descriptions of meaning-making processes without the development of specific coding schemes (e.g. Turner *et al.* 2010). When moving from simple counting of gestures to coding more complex human interactions, the coding schemes used to analyse human behaviour become primarily conceptual, require more interpretation and thus are more difficult to validate (Bakeman & Quera 2011). Bakeman and Quera suggest that a safe way to code observed behaviour is to apply a ready-made, validated coding scheme with a similar theoretical background. This, however, limits the results to the researched categories, whereas a qualitative, data-driven approach might bring out new aspects of researched phenomenon. Often, the approach to video analysis of interactions lies somewhere in between. For example, general theoretical perspectives and coding frameworks have been used to frame the analysis, which has been taken a step further to generate thick descriptions and contextualisation of the phenomenon researched (e.g. Pino-Pasternak *et al.* 2014, Snell 2011). Another common way to analyse observational data when exploring learning processes is quantification of qualitative data (Chi 1997). For instance, Molenaar and Chiu (2012) studied primary-school children's collaborative learning by exploring the sequences of regulatory behaviours. In their study, content analysis was used to create a coding scheme that includes both cognitive regulatory activities and interactional variables. Based on these variables, they conducted statistical discourse analysis.

4.2 Video-stimulated recall interviews

According to Jordan and Henderson (1995), participants' reflections can provide valuable information on the social interactions researched and reveal participants' perspectives and views of the world, allowing the researcher to reflect on the analysis and its results. Stimulated recall interviews (SRI), in particular, have been proposed as a method for exploring why people act in certain ways in different situations and what their motivations for the strategies used in interactions and practices are (Dempsey 2010). The practical purpose of SRI is to give participants stimuli to recall and reflect on their thoughts concerning the situation of interest (Lyle 2003, Vesterinen *et al.* 2010). In video stimulated recall interviews (VSRI), the stimuli are video recordings.

SRI is regarded as a method with potential for studying cognitive strategies and learning processes (Morgan 2007). Compared to traditional interview methods, the value of SRI lies in bringing the participants closer to the activities in question, revealing understandings of others' actions and the participants' goals and tying it

all in to the context of the activities (Lyle 2003). In research, VSRI has been used, for example, to explore children's perceptions of their learning experiences in school settings (Morgan 2007). Powell (2005), in turn, used SRI to uncover teachers' reflections on classroom situations, including active learning, and to find indications of teachers' tacit knowledge about pedagogical practices related to it. Bøe and Hognestad (2015) studied teacher leadership using methodological triangulation of shadowing, video observation, contextual interviews and SRI. In their study, SRI served as a method to focus on teachers' reflections of their work practices related to leadership and the meanings they give to these practices (Bøe & Hognestad 2015).

SRI is based on the premise that people are capable of observing and verbalising their internal processes (Gass & Mackley 2000, Vesterinen *et al.* 2010). It has been pointed out, though, that an interview might not stimulate thought processes that reliably reflect the actual thought process of interest (Lyle 2003). Individual ability to reflect on one's own thinking and actions can vary based on both personal skills and the study focus. Some activities can be automated or based on tacit knowledge, which may prevent their verbalisation (Toom 2006, Vesterinen *et al.* 2010). To conclude, SRI has been recognised as a useful method if certain requirements are met. For instance, the data collection method needs to be valid to capture the phenomenon of interest, and the participants need to be able to reflect on their actions related to the phenomenon. Triangulated with other research methods, such as systematic observation, SRI can add valuable information to the analysis of interactions.

4.3 Participants and context

This dissertation includes participants from two educational contexts. Table 1 presents a summary of the participants, context and data collection and analysis. The participants in *Study I* were 6–9-year-old pupils from one Finnish primary school, with a mixed pre-primary and primary-school class of grades 0–1. In Finland, children generally enter primary school the year they turn age 7 years. Pre-primary school begins a year earlier and emphasises academic preparation for primary school. The participants in this study were from four classrooms at three grade levels. Six children were selected from each classroom based on their teacher-rated scores in a questionnaire measuring social competence (Multisource Assessment of Social Competence, MASCS, Junttila *et al.* 2006). Twelve children were assessed to have high social competence, and 12 low social competence.

Twelve girls and 12 boys participated in the study, and three children with high social competence and with low social competence from each class were selected for video observations. The class activities consisted of literature, maths, science, religion and history studies.

Studies II and *III* were conducted in Finnish open day-care facilities which were designed for research and teaching purposes. In Finland, open early education is provided, especially for children who do not participate in general early education but are cared for at home. In open early education, 2–5-year-old children participate in three-hour sessions of open day-care activities two or three times a week. In this study, the videotaped day-care activities were part of three-hour sessions of general open day-care activities provided for two groups of 15 children (total: 30 children) twice a week. One group was present at a time. Eight teachers (two teachers and six teacher trainees) worked with both groups at different times. Two teachers remained the same throughout the data collection, while three teacher trainees worked in the autumn term, and three in the spring term. Group activities were normally led by two to four teachers. These eight teachers were the participants in *Study II*, which explored teachers' co-regulation in children's authentic challenging situations. The teachers were also invited to participate in VSRI, during which they were shown video recordings of socio-emotionally challenging day-care activities. *Study III* focused on 30 2–5-year-old Finnish children who regularly participated in open day-care activities. These activities consisted of various teacher-directed programmes, free play and lunch.

Table 1. Summary of Studies I, II and III.

Studies	Study I	Study II	Study III
Participants	7–9-year-old children (N = 24)	Teachers (N = 8)	2–5-year-old children (N = 30)
Context	Primary-school classroom activities	Open day-care activities	Open day-care activities
Aim	Explore ER (emotion regulation) strategies and success in strategy use among children rated high or low in social competence.	Explore teachers' co-regulation strategies and which strategies teachers identify using.	Explore children's independent and teacher-supported ER and BR (behaviour regulation) strategies.
Methods	Video analysis MASCS questionnaire	Video analysis Stimulated recall interviews	Video analysis
Analysis	Identifying strategies Mann-Whitney U-test for success differences in ER.	Identifying strategies and their relations to each other. Cohen's Kappa test for teachers' identification of strategies.	Identifying strategies and their relations to each other. Sequential analysis for the associations of strategies. Chi-Square test for independent and teacher-supported strategies and adaptation of strategies.

4.4 Data collection

This dissertation involves two different data collections. In the first, data on classroom interactions (*Study I*) and, second, data on interactions in day-care settings were collected (*Studies II and III*). The studies were aimed at exploring authentic classroom and day-care activities, so no interventions were included in the studies.

In *Study I*, children's classroom activities during typical school days were videotaped over approximately seven weeks. Two researchers were present in the classroom and videotaped one child at a time. Each child was videotaped during two different lessons over the data collection period. The video recordings lasted for the whole lessons, and a total of 48 lessons and 32 hours of video recordings were collected. The teachers also assessed the children's social competence using the MASCS questionnaire. In *Studies II and III*, the interactions among children and teachers during authentic day-care activities were videotaped for three hours a day over ten days. Three cameras were used to record activities in different areas of the facilities, generating 90 hours of video recordings. The researcher was not visible to the participants but was present in the control room, directing the cameras and making notes with time stamps to indicate socio-emotional challenges.

For *Study II*, VSRI with the teachers were conducted two to four weeks after the video observations. In the interviews, teachers were shown video clips of socio-emotionally challenging situations in which they were present and co-regulated children. The teachers were first asked if they remember the situation and, if so, what they did in the situation and why. The question of strategies was further investigated by asking what practical strategy they used to deal with the situation.

4.5 Data analyses

The analysis of video data for each study in this dissertation began similarly: challenging situations were identified, and categories of teachers' co-regulation strategies and children's emotion and behaviour regulation strategies were created and reformulated based on data-driven analysis of video events and literature reviews of different regulation strategies (Hsieh & Shannon 2005, Whitebread & Pino-Pasternak 2013). Different approaches were taken towards the quantification of the data. In the video analysis in *Study I*, the use of different strategies in the events was calculated, and success in emotion regulation during events was evaluated based on the observation data and the conceptual definitions of emotion

regulation. In *Study II*, the frequencies of co-regulation strategies were calculated, and the matches and mismatches of co-regulation strategies observed and identified by the teachers in VSRI were subjected to quantitative analysis. In *Study III*, in addition to calculations of the frequencies of children's use of different strategies, the associations of strategy types and teacher involvement were tested, and children's strategies and adaptive behaviour during the challenging events were compared to situations with and without teacher involvement.

4.5.1 Video analysis of socio-emotionally challenging situations

In the video analyses, selectively employed video analysis was first undertaken, looking for events that could be regarded as socio-emotionally challenging based on the following selection criteria: socio-emotionally challenging situations were defined as situations that involved clear emotional reactions and/or opposite or variant goals or interpretations of the situation among children or teachers (Arsenio & Lover 1997, Järvenoja *et al.* 2012). In *Study I*, 167 events with socio-emotional challenges were selected for further analysis from the video corpus of classroom activities. The analysis of the challenging situations consisted of identifying and classifying qualitatively different challenges and formulating categories of emotion regulation strategies based on both observations and the literature (Hsieh & Shannon 2005, Whitebread & Pino-Pasternak 2013). In the coding, verbal and physical strategies were considered. Additionally, events were analysed based on the differences in children's success in emotion regulation (Whitebread *et al.* 2009). Statistical analysis was performed to compare the success in emotion regulation achieved by children in the high and low social competence groups during events. Mann-Whitney U test, which is suitable for testing independent non-parametric variables (Cohen 1988), was used to assess the statistical significance of the results.

In *Study II*, 30 events with socio-emotional challenges were selected from the video corpus of day-care activities for further analysis of teachers' co-regulation strategies. All 30 video events were shown to the teachers involved. The strategies identified in the video analysis were assessed in two ways. First, they were divided into emotion- and activity-focused strategies. Second, it was determined whether the teachers' strategies focused on providing the children with strategies to manage challenges, modifying the children's behaviour and the challenging situation or supporting the children's understanding of the situation. Combinations of different strategies were also assessed. Video events were then used as a stimulus in SRIs to explore what strategies teachers reported using in the events. Cohen's Kappa

(Cohen 1988) was used to explore the matches and mismatches of the observed and teacher-reported co-regulation strategies used during challenging events.

Study III was completely based on a video analysis of socio-emotionally challenging situations exploring children's emotion and behaviour regulation strategies in interactions during these events. Seventy-five challenging events were chosen for analysis and accordingly divided into those when the children managed the challenge by themselves and those in which teachers were involved. These two conditions were used in the analysis to explore what strategies the children used and how they could adapt their strategy use. After a detailed analysis of the strategies based on observations and the literature, sequential analysis of the strategy types and teacher involvement was performed to explore whether certain strategies followed one another more often than determined by chance. Using Observer XT software, the analysis began by forming a 6 x 6 matrix for the five strategy types and teacher involvement. Chi-square statistics for the matrix were calculated. Next, the associations between different strategy types and teacher involvement were analysed by looking at the significant z scores from adjusted residuals with alpha levels .05 and .001 ($z < 1.96$, $z < 2.58$). These scores show whether a particular behaviour occurred significantly more or less frequently before or after another behaviour than expected (Bakeman & Quera 1995). The associations of strategy types with teacher involvement were analysed similarly. Finally, the chi square test (Bakeman & Quera 1995) was used to explore two conditions of teacher involvement (no teacher involvement/teacher involvement) in children's strategies and children's adaptation of strategy use.

4.5.2 Analysis of stimulated recall interviews

To explore how well the teachers identified their own strategic activities (Lyle 2003), VSRI (Study II) were analysed using the co-regulation strategy coding scheme developed in the observation analysis of challenging events. When teachers verbally described their strategic activities in the interviews, the researcher coded these descriptions into one of 14 strategy categories. Next, the results from the systematic observation and teachers' identified co-regulation strategies were compared. If the teachers described using similar strategies in the events that they watched in the SRIs as the researcher identified in the systematic observation of the same event, this was coded as a match. The matches and mismatches of observed and teachers' reported co-regulation strategies during the events were tested using Cohen's Kappa statistic, which has been mainly used for assessing the

reliability of the coding categories and agreement reached in coding different types of data by more than one researcher (Bakeman & Quera 2011, Cohen 1988).

4.5.3 MASCS questionnaire on children's social competence

The participants in *Study I* were selected based on the results of teachers' assessment using the MASCS social competence scale (Junttila, *et al.* 2006) in order to enable comparisons of high and low socially competent children's strategies and success in emotion regulation in socio-emotionally challenging situations. The questionnaire was composed of 15 items measuring factors such as co-operation skills (*e.g.* 'effectively participates in group activities'), empathy (*e.g.* 'is sensitive to the feelings of others'), impulsivity ('has a short fuse') and obtrusiveness (*e.g.* 'argues and quarrels with peers'). The MASCS questionnaire's validity for measuring the social competence of elementary school children has been confirmed (Junttila *et al.* 2006). In this study, 12 children assessed to have high social competence and 12 children assessed to have low social competence were selected to be videotaped in authentic classroom activities.

In the analysis, the differences in the emotion regulation strategies and socio-emotional challenges of the low and high social-competence groups based on the questionnaire were explored. The two social competence groups were also compared statistically using the estimations of success in emotion regulation.

4.6 Evaluation of the research

In this dissertation (*Studies I, II and III*), the challenges and specific requirements of studying children were considered in the methodological decisions. Video-based methods (video observation and VSRI) were considered to be useful in studying regulation activities and teachers' reflections on these activities. In general, research design in this study was based on assumptions familiar from interaction analysis research (Jordan & Henderson 1995), stating that the knowledge and action are situated in the interactions of the members of community. The aim was to identify the regularities of how participants interact with the social and material world (Jordan & Henderson 1995) and how they share the resources with each other (McCaslin 2009). More specifically, this study assumed that authentic everyday interactions provide the context in which children rehearse, conduct and are supported in regulatory activities in a natural way (Whitebread & Pino-Pasternak 2013).

Compared to traditional research methods, video observation offers the advantage of generating data closer to the actual event (Jordan & Henderson 1995). Video analysis skips reconstruction of the phenomenon through the participants' interpretation (Jordan & Henderson 1995, Winne & Perry 2000). Video recordings also make it easier to analyse complex interactions with the possibility to repeatedly view recordings, instead of making notes at the moment (Jordan & Henderson 1995). Especially among young children, video research has been seen as a reliable method to explore their psychological processes as children's abilities to verbalise and reflect are still developing (Whitebread *et al.* 2009). In this dissertation, video observation of authentic interactions was regarded as a suitable method to explore young children's emotion and behaviour regulation for several reasons. First, children's actual regulatory activities can differ from their reflections of these activities (Cole *et al.* 2009). Second, 2–5-year-old children might not possess sufficient verbal abilities to provide information about their regulatory activities. Third, it was assumed that focusing on observations of authentic situations enabled capturing the contextual and interactional features of children's emotion and behaviour regulation (Whitebread *et al.* 2009).

Despite the advantages of video research, some limitations of data collection and analysis affect the reliability of studies using video recordings as the main data source. In practice, the camera cannot capture all the angles of interactions, and especially in authentic situations, problems capturing speech might occur (Jordan & Henderson 1995, Roschelle 2000). In this research, the challenge was to obtain high-quality video data which recorded the utterances of a particular child or a teacher when several children were talking at the same time without using wearable microphones. These problems related to data quality were addressed in *Studies II* and *III* by placing wireless microphones around the day-care facilities and by appropriately zooming and steering the camera to capture the interactions as well as possible. Also, if needed, situations could be observed using two cameras recording from different angles as three cameras were recording at the same time. In *Study I*, the classroom activities were less noisy, so there were fewer challenges capturing speech than in day-care activities. High-quality recording devices also helped ensure the data quality.

The impact of the video camera on participants also needs to be acknowledged when doing video research. Whether awareness of being video recorded affects and changes participants' normal behaviour needs to be considered (Jordan & Henderson 1995, Roschelle 2000). Studies using video research, however, have shown that, in the long run, participants forget about the presence of the camera

and return to their normal behaviour (Jordan & Henderson 1995). In *Study I* of this dissertation, it could be noticed that students quite quickly got used to the camera in the room. In *Studies II* and *III*, the participants were aware that they were being recorded. The teachers and children were told about it in advance. The cameras, however, were fixed in a laboratory-like open day-care facility, and no one was visibly filming the interactions, which made the situation more natural-like.

The power of the analyses in this dissertation is derived primarily from the interpretation of the observed data. The analytical choices were based on the interaction between the theoretical perspectives, previous research findings and detailed, exhaustive review of the data (Chi 1997, Whitebread & Pino-Pasternak 2013). The analyses consisted of a detailed qualitative analysis of observational data, which led into the quantification of qualitative data (Chi 1997). The data analysis was directed by clear research questions and a theoretical understanding of regulatory processes.

One limitation of mere video analysis of interactions is that it cannot detect internal processes, such as the reasoning, intentions or goals of the participants in the researched context unless they are verbalized (Whitebread & Pino-Pasternak 2013). Video analysis also cannot provide information about the historical context of the captured behaviour (Powell *et al.* 2003). In *Studies I* and *III*, the interpretations of self-regulatory behaviours were based only on visible behaviours, and more internal self-regulatory behaviours, such as cognitive reappraisal (Gross 2014), may have not have been detected. Although video analysis gives direct information on the behavioural enactments of children at that moment, other research methods such as story-based interviews or other self-reports designed for children (*e.g.* Davis *et al.* 2010, Waters & Thompson 2016) may better reveal children's own perceptions of emotion regulation strategies and children's understanding of internal regulation processes. Some earlier research conducted using story-based interviews (Lagattuta & Wellman 2001, Pons *et al.* 2004) has evidenced that even children as young as three years old show signs of awareness of cognitive processes eliciting emotional reactions, such as remembering a past sad event causing sadness. However, there is mixed evidence provided by similar methods studying children's understanding of emotion regulation strategies. Some studies show that children under school age primarily prefer strategies to regulate the environment rather than their internal states (McCoy & Masters 1985, Pons *et al.* 2004), whereas other studies have provided evidence of even 5-year-olds describing strategies of cognitive reappraisal (Davis *et al.* 2010). This raises the question of whether different ways of applying story-based methods have effects

on the research results. Compared to these methods, the benefits of the present study's approach are in exploring what children actually do instead of what they would hypothetically do or what kinds of strategies they are aware of, revealing more reliably the actual level of children's abilities to use particular strategies. Overall, video analysis tackles with challenges any method conducting research with children has, the problem of exploring mental processes of children with yet developing ability to verbalise or reflect on their mental processes (Whitebread *et al.* 2009). In *Study II*, VSRI were conducted with the teachers, which provided information about their interpretations of their activities in the video events shown.

Another issue in video analysis is related to the selection of data for analysis. When placing and aiming a video camera, the researcher makes choices about what kinds of interaction to analyse and prefers some events over others. Moreover, it is often necessary to narrow down the amount of data based on certain criteria as analysing video data is often complex and time-consuming. This can be regarded as a limitation of video analysis, as it always entails a choice of leaving something out (Pirie 1996, Powell *et al.* 2003). In this dissertation, the focus of analysis was on socio-emotionally challenging events, and it was acknowledged that analysing only situations clearly indicating a socio-emotional challenge can miss a full range of regulatory behaviours in which children normally engage in in various situations in day-care settings. For example, strategies to regulate emotions can already be used before the challenge escalates (Gross 2014). To detect these strategies, the video data should either broaden its focus from the challenges to overall interactions, which in turn would result in an extensive amount of data, or these strategies should be explored with different methods, such as earlier mentioned self-reports or interviews suitable for children. A new promising method for detecting situations calling for emotion regulation may also be the use of physiological measures, which can more accurately detect a state of arousal among participants (Järvenoja *et al.* 2017).

When assessing the reliability and validity of research, the research data and the analysis methods need to be considered (Peräkylä 2011). It has even been stated that reliability and validity should always be evaluated based on each paradigm's own terms (Healy & Perry 2000). According to Golafshani (2003), the reliability of quantitative research arises from the replicability and consistency of the results, while in qualitative research, reliability emphasises the quality of the study: whether the study is able to increase understanding on the phenomenon researched. When it comes to the validity of research, Golafshani (2003) regards it as the correspondence of the methodology to the researched phenomenon and the

correspondence of the interpretations with the data and previous research. Simply put, Golafshani (2003) states that the validity of research emerges from whether the methods used are in line with the focus of research.

In assessing the reliability and validity (or the quality) of any study but especially qualitative studies, transparency becomes a key notion (Flewitt 2006, Volet & Summers 2013). In this dissertation, detailed descriptions of the theoretical groundings, research settings, analysis procedures and rationale behind the methodological and analytical choices have been provided to increase the transparency needed to evaluate both the reliability and the validity of the studies. When studying authentic settings, it is not possible to create circumstances that can be replicated, but detailed descriptions of procedures do allow for replication of the study in different contexts.

At the core of the reliability and validity of this study are the interpretations of the children's and teachers' observed behaviours. The assessments of success in emotion regulation (*Study I*) and adaptation of emotion and behaviour regulation strategies (*Study III*) relied on theoretical definitions and operationalisations introduced in earlier literature (Hadwin 2013, Whitebread *et al.* 2009). Interpretations of behaviours indicating success as well as adaptation in emotion regulation were conducted based on children's observable behaviour in the various different challenging situations. Many studies have favoured more controlled settings exploring general self-regulation skills of children (*e.g.* Marshmallow test, Mischel, HTKS by Ponitz *et al.* 2009) or used parent or teacher reports on rating children's regulatory behaviours (*e.g.* CBRS, Bronson *et al.* 1990, CBQ, Rothbart *et al.* 2001). These validated tests may provide a more reliable way to explore children's general abilities to self-regulate compared to the present study exploring aspects of successful regulation in authentic situations. Validated tests measuring general regulation abilities can also provide valuable information about individual differences for analysis of authentic interactions. In *Study I*, the MASCS-questionnaire for social competence was used to explore differences among children with different social competence levels in qualities of strategies and success in using them. However, these measures of general competence cannot be similarly connected to the interactions around children's specific behaviours and may fail to explain the contextual factors affecting children's regulatory behaviour in that particular situation. The development and validation of more context sensitive tools for assessing self-regulatory behaviours may increase the quality of a study conducted in authentic settings (Järvenoja *et al.* 2015).

The classification of emotion and behaviour regulation and co-regulation strategy categories was developed based on the theoretical definitions and categorisations of the researched phenomenon in the literature (*e.g.* Gross 2014) and exhaustive qualitative reviews and reformulation of the coding scheme based on the observations. When forming coding schemes for observable indications of regulatory behaviours, the possibility of different levels of coding needs to be acknowledged. These coding levels can range from visible physically based categories that are easy to detect to socially based categories that require more interpretation and cultural understanding from the observers (Bakeman & Gottman 1997, Whitebread *et al.* 2009, Whitebread & Pino-Pasternak 2013). To avoid extensive interpretation of the meanings or goals of the observed activities, the strategy categories in this study were designed to be simple to detect from the participants' observable physical and verbal behaviour. Even though described in detail, the present study's classifications may still simplify the complex phenomenon of emotion and behaviour regulation by grouping together different behaviours that may be qualitatively different and used in more or less adaptive ways depending on the context (*e.g.* Aldao *et al.* 2015, Gross & Thompson 2007). It is acknowledged that more sophisticated categorizations that emphasize the qualities of strategy use in relation to contextual goals and demands could offer even more useful information of children's abilities to use emotion and behaviour regulation strategies in the challenges they face.

A detailed exploration of regulatory interactions in authentic situations using video analysis sets limitations to the number of participants in the study, which makes it difficult to add individual factors, such as age, general regulation skills or temperament, to analysis of video data. It is also a problem in terms of reliable generalisation of the research results (Whitebread & Pino-Pasternak 2013). This is a limitation of the present study, as particularly children in the age range of two to five years develop rapidly in terms of regulation skills (Whitebread & Basilio 2012). However, a larger number of participants may require a more controlled setting, a shorter period of observation and a less detailed analysis of behaviours, which, in turn, may not reach all the aspects of interactions present in naturally occurring socio-emotional challenges children engage in.

Inter-rater reliability was used in the studies in this dissertation to ensure the reliability and validity of the observation analyses and the analysis of VSRI. Chi (1997) raises three questions concerning inter-rater reliability; first, how carefully the categories need to be defined before coding; second, whether disagreements between coders always need to be resolved; and third, whether disagreements

should be discussed during coding. In this study, the researcher developed the categories, and the definitions were predefined using operational descriptions of the theoretical definitions of socio-emotional challenges, emotion and behaviour regulation, co-regulation and adaptation. The second researcher, who acted as an inter-rater coder, was provided with the coding scheme to identify which types of behaviours to code in the observed events. The coding scheme was examined and reformulated based on the discussions of the meanings and functionality of categories with the second researcher. This procedure ensured that the understanding of the researched phenomenon was mutual, the categorisations of behaviours were valid, and the coding of the behaviours was reliable and could be replicated.

4.7 Ethical considerations

In this research, ethical issues were handled following the principles of the Finnish Advisory Board on Research Integrity (2012: 28–40), along with the guidelines of the research community and the participating educational institutions. The measures used in the study met the requirements of the ethical guidelines related to the use of children as research participants. The participants and their parents were informed about the study and that participation was voluntary. In *Study I*, which was conducted in a primary school, consent for participation was collected from the children themselves, as well as their teachers and parents. Due to the research and teaching purpose of the facility in *Studies II* and *III*, the parents of all the children participating in the day-care group activities were asked to complete consent forms for research before the children were accepted to the open day-care group. The teachers and teacher trainees were also provided with consent forms for video observation and VSRI. Due to the non-intrusive nature of these studies, consent for particular interventions and trials was not needed. The parents of the participants were informed about the study, its purpose and the particular times when data were collected. The participants were also informed about the study in a way suitable for their age. They were also informed that their activities were recorded.

When making recordings of individual subjects, privacy and confidentiality concerns need to be considered, especially when researching vulnerable populations, such as young children. The issue of anonymity arises in video recordings as the participants in the video are recognisable. This must be taken into account when storing, analysing and presenting the research data (Derry *et al.* 2010,

Flewitt 2009). In this dissertation, the participants' anonymity was taken into account, and the confidentiality of the collected data was ensured by appropriate storage of the recordings. The video recordings were viewed only by the researchers and were not shown to outside viewers at any point. Instead, examples of the data were presented in transcript form in publications and conference presentations. When images were shared, the participants were rendered unrecognisable. The anonymity of participants was also ensured by using pseudonyms in publications and conference presentations.

5 Overview of the articles

This dissertation consists of three studies reported in three empirical articles. *Studies I* and *III* investigated how children use emotion and behaviour regulation strategies in socio-emotionally challenging situations in educational settings. *Study I* focused on primary-school children's emotion regulation strategies in socio-emotionally challenging classroom situations. *Study III* explored preschool-aged children's independent and teacher-assisted emotion and behaviour regulation strategies in socio-emotionally challenging situations in day-care settings. *Study II* examined teachers' use of co-regulation strategies and awareness of their use of strategies when children faced socio-emotionally challenging situations in day-care settings.

These three articles are based on the assumption that, when children act in educational settings, they face various situations requiring the use of emotion and behaviour regulation strategies. The ways in which children engage in emotion and behaviour regulation and access different strategies are affected by both the children's individual skills and external influences in challenging situations.

5.1 Study I: Investigating children's emotion regulation in socio-emotionally challenging classroom situations

Study I was grounded on the notion that the ability to apply appropriate strategies to regulate emotions helps children manage the academic and social demands of the school environment (Boekaerts 2011). The study aimed at describing how emotion regulation skills manifest in authentic socio-emotionally challenging classroom situations by exploring what kinds the socio-emotional challenges children encountered and the types of strategies they used when regulating emotions in these situations. The study investigated whether children assessed as having low and high in social competence faced different challenges. In addition, the children's different strategies were identified, and their success in emotion regulation during challenging situations was explored by making comparisons between children rated to have low and high social competence.

The study data consisted of video recordings of authentic classroom situations involving the children selected based on their assessed social competence (N = 24, 12 high and 12 low socially competent children). The video data were first analysed using selectively employed video analysis, focusing on situations in classroom activities when challenges arose. The analysis of the video events entailed

exhaustive analysis of the children's verbal and non-verbal activities. The analysis of the children's different strategies and success in emotion regulation was conducted in dialogue with the observational data and the theoretical literature concerning emotion regulation and associated strategies.

The study findings showed that, first, the children faced various challenges in classroom activities and that the children assessed to have high social competence experienced fewer socio-emotionally challenging situations than the children assessed to have low social competence. The high social-competence group's most common challenges were dealing with mistakes, evaluation and criticism, whereas the low social-competence group most commonly faced challenges in remembering and following rules. Second, the results showed that the children used qualitatively various regulation strategies, and expression of emotions in challenging situations was the most commonly used strategy in the high social-competence group. The second most commonly used strategy by this group was attention-focusing strategies. In the low social-competence groups, switching to alternative activities was the most commonly used strategy, and expression of emotions was the second most commonly used strategy. Based on these results, the children with high social competence seemed to be more able to refocus their attention towards the task when encountering challenges than the children with low social competence, who more frequently switched to an alternative activity (*i.e.* off-task). Finally, the study results also indicated a significant difference in the two groups' emotion regulation during challenging events favouring the high social-competence group. The two groups also differed in the quality and success of their strategy use. Overall, *Study I* suggested that the level of skills in social competence can contribute to the challenges children face and the amount, quality and success of the strategies they use in classroom activities.

5.2 Study II: How teachers co-regulate children's emotions and behaviour in socio-emotionally challenging situations in day-care settings

In *Study II*, the challenges that children encountered in day-care settings were explored by focusing on how teachers supported the children in managing these situations. This study was based on the understanding that the quality of teacher support contributes to children's developing abilities to manage emotions and behaviour (Rimm-Kaufman *et al.* 2009). The aim of the study was to explore the teachers' co-regulation strategies and the aspects of socio-emotionally challenging

situations these strategies targeted. In addition, how the teachers themselves recognised the strategies they used when co-regulating children in these situations was investigated.

The study participants were eight teachers providing day-care activities for children. In the analysis, socio-emotionally challenging events in the video corpus were identified, and the teachers' activities in these events were described and analysed in detail, examining the indications of co-regulation of the children's emotions and behaviour. The teachers were also invited to participate in VSRI, in which they reflected on their own co-regulation strategies based on the video stimulus of challenging situations. In the analysis, the strategies identified in the systematic observation and the strategies identified by the teachers in the VSRI were compared using Cohen's Kappa statistics.

The results of *Study II* indicated that the teachers mostly focused on co-regulation strategies targeted at influencing the children's activities, such as giving instructions and physically directing their activities. The teachers used strategies discussing and acknowledging emotions less frequently. The teachers did not use only one type of strategy but, rather, combined strategies with different means, such as directly modifying the children's activities, supporting the children in interpreting challenging situations and providing the children with strategies to manage challenging situations. The results also showed that the teachers were, to an extent, aware of what types of strategies they used, but the teachers identified them less frequently than in systematic observation. The teachers also identified physical strategies better compared to verbal strategies.

5.3 Study III: Young children's use of emotion and behaviour regulation strategies in socio-emotionally challenging day-care situations.

Study III investigated the ways that children ages 2–5 years engaged in emotion and behaviour regulation activities in socio-emotionally challenging situations in day-care. The research was based on the assumption that, when facing challenges, children apply and rehearse emotion and behaviour regulation strategies and in these situations, they benefit from external support (Morris *et al.* 2007). More specifically, the study investigated the strategies that the children used independently and with teacher involvement and the sequential connection between the strategies and teacher involvement. Finally, how the children were able to adapt strategy use independently and with teachers involved was studied.

Using the same video corpus as in the *Study II*, the challenging events were located and analysed in detail. First, the children's regulation strategies were analysed comparing two conditions: independent strategy use and strategy use with teacher involvement. The differences in the strategies used in these conditions were statistically tested. Second, the children's regulation activities were subjected to lag sequence analysis to explore whether certain strategy types were significantly more frequently followed by each other or teacher involvement and whether teacher involvement was followed by certain strategy types. Third, when analysing children's behavioural patterns in strategy use, event-level analysis was performed to statistically test whether teacher involvement increased the children's abilities to adapt their strategies in challenging situations.

The study results showed that the children's interactions with teachers and peers influenced their strategic activities. First, interactions with the teachers in challenging situations changed the children's strategy use. When acting independently, the children mostly used simple strategies, such as physical regulation and expression of emotion, whereas in the presence of teacher involvement, the most common strategy was redirecting the activity or attention. Second, the sequence analysis results provided evidence that the strategies were not used at random but influenced and were influenced by the other strategies used in challenging situations. In particular, similar strategy types, such as situation modification and redirecting activity/attention, were often conducted in sequence with each other. The sequence analysis also showed that significant associations of certain strategy types with teacher involvement. For example, when children used the strategy of situation selection, namely switching to off-task activities, it seemed to trigger teachers' involvement, which, in turn, was followed by children redirecting their activities or attention and providing information. Finally, the analysis of children's behavioural patterns in the adaptive use of emotion and behaviour regulation strategies revealed an association of teacher involvement with young children's adaptive use of strategies. In conclusion, the results showed that the interactions in challenging situations influenced not only on what types of strategies the children used but also when the children used them and how the children were able to change their strategy use when needed.

6 Discussion

Young children's emotion and behaviour regulation is a complex phenomenon. It involves children's own traits and growing abilities but cannot be studied in isolation from the interactions that affect and are affected by it. A strong body of research recognises the importance of early interactions in the development and learning of self-regulation skills (Colman *et al.* 2006, Kopystynska *et al.* 2016, Lengua *et al.* 2013, McCoy & Raver 2011, Miller *et al.* 2015, Rimm-Kaufman *et al.* 2002), which, in turn, have been linked to children's educational outcomes (Kim & Hodges 2012, Schmitt *et al.* 2015, Valiente *et al.* 2010) and success in social relations (Blair & Raver, 2015, Denham *et al.* 2003). Particularly in educational settings, children clearly benefit from teachers' assistance in academic activities and in ways to deal with challenges in learning and social situations (Pianta *et al.* 2008, Rimm-Kaufman *et al.* 2002). In learning activities, skilled self-regulators can control cognition, behaviour and emotions to overcome motivational, cognitive and behavioural challenges related to learning (Hadwin & Oshige 2011). However, research shows that, even higher education students lack the skills or will to regulate their learning when facing related challenges (Järvenoja *et al.* 2012, Winne & Jamieson-Noel 2002). The development of SRL skills begins at early ages when the basis for self-regulation is established in co-regulatory interactions with caretakers and teachers. This trend provides a strong argument for studying self-regulation and co-regulation among young children and teachers in educational settings and analysing the authentic interactions in which children are assumed to acquire skills to manage socio-emotional challenges.

In this study, children's emotion and behaviour regulation strategies were explored among different educational contexts, age groups, and social skill levels without neglecting an essential factor in these growing abilities: interactions. The study relied on socio-cognitive and socio-cultural perspectives to approach self-regulation as an individual and interactional process in educational settings. This research focus was also justified by the results from developmental research on self-regulation among young children. The methodological decision to focus the research on video analysis of authentic interactions took into account the contextual and interactional features of emotion and behaviour regulation and the age range of the participants. The study results add to the understanding of emotion and behaviour regulation processes in educational settings and emphasise the importance of appropriately focused and timed supportive actions to manage the challenges children encounter.

6.1 Main findings

In general, the main findings of this dissertation showed that the children's emotion and behaviour regulation strategy use in authentic educational settings is affected by situational factors, such as teacher involvement and interactions with others, and by children's social skills (see Figure 2). The findings suggest that both teachers and children use and combine a variety of strategies to regulate and attempt to solve socio-emotionally challenging situations.

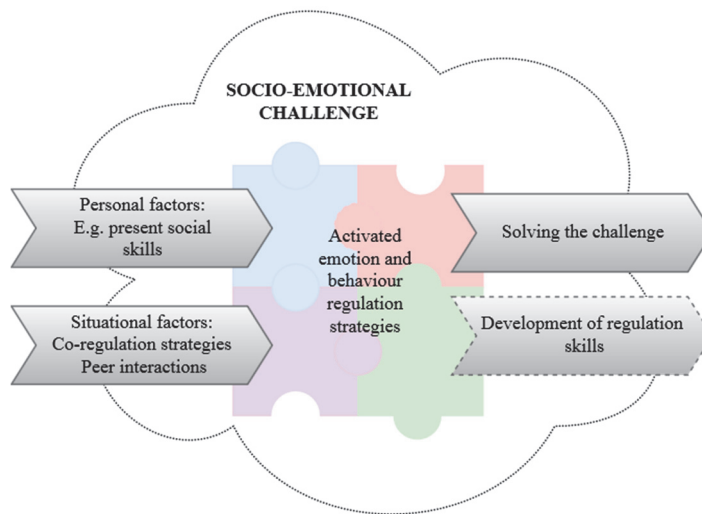


Figure 2. Main components of the findings.

The first aim of this research was to explore how young children's emotion and behaviour regulation manifested in socio-emotionally challenging situations. *This dissertation results indicate that the children's regulatory activities in the day-care context (Study III) are primarily focused on affecting the environment rather than regulating themselves.* Especially when children acted independently in socio-emotionally challenging situations, they relied on physical strategies to regulate the situation or expressed emotions or their opinions and will to maintain their position. These strategies have been found to be used by children also in earlier studies (Rimé 2007, Ross & Conant 1992, Thornberg 2006, Yan 2012). Also Cole, Dennis, Smith-Simon and Cohen (2009) found that, when facing challenges, children use

strategies to regulate the situation rather than their own emotions. However, Pons, Harris and De Rosnay (2004) and McCoy and Master (1985), who studied age differences in children's emotion regulation and understanding, showed that children experience a shift in emotion regulation strategy use as they grow older. In the results of *Studies I* and *III*, a similar shift can be seen: children in primary school (*Study I*), especially more socially skilled children, managed emotionally eliciting situations more frequently by regulating themselves than the environment. These differences can partially be explained by contextual factors. For example, challenges in classroom contexts might be more individually focused as many classroom activities are individual tasks. However, these differences can also be explained by the assumption that young children's limited skills at regulating their own emotions lead to attempts to, instead, direct regulation activities towards the environment to acquire the desired outcomes in the challenging situation. The results support the notion that, in developing emotion and behaviour regulation skills, children benefit from co-regulation with teachers to manage the challenges at hand and to expand their array of regulation strategies to manage their own emotions and behaviour. In particular, children need support to be able to reflect on their own emotions and goals and to consider others' perspectives in order to learn to activate appropriate strategies to achieve the desired social or learning goals in each situation (Bronson 2000, Thornberg 2006, Whitebread & Basilio 2012).

Second, this dissertation aimed at studying how teachers support children in regulating their emotions and behaviour in challenging situations. The results of the dissertation indicate that *teachers conduct more co-regulatory actions directed at children's activities than emotions* in socio-emotionally challenging situations (*Study II*). Similar results have been reported in earlier studies (Hyson *et al.* 1990, 2007). The results of *Study II* also showed that the teachers used different combinations of co-regulation that focus on supporting children in interpreting situations, providing the children with strategies to manage situations and directly modifying the children's activities and attention.

It has been argued that optimal interactions supporting children's self-regulation involve both acceptance of emotional interactions and guidance in managing those emotions (Cole *et al.* 2009, Gottman *et al.* 1996). Emotional validation, or coaching from caretakers, such as talking about and naming emotions, has been seen as a way to support children's developing understanding and regulation of their emotions (Gottman *et al.* 1996, Morris *et al.* 2011). If not complemented with structuring opportunities for children to rehearse using strategies, however, emotional support might not support the development of skills

to regulate emotions (Cole *et al.* 2009, Denham & Kochanoff 2002). Combining both emotional and instrumental support may help children interpret their own emotions and more appropriately focus their regulatory actions on their emotions (Cole *et al.* 2009). The children in the present research were in a developmental stage in which both understanding and regulation of emotions arise (for overview Pons *et al.* 2004), which makes appropriate support during these years especially important. This dissertation indicated that the teachers combined strategies potentially effective at supporting the skills to manage challenging situations but did not always make use of opportunities to provide the children with knowledge or awareness of their emotions.

The third study aim was to investigate the factors affecting the children's emotion and behaviour regulation in challenging situations. The results provide evidence that *situational variations, such as teacher involvement and peer interactions, influence the children's strategy use in the day-care setting*. The children's different levels of social skills also affected how they dealt with socio-emotional challenges. In classroom learning activities and in some day-care activities, strategies to resist distraction and refocus attention are especially needed and are recognised to be important aspects of self-regulation skills (McClelland *et al.* 2015, Schutz *et al.* 2006, Whitebread & Basilio 2012). The results of *Study I* showed that children with low social competence more frequently failed to maintain task focus during socio-emotional challenges than the children with high social competence. As well, the results from day-care activities (*Study III*) indicated that the children needed teachers' support to refocus their activities and attention when facing challenges. Morris, Silk, Morris, Steinberg, Aucoin and Keyes (2011) support the notion that external support in refocusing children's attention, indeed, makes a difference in challenging situations. Notably, the results of *Study III* also showed that the children rarely engaged in discursive strategies, such as negotiating and providing constructive solutions, even when the teachers were involved. This may indicate that the teachers tend to take over the regulatory role rather than provide children support so that they have opportunities to actively solve the challenge (Pino-Pasternak *et al.* 2010).

The influence of peer interactions on children's strategy use was also evident in the results of *Study III*. The strategies were not activated randomly, but similar strategies tended to follow one another. This trend has also been found in earlier studies suggesting, for example, that children follow other children's responses in conflict situation (Ross & Conant 1992, Thornberg 2006). Regarding to successful emotion and behaviour regulation in challenging situations, the present results

indicated that teacher involvement (*Study III*) and children's skill levels (*Study I*) affected how well they managed challenges, indicating that not only the choice of strategies but also the ability to appropriately use and adapt strategies make a difference in challenging situations (Aldao *et al.* 2015, Sheppes *et al.* 2014).

Overall, the results reveal the complexity of the regulatory interactions and the various regulation strategies performed by both children and teachers. The results emphasise the influences of interactions on children's strategic activities in socio-emotionally challenging situations and, thus, the importance of paying attention to what strategies children adopt and what strategies teachers use to support children's regulatory activities. The level of appropriate support also needs to be acknowledged in order to provide children possibilities to rehearse strategy use. It is evident that the children benefit from real-time support in adapting their strategy use and choosing appropriate strategies to manage socio-emotionally challenging situations in educational settings.

6.2 Final remarks and implications

To justify and ground this research, a theoretical understanding of young children's self-regulation and the methodological and analytical choices were developed based on the perspectives of socio-cognitive, socio-cultural theory and developmental research. Despite some theoretical differences, these areas have similar understandings of emotion and behaviour regulation and complement each other within this dissertation. First, this study was conducted in educational settings, so it was acknowledged that emotion and behaviour regulation activities were also related to academic activities and the processes of SRL (Boekaerts 2011, Boekaerts & Pekrun 2015). Self-regulation abilities are considered to be prerequisites of SRL, affecting the activation and monitoring of one's own learning processes (O'Malley 2005, Whitebread & Basilio 2012) and thus are an important research area in educational settings. Second, interactional processes were considered in order to explore the acquisition of emotion and behaviour regulation skills. Regulatory interactions were explored based on the socio-cultural perspective (Gallimore & Tharp 1990, Hadwin & Oshinge 2011, McCaslin 2009), which stresses the profound effects of interactions on children's acquisition of skills in higher mental processing. Finally, the research aims were justified by the body of developmental research strongly linking not only the academic and social aspects but also the qualities of interactions to young children's self-regulation skills (Calkins & Hill 2007, Graziano *et al.* 2007, McClelland *et al.* 2015).

Overall, this dissertation contributes to the research field of self-regulation by describing in detail how children's emotion and behaviour regulation manifests in real socio-emotionally challenges in educational settings, and how different interactional processes make an immediate difference to children's regulation activities. The dissertation also provides a detailed analysis of teachers' qualities of co-regulation in these situations. However, in order to provide more grounding for developing practical implications for educators, more research is needed to understand how teachers' qualities of co-regulation contribute to children's own regulatory activities at that moment (Morris *et al.* 2011) and how the support teachers provide gradually transfers into skills children can use independently (Bernier *et al.* 2010, Hofer 1994). Further exploration is needed to increase understanding on how these interactional regulatory processes manifest among children with different skill levels and age as well as in different social and learning challenges. There is a need to explore these interactions to identify an appropriate level and quality of co-regulation for teachers to optimally support children's learning and rehearsal of strategy use in both social and academic activities (Pino-Pasternak *et al.* 2010).

Studying young children's mental and emotional processes is challenging. Young children live in the moment and are less capable of using language to provide information about their internal processes and external behaviours, which decreases the reliability of research methods such as questionnaires and interviews. Traditionally, methods examining aspects of children's self-regulatory abilities have relied heavily on verbal behaviours which require that children possess language skills and consciousness of their skills. These methods may, however, undermine children's abilities to regulate their own activities (Bryce & Whitebread 2012, Whitebread *et al.* 2009). Researchers have attempted to address these problems by approaching children indirectly, for example, administering questionnaires to their parents and teachers (MASCs, Kaukiainen *et al.* 2005, CBQ, Rothbart *et al.* 2001, CBRS, Bronson 1990). In studying young children's self-regulation, also different tests have been used, such as the marshmallow test measuring delay of gratification (Duckworth *et al.* 2013, Mischel *et al.* 1989, Zimmerman & Stansbury 2003) and the HTKS measuring children's ability to follow multistep instructions (Ponitz *et al.* 2009). The results of these various data-collection methods have been statistically analysed in relation to other variables.

Despite some advantages, these research methods generally ignore the importance of meaningful contexts in research on children's self-regulation. They also use ready-made evaluation criteria to assess regulation skills as general

abilities, without describing authentic regulation processes as they occur in real situations. However, when combined with more context-sensitive research methods, these research methods can contribute valuable information to the research on children's self-regulation processes. In this dissertation, the method of video observations of authentic educational situations was chosen to increase understanding of young children's emotion and behaviour regulation not as general abilities but as visible processes in real-life, everyday challenges and interactions. The aim was to reveal the qualities of the strategies, the ways they were used and the effects from the different variables present in these situation. Thus, this dissertation provides a detailed picture of the phenomenon of emotion and behaviour regulation processes.

Even though video analysis is regarded as a sound way to research regulation activities in real time, especially among young children (Whitebread & Pino-Pasternak 2013), it should be noted that the authenticity of the researched situations poses challenges and limits to the analysis methods. It is difficult to make generalisations from real-life, situation-specific data without losing aspects of the complexity of a phenomenon (Snell 2011). In future research on young children's self-regulation, new process-oriented research methods should be adopted to manage the issue of complexity and to even more reliably study regulatory interactions. There is a need for research methods that can consider various aspects of regulatory interactions, such as how the participants' goals, the level and quality of support and the overall atmosphere of interactions interplay with children's regulatory activities. In addition, researching the transference of regulation skills from particular rehearsal situations to more general abilities and across contexts requires new methodological and analytical ideas.

At present, there is much discussion of children's emotional and behavioural problems in Finland. To prevent these problems and to support children in acquiring skills to manage social and learning challenges, emotional skills have been the focus of curriculum reform in school and early childhood education (Opetushallitus 2016a, 2016b). Additionally, some educational interventions have been conducted in schools to improve emotional skills (*e.g.* Tunnetaitojen oppitunti, a classroom activity for identifying emotions offered by the Finnish National Association for Mental Health). However, it has been stated that skills may not transfer well from simulated situations or lectures, but individuals must learn to use them in real situations to truly acquire these skills (Perkins & Salomon 1989, Weinstein *et al.* 2000). It can be assumed that learning out of context is especially difficult for young children, whose thinking is more tied to the meaningful activities in their

lives (Whitebread & Basilio 2012). Based on the idea of co-regulation and scaffolding as means to develop self-regulation skills (Meyer & Turner 2007), it is clear that, in addition to teaching about emotions by describing imaginary situations and holding separate classes to discuss emotions, support should be provided in authentic socio-emotional challenges in everyday interactions. In educational situations, these challenges provide a natural context in which children experience emotions and can learn to identify and regulate them.

Based on the understanding of young children's emotion and behaviour regulation presented in this study, practical implications for the educational field can be suggested. Teachers benefit from knowing the importance of self-regulation skills in academic and social activities in general and the impacts of teachers' regulatory activities on children. Teachers also benefit from awareness of the repertoire of co-regulation strategies they can activate to best support children in interpreting and managing challenging learning and social situations in educational settings. Teachers need to be able to evaluate the level of skills and contextual abilities that children have to manage challenges and accordingly alter their co-regulatory activity. In particular, teachers need to acknowledge that not only are instructional and organisational support in classroom activities important, but appropriate emotion-focused co-regulation is also valuable for children to learn how to understand and effectively regulate their emotions. These implications require changes in both educational practices and teacher education, in particular, acknowledging the dual role of teachers in the socio-emotionally challenging learning and social situations. The teacher-child interactions in challenging situations need to be reflected upon from at least two points of views: 1) as arenas for children to learn, rehearse and receive support for their developing skills in emotion and behaviour regulation; and 2) as educational contexts where certain social and academic goals need to be considered, and emotions affecting the pursuit of these goals need to be regulated appropriately.

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