Different is cool!
Self-efficacy and participation of students with and without disabilities in school-based Physical Education

Karin Bertills
Doctoral Thesis in Disability Research

Different is cool! Self-efficacy and participation of students with and without disabilities in school-based Physical Education
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Music ...and I can’t f*ing do it at all... I’m not tone death, I’m tone dumb! ... Some people can’t walk for Christ’s sake, some people have severe dyslexia or cerebral palsy and I’m whining about not having a gift of music...Music is more than that! Music is social! Music begins in dance! Music is actually about joining in!

When I moan about swimming or about singing, I’m really moaning about not being able to join in!

Stephen Fry
Abstract

Background: Self-efficacy predicts school achievement. Participation is important for life outcomes. Functioning affects to what degree you can participate in everyday life situations. Participation-related constructs such as self-efficacy and functioning work both as a means of participation and as an end outcome. Learning takes place in this interrelationship. How relationships between participation and these constructs vary, depending on whether impacted by disability or not, how they develop over time and outcomes of these processes need to be explored.

Method: In this three-year longitudinal study developmental processes of student self-efficacy (PE specific and general), aptitude to participate and functioning were explored. The context is school-based Physical Education (PE) in mainstream inclusive secondary school in Sweden. Data was collected from student and teacher questionnaires and observations of PE lessons. Students self-rated their perceived self-efficacy, aptitude to participate and functioning in school years seven and nine. Teachers self-rated their teaching skills. Student engagement, teaching behaviors, interactions and activities in Swedish school-based PE were observed in year eight. Relationships between the constructs and how they develop over time were studied in a total sample of 450 students (aged 12.5-15.5). Specifically focusing on three student groups, students with diagnosed disabilities (n=30), students with low grades in PE (n=36), and students with high grades (n=53) in PE.

Results: Adapted instruments to measure self-efficacy (PE specific and general), aptitude to participate in PE, and functional skills (physical and socio-cognitive were developed and validated. PE specific self-efficacy is closely related to the aptitude to participate and has effects on student engagement and general self-efficacy. Over time PE specific self-efficacy increase in adolescents, but students with disabilities initially responded negatively if their PE teachers rated their teaching skills high. They were also more sensitive to the social environment, which was associated with PE grades over time. During this time the relationship between perceived physical functional skills and PE specific self-efficacy accelerated for students with disabilities. They were observed to be equally highly engaged in PE lessons as their peers. However, students with disabilities were observed to be closer
to their teacher and tended to be less social and alone than their peers. Observed teaching skills as measured by level of alignment with syllabus, and affective tone when giving instructions showed differences in complexity and efficiency. Students in the study sample were more engaged in high-level teaching and were more frequently in communicative proximity to their teacher. In conditions of high-level teaching, teachers gave more instructions and used more materials for teaching purposes. Lessons were more often structured into whole group activities and lessons were more focused.

Conclusion: PE specific self-efficacy measures students’ perceived knowledge and skills in PE and is related to students’ aptitude to participate, general self-efficacy and functioning. The overall findings imply that the developmental processes of perceived self-efficacy (PE specific and general), aptitude to participate and functioning differ between the student groups. PE specific self-efficacy and socio-cognitive functioning improve over time in all groups. Stronger associations of PE specific self-efficacy with aptitude to participate and functional skills, and weaker with general self-efficacy were found in students with disabilities compared to their typically functioning peers. Individual factors are vital to learning, but students with disabilities seem to be more sensitive to environmental factors than their peers. The aptitude to participate declines in students with disabilities, probably due to their experience of having physical restrictions. However, while participating in PE, they were similarly relatively highly engaged as their typically functioning peers. Instructions in PE indicate differences in complexity and efficiency of PE teaching. More complex lesson content requires more instructions and more purposeful materials. Time was used more efficiently in high-level teaching conditions. Lessons were more focused and had more flow, leaving students with less time to socialize. Space was also used more efficiently, and teachers were closer to their students. Indicating that more individual support, feedback and feedforward was provided. Students with disabilities were more frequently close to their teacher than their typically functioning peers. The use of more whole group formats indicate that teaching is more differentiated in high-level teaching. When activating students physically, teachers may choose simpler self-sustaining activities, i.e. sports games. Small group formats may be used for individual development of motor skills or drills.
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## Definitions and Abbreviations

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<th>Definition</th>
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<tr>
<td>Aptitude to participate</td>
<td>Operationalized as prerequisites for participation in PE meaning the perceived will to participate in terms of ability, predispositions, safety and support</td>
</tr>
<tr>
<td>Curriculum</td>
<td>National policy document outlining fundamental values and tasks of the school and overall goals and guidelines</td>
</tr>
<tr>
<td>Criterion-referenced grading system</td>
<td>The Swedish grading system is designed to measure knowledge and skills against a fixed set of predetermined criteria</td>
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<tr>
<td>Disability definition</td>
<td>The impact of an impairment entailing barriers in relation to the environment (The National Board of Health and Welfare [Socialstyrelsen], 2007). The use of handicap is extracted from terminology</td>
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<tr>
<td>Disability</td>
<td>For international communication, operationalized as diagnosed physical, neurodevelopmental or intellectual restrictions. In Swedish communicated as impairment or disability in accordance with terminology recommended by the National Board of Health and Welfare</td>
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<tr>
<td>Final PE gradeY9</td>
<td>Final PE grade spring term year 9</td>
</tr>
<tr>
<td>fPRC</td>
<td>The family of Participation Related Constructs (Imms et al., 2017)</td>
</tr>
<tr>
<td>GeneralSE, GSE</td>
<td>General self-efficacy. A general sense of competence within the subdomains academic, social, and emotional self-efficacy</td>
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<tr>
<td>Grade</td>
<td>The assessment, on an A-F scale where A-E are passing grades and F is fail</td>
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<tr>
<td>GradeY7S</td>
<td>PE grade spring term year 7</td>
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<tr>
<td>Term</td>
<td>Description</td>
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<tr>
<td>Grading</td>
<td>Assessment of knowledge and skills</td>
</tr>
<tr>
<td>IEP</td>
<td>Individualized Education Program, written education plan designed to meet a child’s learning needs</td>
</tr>
<tr>
<td>Impairment</td>
<td>Restrictions in physical, mental or intellectual functional ability (The National Board of Health and Welfare [Socialstyrelsen], 2007)</td>
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<tr>
<td>Lgr-11</td>
<td>The Swedish national curriculum for the compulsory school, preschool class and school-age education</td>
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<tr>
<td>Participation</td>
<td>Involvement in a life situation, including the dimensions of frequency of attendance, and involvement while being there (Imms et al., 2017). Operationalized as self-perceived aptitude to participate and observed engagement</td>
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<tr>
<td>PE</td>
<td>Physical Education</td>
</tr>
<tr>
<td>PEH</td>
<td>Physical Education and Health, the Swedish school subject</td>
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<tr>
<td>PE specific self-efficacy</td>
<td>Specific competences in core content areas of the Swedish syllabus in PEH: movement, health and lifestyle, and outdoor life and activities</td>
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<tr>
<td>Physical functioning</td>
<td>Physical functional skills. Operationalized as ability to use hands, arms, legs</td>
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<tr>
<td>PPTC model</td>
<td>Bioecological systems theory in the current version, the Process-Person-Context-Time model (Bronfenbrenner &amp; Morris, 2006)</td>
</tr>
<tr>
<td>Secondary school</td>
<td>Year 7 to 9 of compulsory, inclusive, mainstream schooling</td>
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<tr>
<td>Self-efficacy</td>
<td>Perceived personal capability to organize and execute actions to attain goals</td>
</tr>
<tr>
<td>Socio-cognitive functioning</td>
<td>Connections of complex social and cognitive processes operationalized as general health, social skills, communicative (understand others and make oneself understood), behavioral and problem-solving skills</td>
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<td>----------------------------</td>
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<tr>
<td>Students in need of special support</td>
<td>Any student restricted by short- or long-term functional limitations</td>
</tr>
<tr>
<td>Syllabus</td>
<td>Purpose, core content (movement, health and lifestyle and outdoor life and activities) and knowledge requirements for school subjects</td>
</tr>
<tr>
<td>T1</td>
<td>Timepoint 1, late autumn and early spring term year 7</td>
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<tr>
<td>T2</td>
<td>Timepoint 2, early spring term year 8</td>
</tr>
<tr>
<td>T3</td>
<td>Timepoint 3, early spring term year 9</td>
</tr>
<tr>
<td>T4</td>
<td>Timepoint 4, grades collected for participants after graduation</td>
</tr>
<tr>
<td>Team games</td>
<td>Team building games, e.g. dodge ball, capture the flag</td>
</tr>
<tr>
<td>Team sports</td>
<td>Sports organized into two opposing teams, e.g. volleyball, soccer</td>
</tr>
<tr>
<td>Year 7-9</td>
<td>School years seven to nine of Swedish compulsory school, ages 12.5 – 15.5</td>
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Preface

Two young adolescents, Rebecca and Elsa were approached at a social event by a third teenager, Anna, with the prospect of making new friends. After initial introduction, Anna waffled on in a stream of words. Rebecca and Elsa were stunned! In silence they just watched the mouth that went on and on and on. Suddenly the flow of words stops, and Anna says “oh, no I’m sorry, I scare you, I always do that, scare people, because I’m different”. Rebecca’s response “different is cool!” moved me and warmed my heart. Social cues are difficult to grasp to anyone. Perhaps even more so in adolescence, where friends often become more important than the immediate family. Having neurodevelopmental disorders may add to the challenge of making friends. Whether Anna had a diagnosis is not known but hearing the words “different is cool!” she probably experienced a moment in her teenage life of being accepted by a significant other. Different is Cool! embraces the UN Convention on the Rights of Persons with Disabilities.
Introduction

What do you think is most important for your child to learn in school? Parental replies would probably be: To learn how to read, write, and do math’s. On second thoughts, they would probably add: to feel good about yourself and to gain beliefs in your abilities to achieve, problem-solve and make good decisions. The former outcomes are measured into summative final grades whereas the latter are gathered in a sense of personal competence frequently operationalized as self-efficacy. Self-efficacy may be boosted by gaining feelings of mastery, imitating role-models, receiving encouragement and by self-regulating your emotions.

In all learning, the first question to ask when encountering new challenges is: Can I do it, can I solve this problem? To learn new knowledge and skills, you are forced to step out of your comfort zone and to push your limits. To succeed you have to make an effort, you need to practice, and you must persistently stay on task until new knowledge and skills are learnt. Learning in Physical Education (PE) is different from learning in a typically academic school subject. Once a motor skill is learnt, the skill is stored in your brain as a movement memory. Motor skills may be automized, which means you never again need to use cognition to repeat the automized skill (e.g. walking, bicycling, driving a car). By doing things without thinking, energy can be spent on other things, like talking while walking. Early adolescence is sometimes referred to as the golden age for automizing, an ultimate age to learn new techniques and motor coordination skills (i.e. rhythm, balance, reaction, perception of space, adapted strength, eye-hand/foot coordination). Former experiences of mastery are most vital for acquiring new motor skills. According to the syllabus of Physical Education and Health (PEH) in the Swedish national curriculum students should be provided with opportunities for mastery experiences of physical, motor, health and outdoor life skills (The Swedish National Agency for Education, 2018). In childhood your main role-models appear in your immediate family. In adolescence friends and significant others, e.g. your sports coach or PE teacher become your role-models. Encouragement, cheers, chants and feedback are important cues for learning, how you handle success and losses and whether you are in the mood or not of achieving new knowledge and skills. Student attendance is a
prerequisite for learning and student engagement in learning activities is essential to gain knowledge and skills (Imms et al., 2017).

Gained learning experiences and feelings connected to these experiences are carried by the individual and make out the grounds for all new learning. Student self-efficacy is essential to promote student engagement and learning (Linnenbrink & Pintrich, 2003). The predictive power of self-efficacy for future success in academic achievements is well established (Schunk & Pajares, 2010). And self-efficacy in specific school subjects, e.g. PE specific self-efficacy, may be transferred to other school subjects and areas of competences affecting student overall functioning (Bandura, 1993). However, student subject specific self-efficacy may be affected both positively and negatively by their teachers. According to Skinner and Belmont (1993) teaching behaviors and student engagement mutually affect each other and are either nurtured or undermined, with effects on degree and quality of teaching and teacher support, student learning and achievement.

PE offers challenges and sensory perceptions (loud noises, body contact, vision impressions) that may impede learning for students with functional restrictions. Physical, neuro-developmental and intellectual disabilities may limit optimal learning and development. Learning in PE require teachers to communicate the syllabus to the students, align their lessons with the syllabus, and assess students’ knowledge and skills according to the syllabus. The commonly occurring collaborative activities require student-peer interactive skills. Rules on how to behave and interact for safe and successful performance must be followed. PE teachers continually report lack of knowledge in different disabilities and how to adapt and modify their teaching to include and grade students in need of special support (Block & Obrusnikova, 2007; Tant & Watelain, 2016). A decade ago, the Swedish School Inspectorate observed PEH lessons and found that a majority of PEH lessons contained competitive activities such as team sports and team games including balls. They reported a positive effect on self-efficacy in many students, but a negative effect on groups of students. In their conclusion, they suggested that inclusive teaching and student participation is dependent on how teachers link the syllabus intentions to their teaching (The Swedish Schools Inspectorate, 2010). In a recent quality report, The Swedish Schools Inspectorate (2018) identifies four areas for further development concerning

- prerequisites for learning in all three core content areas
• the fostering of a mastery (opposing competitive) climate
• individually adapted solutions for students in need of special support
• individual feed-back for student control of their learning

Student attendance is a prerequisite for participation but does not automatically mean feeling included (Imms et al., 2017). PE teachers shoulder responsibility to create learning environments where students collaborate, feel competent to master their skills, and control their body and their emotions. Teachers’ attitudes towards students with disabilities and good teacher-student relations promote positive peer interaction (Falkmer, 2013). Limited participation in PE is linked to type and degree of disability, individual will and skill to perform, and external circumstances, e.g. teachers’ lack of information and knowledge about specific disabilities (Block & Obrusnikova, 2007; Tant & Watelain, 2016). Special support with assisting paraprofessionals in PE are scarce. In their daily work, PE teachers therefore handle situation-based incidents, injuries, accidents, conflicts, and resolve the following student reactions by themselves.

National grading criteria are the same for all students. Teachers individually interpret the syllabus and assessment criteria. By law, special circumstances such as long-term disability should be treated exceptionally (SFS (2010:800)). Individualized Educational Programs (IEP) occur, mainly if the requirement of swimming 200 meters is not fulfilled. Teaching however, should be differentiated. Inclusive teaching does not mean all students must do the same activity. Teachers can facilitate participation by planning content for student preunderstanding. They can also organize lessons in a way where students are offered the opportunity to participate within, or a choice to participate segregated from ordinary classroom activity (Bredahl, 2013). Students in need of special support do activities differently from their typically developing peers and should be assessed accordingly. Teaching style and teacher-student interactions affect student health and achievement (Gustafsson et al., 2010). Grades as well as perceived self-efficacy may influence future health and trajectories of life outcomes (Engström, 2008).

This project is about the impact of individual and environmental factors on PE learning, as measured by student perceived self-efficacy, aptitude to participate, functioning, engagement and PE final grade year 9. How self-efficacy and aptitude to participate develop over time, how functional restrictions affect these concepts, and are affected by teaching style. The
overall aim of this thesis is to explore developmental processes of perceived self-efficacy, aptitude to participate, functioning and learning in school-based Physical Education and Health (PEH) during secondary school. Student voices, in terms of self-reported perceptions of these aspects are targeted in self-report questionnaires at two timepoints, year 7 and year 9. PE teachers self-rated their teaching skills when the students were in year 7. Student engagement and teaching skills were observed during PE lessons year 8. Finally, student spring PE grade year 7 and final PE grade year 9 were collected. The perceptions of and engagement in PE of students with disabilities are compared to their typically functioning peers. Their peers were categorized into either a group of students with low grades or with high grades in PE year 6, i.e. before transitioning into secondary school. Results from this thesis, may show aspects of learning in a PE environment that extends understanding of, to whom what works and under what circumstances. Special focus is on how disability affects processes linked to learning. Intended learning outcomes may be too farfetched for all students to reach a passing grade, but self-efficacy and engagement are examples of important school outcomes that may be crucial in future life, irrespectively of grades.

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1 Physical Education and Health (PEH) is the subject name in Swedish, marking the context in which this thesis is framed. PEH in this thesis refer to specific Swedish contexts. Physical Education (PE) is the term used when communicating the thesis findings in a generalizable international perspective.
Background

Self-efficacy

Am I capable? Can I do it? Do I have the will and skills? Self-efficacy refers to an individual’s belief in her ability to engage in an activity and find a solution. Self-efficacious individuals are characterized by choosing new challenging tasks, trying harder to find a solution to a problem and being more persistent to finish the undertaken task (Zimmerman, 2000). Failure is explained by matters out of the individuals’ control and followed by quick recovery. Successful achievement is attributed to effort and competence (Schunk & Pajares, 2010).

Self-efficacy is defined as ‘perceived personal capability to organize and execute actions to attain goals’ (Bandura, 1986). Academic, or specific, self-efficacy refers to a personal sense of competence to successfully finish a specified task. Global self-efficacy embody a general sense of life situation (Bandura, 1994), which may spread across domains. By successfully completing a task, a general sense of capability can improve (Schunk & Pajares, 2010). When learning new skills, you need to practice, put in effort, and be persistent. Practice, effort and persistence are examples of qualities needed to succeed in any school subject and positive effects of self-efficacy on academic achievement are well established (Gustafsson et al., 2010; Kitsantas, Cheema, & Ware, 2011; Klassen, 2007; Pajares, 2003; Schunk, 2003). One source of self-efficacy is prior accomplishment, mastery experiences (see figure 1), which has the strongest effect on future performance. Other sources of self-efficacy are vicarious experiences, observing peers and role-models, verbal persuasion, encouragement from teacher and peers, and physiological states such as anxiety and stress (Bandura, 1997).
Many students in need of special support perform lower academic achievement and show higher drop-out rates (World Health Organisation, 2011). Students need to exercise control over their learning by activating and regulating behaviors, thoughts, and emotions, and they must learn to manage their learning environment (Zimmerman, 2000). School-based PE, offering pro-social activities requiring lower levels of cognition, has the prospect of fostering positive self-efficacy skills, effort, persistence, focus and emotional control. Such skills may be more important than cognitive skills to students in need of special support since they affect peer-relations and identity (Guay, Marsh, & Boivin, 2003), life situation (Marsh & Martin, 2011) and future health (Marsh, Papaioannou, & Theodorakis, 2006). Elevated self-efficacy is an alternative positive school outcome, which affect future accomplishments indirectly (Gustafsson et al., 2010). The most predictive power of motivation, learning, self-regulation and achievement has been found in self-efficacy (Zimmerman, 2000). The more specific a task, the more accurately self-efficacy can measure prediction of outcome (Bandura, 2006). Measuring self-efficacy adds considerable information to general cognitive ability, academic aspirations, mental state and prosocial versus problem behavior (Pajares & Urdan, 2006).

Participation

‘Involvement in a life situation’ is the definition of participation expressed in the International Classification of Functioning, Disability and Health for Children and Youth, ICF-CY (World Health Organisation, 2007). Participation can be seen as an expression of inclusion (Maxwell, Alves, &
Granlund, 2012). In conceptualizing participation, there are two key elements; attendance and involvement. ‘Being there’ is a prerequisite but does not guarantee an individual to perceive participation. ‘Being involved’ means experiencing engagement and affect in interactions or activities. Meaningful participation is another crucial aspect of whether a person will engage in an activity or not, especially in contexts of mastery (King, 2013), e.g. school-based PE, which is a compulsory context with specified knowledge requirements. There are several aspects of participation, with dimensions of physical, social and self, that facilitate or hinder persons with disabilities to participate in physical activities (Kang, Palisano, King, & Chiarello, 2014). Increased participation is seen both as a means and an outcome of positive individual development (Imms et al., 2017). For example, services provided to improve life situations commonly focus on increased participation. Meaningful experiences of participation in leisure activities for persons with disabilities are thought to affect future quality of life, healthy lifestyles, and emotional and psychosocial well-being (Kang et al., 2014).

Environmental aspects can be seen as prerequisites of participation and are described in five dimensions, the five A’s: availability, accessibility, accommodability, affordability and acceptability (Maxwell et al., 2012).

- Availability - Is the activity offered?
- Accessibility – Can you access the activity specific facility?
- Affordability – Is it worth the money or energy?
- Accommodability/adaptability – Is the activity adapted and/or equipment modified?
- Acceptability – Is your presence accepted by self or others?

These aspects are in line with international policy documents about inclusion (United Nations, 1989, 2011). The five A’s can be used to evaluate inclusion by measuring participation for students with disabilities (Maxwell, Granlund, & Augustine, 2018).

**Functioning in PE**

Students in need of special support perceive PE as an arena where skillful participation can be experienced, and emotions vented. PE provides opportunity for social interaction where you exercise, work in teams and have
fun with friends (Goodwin & Watkinson, 2000). On the hindsight, this group of students often feel victimized by derogative language from peers and teachers, bodily exposure in class and in changing rooms, lack of capability and negative social comparisons (Coates & Vickerman, 2010; Crombie, Brunet, & Sabiston, 2011; Fitzgerald, 2005; Healy, Msetfi, & Gallagher, 2013; Olafson, 2002). One in five (19% (n=11,938)) adolescents in 15 European countries, are reported to have long term illnesses, disabilities, or medical conditions as stated by a doctor. These adolescents are to a large extent included in mainstream schools, and for 30% of the students with disabilities participation in physical activities is restricted (Ng et al., 2017).

The right to a life, not conditioned by disability is stated in several conventions and laws. Equal access to education is fundamental to child development, Convention on the Rights of the Child (United Nations, 2011). Access and equal opportunities to education is not enough for children with disabilities to reach their potential, education needs to be of highest quality, incorporating cognitive, creative and emotional development (UNICEF, 2012). According to the Swedish Education Act special support is to be supplied when any student is at risk of not achieving the knowledge requirements. Rights for students in need of special support were enforced in 2010 e.g. by introducing teacher certification (SFS (2010:800)).

**Disability**

Impairment\(^2\) is, in a Swedish perspective, the politically correct term to use for a condition, generic or acquired, impeding every-day functioning. Disability\(^3\) refers to relationships between the environment and the individual, who has a disability only when the environment hinders their functioning. Three types of impairments are defined.

**Physical impairment** entails difficulties performing motor skills e.g., cerebral palsy (CP), paraplegia, hearing and vision disorders

**Neurodevelopmental disorder** involves difficulties in social interaction, due to neural activity processing information atypically e.g. attention deficit hyperactivity disorder (ADHD), autism

**Intellectual impairment**\(^4\) causes communicative difficulties encompassing acquiring, processing, and conveying information.

Students with impairments are a heterogenous and vulnerable group of adolescents. In a national mapping of mental health among children and youth disparities were detected among adolescents with impairment, compared to adolescents without impairment. Areas of mental health, bullying and living habits were emphasized, implying greater risk of future ill health (The Public Health Agency of Sweden, 2011).

Impairment is the term used in Swedish communication. Due to the more commonly used term of disability when disseminating research, disability is the term used in this thesis.

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\(^2\) In Swedish: Funktionsnedsättning is the term used in disability research referring to congenital or acquired impairments that have long-term effects on a person’s every-day functioning, not ability “funktionsförmåga”. Functioning of a person with impairment/-s can either ameliorate or deteriorate, it does not vary “funktionsvariation”.

\(^3\) A person has a disability if the context hinders their functioning and is not connected to identity, a person is never disabled. There are exceptions, a person is deaf or is blind and belongs to a culture with their own customs and specific communicational tools (sign-language vs. braille)

\(^4\) In Swedish: ”Kognitiv funktionsnedsättning” and ”utvecklingsstörning” are terms used interchangeably
Physical disabilities
Students with physical disabilities describe good days as PE lessons where you experience a sense of belonging, your participation as skillful and where you share benefits. Bad days are defined by lessons where you feel social isolation, your competence is questioned and participation is restricted (Goodwin & Watkinson, 2000). Pain and other people’s negative attitude towards ability are examples of limitations for adolescents with physical disabilities (Kang, Zhu, Ragan, & Frogley, 2007). According to students with physical disabilities positive peer interactions are those where support is available, when needed, and caring. Patience and social encouragement are examples of caring support (Goodwin & Watkinson, 2000). Outcomes of positive peer interaction have been reported when students experience actions of encouragement, reinforcement, help and guidance (Seymour, Reid, & Bloom, 2009). For visually impaired and blind students the attitudes of the teacher and the one-to-one support assistant are important to their learning and participation (Herold & Dandolo, 2009). In PE students who are hard of hearing or deaf are often considered to have the same ability as their typically functioning peers. Modification of communication styles enable their full participation (Reich & Lavay, 2009; Schultz, Lieberman, Ellis, & Hilgenbrinck, 2013).

Neurodevelopmental disorders
Movement impairments are common in children with autism spectrum disorders (ASD). Impairments in motor control, balance and grit, slower timing, clumsiness and odd posture have been reported as common features (Green et al., 2009). There are also reports on unsuccessful response to imitation on instructional demand (Green et al., 2002). Yet, PE with plenty of situation-based learning is noticed to develop the functioning of students with ASD since this group of students have a capacity for spontaneous imitation in playful settings (Jespersen & He, 2015). Nadel (2015) argues that interactive imitation (imitating, and recognizing being imitated), boosts social development of children with neurodevelopmental disorders. In PE potential learning outcomes may include awareness of physical strength, PE specific self-efficacy, social interaction and self-esteem (Jespersen & He, 2015). However, sensory perceptions of PE may be too challenging (Healy et al., 2013). Recommended to consider for this group of students in secondary school is a combination of academic and psychosocial support. Crucial aspects are diverse instructional methods with technology adapted to student needs,
differentiated teaching methods (choice and modifications) and support that is individually appropriate and developing self-regulatory skills (Bolic Baric, Hellberg, Kjellberg, & Hemmingsson, 2016). A clear structure with predictability, routines and low sensory stimulation may prevent conflicts caused by misunderstandings (Humphrey & Lewis, 2008). The speed of activities can be problematic, to gain full access and perception of participating (Bredahl, 2013; Healy et al., 2013). Legitimate activities are those where students can attend and perceive to carry the same status and value as traditional sport games (Fitzgerald, 2005). Students with ASD express negative social comparison in competitive activities, where their ability is compared to peers. In contrast, when peers recognize their ability, they perceive friendship (Healy et al., 2013).

**Intellectual impairment and other impairments**
Students with intellectual impairments are rarely represented in Swedish mainstream secondary schools. The transition into secondary school commonly summons up to a special school placement for pupils with learning disabilities. Concluded from the pilot study, was to only include students with mild intellectual impairments into the current study, since they are more likely to be present in mainstream schools, than those with more severe impairments. One feature of students with intellectual impairments is that they need more time to understand and learn (Barnombudsmannen [The Ombudsman for Children in Sweden], 2016). In mainstream schools, you find students without a diagnosis, but in need of special support, due to learning difficulties. In the current study, these students are presumed to be represented within the group of students with low grades in PE. A low PE grade, however, may be due to other reasons. Restricted opportunities of participation in extracurricular physical activities makes school-based PE an important context for students with learning difficulties in PE to gain the benefits of physical activities (Block & Obrusnikova, 2007).

There are many other impairments or long-term health conditions that may be related to difficulties and problems with participation in PE e.g. chronical heart diseases, asthma, scoliosis, obesity, diabetes, epilepsy. These students are not identified in the current study, but are probably represented in the total population, or in the groups studied.
Quality PE Teaching

Effective teaching studies search for links between teacher intentions and student learning (Dyson, 2014). Teachers’ content knowledge and pedagogical skills to modify lessons to diverse learners and to involve students in their learning is reflected in what students learn (Ward, 2013). Research concludes that one key asset for student engagement, motivation, learning and development is teacher-student relationships (Pianta, 2015; Skinner & Belmont, 1993; Öqvist & Malmström, 2018). However, teaching is complex; several other aspects of teaching quality include, for example, professional knowledge, instructional planning, instructional delivery, assessment, learning environment and professionalism (Stronge, 2018). For student learning and achievement, teaching needs to target learning goals, be student focused and build on communication and feedback. Teachers also need to be engaged, caring and trustful (Aspelin, 2012).

Empirical research is primarily based on teaching in general, few studies specifically report on the characteristics of high-quality PE teaching. When aiming for high quality PE, accountability is a matter of concern, and physical, social, cognitive and affective benefits have been claimed (Bailey et al., 2009). According to Rink (2013), PE teachers do not agree on what is important to teach. Motor skills have been emphasized but have not been successfully measured. Physical capacity is another area commonly studied (McKenzie & Lounsbery, 2013). However, today’s PE programs have 2-3 lessons per week, which fails to deliver the 60 minutes of daily physical activity recommended for adolescents to reduce unhealthy and sedentary behaviors (Fröberg, Raustorp, Pagels, Larsson, & Boldemann, 2017; U.S. Department of Health and Human Services, 2008; World Health Organization [WHO], 2015).

Opportunities for social interaction in a context of physical activity are also offered in PE (Elliot, Gable, & Mapes, 2006). Individual students’ social goals describe reasons for integrating groups of students, e.g. students with disabilities, in special education into mainstream education PE classes. However, studies show that students with disabilities may experience not only social inclusion, but also social isolation (Qi & Ha, 2012). Positive peer-interaction is facilitated with encouragement, reinforcement, help and guidance (Seymour et al., 2009). Providing modifications and accommodations during activities, creating positive classroom climates, and offering a choice between inclusive and segregated learning environments can
endorse meaningful learning experiences (Haegele & Sutherland, 2015). An effective teacher values diversity in assignments and criteria, contributes to students’ positive outcomes such as self-efficacy, collaborates to ensure the success of students in need of special support, and provides engaging learning opportunities (Goe & Croft, 2009). Compared to non-specialists, with a general teaching degree, specialist PE teachers used time more efficiently. They also provided more tasks, modified tasks, provided multiple opportunities to practice skills, and used individual or paired activities to allow for more appropriate trials. Whereas non-specialists allowed time for game play, specialists allocated time for motor skills development (Constantinides, Montalvo, & Silverman, 2013). Quality PE teaching should encourage skills, knowledge and positive attitudes that foster active and healthy lifestyles (Dyson, 2014).

**Grading PE in the Swedish school system**

According to the Education Act SFS (2010:800) all students with residential address and irrespectively of demographic and socio-economic status have equal rights to education. School is compulsory from preschool class, ages 5-6 to the end of the ninth school year, ages 15-16. In 2011 the current national curriculum was applied to the Swedish school system (The Swedish National Agency for Education, 2018). A criterion-referenced grading system generate summative grades A-F, where A is the highest grade, grades A-E are passing grades and F means fail. Special support should be provided if needed and additional support if students risk failing one or more subjects. Differentiated grading can be practiced when long-term disability makes passing according to standard criteria impossible.

Assisting teachers in grading PE, the Swedish National Agency for Education has composed a supporting text and film for secondary school (The Swedish National Agency for Education, 2012), supplementing on how to interpret and implement the PE syllabus (The Swedish National Agency for Education, 2018). Current PE syllabus is focused on promoting long-term patterns of physical activity and healthy behaviors. Physical education and Health is the name of school-based Physical Education (PE) in the Swedish school system. There are three core contents, *movement, health and lifestyle, outdoor life- and activities*, to be assessed in eight areas of grading criteria. For an E a criterion is *partly* reached, for a C reached *relatively well*, and for
an A the student adapts their movements well in the criterion. Grades B and D are used when most, but not all criteria, are reached for A and C respectively.

1. Pupils can participate in games and sports involving complex movements
2. In dance, and movement and training programs to music pupils adapt their movements to beat, rhythm and context
3. Pupils can swim 200 meters, of which 50 meters in back position
4. Pupils can set up goals and plan their training and physical activities and also evaluate activities by talking and reasoning about their own experiences and how the activities together with dietary and other factors can affect health and physical capacity
5. Pupils plan and carry out outdoor activities, adapting to different conditions, setting and rules
6. Pupils can orient themselves in unfamiliar settings, using maps and other aids
7. Pupils can prevent injuries, and describe risks associated with physical activities
8. …and handle emergency situations (in general and by the water) using different equipment during different seasons (The Swedish National Agency for Education, 2011)

Valid and reliable grades require that these eight criteria are assessed, not including aspects such as student attitude, leadership, behavior, or physical performance. Teachers need to systematically plan how, when and what criteria to assess, which automatically include aiming their teaching toward the targeted goals. Teachers also need to clearly communicate to students the syllabus content and goals, and regularly give feedback on current achievements, and how to improve the summative outcome, i.e. final grade.

Students attend school-based Physical Education and Health (PEH) two-three times a week. PEH is a high stakes environment in the sense that grades in PEH carry the same value as any other subject, which may affect post-compulsory school education. Over time, incomplete final grades from compulsory school increase risks of future mental illness (Gustafsson et al., 2010). In this thesis indexes of self-rated teaching skills were developed. They were based on empirical evidence of quality teaching in general education and on matters of accountability in PE.
Theoretical framework

The overarching theory of this thesis is systems theory. Disability research is an interdisciplinary phenomenon, where several components of individual and environmental factors interplay. According to (Wachs, 2000) systems theory can describe, develop, and modify dimensions at different levels, across various contexts and over time. In other words, disability cannot be understood without knowledge about individual needs and these needs cannot be understood without knowledge about environmental circumstances. Bertalanffy (1969) elaborated on change over time. In systems theory individual needs and environmental circumstances vary and there are many options, bifurcations. Several changes occur and different changes may lead to the same outcome, equifinality, but a specific change may also lead to a variety of contextual outcomes, multifinality. Vital to an individual’s functioning in society means focusing on the parts of a system, most strongly linking to other parts of the system for a specified outcome, centralization (Wachs, 2000). In this thesis the focus is on system parts believed to be central for learning in PE. Important aspects include relationships between student perceived self-efficacy, aptitude to participate and functioning, how these concepts develop over time, and what links there are to engagement in PE and acquired knowledge and skills in PE.

The bioecological systems theory

Bronfenbrenner’s bioecological systems theory in the current version, the Process-Person-Context-Time (PPTC) model, is described as a theoretical system to study human development over time (Bronfenbrenner & Morris, 2006). According to this theory, human development takes place in proximal processes, that occur in interactions between individuals and the environment. Proximal processes become more complex over time and generate ability, motivation, knowledge and skills. Developmental changes occur when proximal processes are effective (Bronfenbrenner & Morris, 1998). Engagement in interactions and activities is a prerequisite for development (Bronfenbrenner & Morris, 2006). By engaging a developing individual understands and makes sense of their place in this world and gradually expand their horizon (Tudge, 2009). Individuals and environments mutually affect and change the other, either passively or actively due to personal and environmental characteristics. According to Bronfenbrenner and Ceci (1994)
there are interrelated systems, the micro-, meso-, exo-, macro- and chronosystem. Most time is spent on activities and interactions in different microsystems at home, in school or with friends. Individuals exist in several different microsystems (e.g. family, school class, sports club) that are interrelated in the mesosystem. The exo-system influences individuals indirectly, e.g. a child may be affected by parent temperament and behaviour, caused by circumstances at work. The overarching societal structures, cultures, and subcultures in which individuals live, frame the trajectories of norms and values, in which individuals develop. In the current PPTC-model the dimension of time is applied as the chrono-system with its interacting components: the developing person, the changing environment, and proximal processes (Bronfenbrenner & Morris, 2006). This thesis was designed in accordance with the PPTC-model. Process: self-efficacy, aptitude to participate and functioning as perceived and self-reported by the students themselves. Persons: students with and without disabilities. Context: interactions and activities in Swedish school-based PE. Time: mainstream, inclusive secondary school years seven to nine (ages 12,5-15,5).

Individual factors
A major transition takes place in Swedish schools at the age of thirteen, marking the students’ entrance into adolescence. Transitioning into secondary school is a bifurcation point, students generally change schools, classmates and teachers. They also face cognitive challenges (strategy and problem-solving), with higher educational demands. Biologically, through puberty, there are obvious developmental changes in body size, shape and function. Emotionally, physical exposure in PE environments has implications for all students, but especially for students with restricted physical function. Socially, adolescents become more autonomous (Eriksson, Welander, & Granlund, 2007), independent and in search of identity, friends become more important than parents (Steinberg, 2016). Vaz (2010) describes early adolescence as a time where social-cognitive, biological, and environmental transitions concur. The socio-cognitive transition is related to early adolescents’ overall functioning, development and identity. Transitional outcomes of students with disabilities are not well known (Hughes, Banks, & Terras, 2013).

Environmental factors
Inclusive mainstream education is regulated by the national curriculum. The head-teacher is responsible for organizing teaching and health services so that
students with difficulties are accommodated with the support and help needed. Additional support can be supplied if students are at risk of not reaching knowledge requirements by establishing Individualized Education Programs (IEP) (The Swedish National Agency for Education, 2018).

In PE the physical environment encompasses risks and safety issues. Intended learning outcomes in the PEH syllabus require assessment-based information, which is not possible to attain in the gym, e.g. the swimming pool or the forest. Safety issues, transitions and activity specific equipment have implications for the organization of PE teaching. Student participation need not be negatively affected, but may pose barriers to students, especially those with disabilities. In this thesis PE teaching is considered to be an environmental factor. The classroom’s social climate may also affect student participation. PE teaching prerequisites and the overall classroom climate, aspects the teachers are not in control of, were rated by the PE teachers. PE teachers alignment of curriculum, pedagogy and assessment defines quality in PE (Penney, Brooker, Hay, & Gillespie, 2009) and are environmental aspects that PE teachers can control. PE teachers self-rated their teaching skills in questionnaires targeting their alignment of syllabus intentions into their teaching and grading. The degree to which they implemented syllabus intentions into their teaching was observed during PE lessons.

**The Family of Participation Related Construct**

Applying a bio-psycho-social approach to disability, the Family of Participation Related Construct (fPRC) is a model proposed to guide research about the participation of persons with disabilities (Imms et al., 2017). Participation is a human right, and a vital component for development, learning, health and well-being. Yet, students with disabilities participate less in school activities (structured by adults and unstructured), than their typically developing peers (Eriksson et al., 2007). Constructs related to participation in the fPRC-model can be seen both as a means for participation and as outcomes of participation. Attendance or not may be due to personal functional skills or environmental prerequisites for participation. Involvement (will be referred to as engagement, the terms are used interchangeably) may depend on whether learning in PE is perceived as meaningful, student perceived activity competence, and sense of self.
Operationalized individual factors
Preferences, activity competence and sense of self are in this thesis operationalized as student perceived and self-reported aptitude to participate, PE specific self-efficacy, general self-efficacy, functional skills (physical and socio-cognitive) and engagement (see figure 2). Student self-rated self-efficacy (PE specific and general), aptitude to participate, and functional skills are collected at two timepoints, beginning of year 7 (timepoint one=T1, study II) and end of year 9 (timepoint three=T3, study IV). Student engagement in relation to teaching skills is observed in study III.

Operationalized environmental factors
The implementation of PE syllabus intentions is dependent on PE teachers’ skills (including lesson- and long-term planning, and grading), prerequisites for teaching and classroom social climate as reported by the PE teachers themselves (study II and IV). The formal outcome of school achievement, i.e. grades is collected for spring grade years seven and nine. Interactions and activities in PE are considered to be activity contextual factors in this thesis as well as teacher proximity (study III).

Figure 2 Aspects explored in current research project linked to the fPRC model (Imms et al., 2017).
Rationale

Studies reporting the perspective of students with disabilities on inclusive PE are rare, mostly qualitative, concern students with physical disabilities and study ages younger than thirteen (Haegle & Sutherland, 2015). Students with disabilities are rarely studied as a separate group (Alderson & Morrow, 2011). There are several reasons for this: quantitative methodology is exclusive in its nature, requiring large sample-sizes to show significance (Haegle & Hodge, 2017), there are ethical issues, instrument adaptations are required, and to show directionality of effects longitudinal approaches are needed, with a risk of high drop-out rates (Sabiston, Pila, Pinsonnault-Bilodeau, & Cox, 2014).

Personal and environmental factors of functioning need to be studied in separate groups of students (Muenks, Wigfield, & Eccles, 2018). When exploring developmental trends of students’ self-reported experiences longitudinal approaches are needed to study directionality of relationships and stability of scores (Sabiston et al., 2014). If students with disabilities do not partake as a separate group, their voices will not be heard.

Students with disabilities report that inclusion in PE may be enacted by activities together with personal assistants in or outside the gym (Andersson, 2011). Students without a personal assistant also report that they often do activities segregated from class (Falkmer, 2013). Absence is more common and 30% of students who did not receive a final grade in PE were disadvantaged by disability (Bråkenhielm, 2008). Mobility restrictions and severe vision impairments limit participation in ball sports, tag games, obstacle runs, and outdoor activities such as orienteering. Motor control, spatial awareness, balance and sensory perceptions are examples of difficulties experienced by students with neurodevelopmental disorders (Green et al., 2009). Parents of children with autism report that an “invisible” disability imply facing increased risks of stigmatization and bullying (Gray, 2002).

Common practice in mainstream schooling to create opportunities for students with disabilities to interact with their typically functioning peers is to include these students into preference-based subjects. The nature of PE, for which physical, motor, social, emotional and cognitive educational gains have been claimed (Bailey et al., 2009) often makes PE a first-hand choice. Considering the two dimensions of participation, attendance and being
involved while attending, mere attendance does not guarantee feeling included. Demands of adaptations and modifications are placed on PE teachers, who report lack of skills on how to adapt their teaching and knowledge about various disabilities as barriers to successful inclusion (Tant & Watelain, 2016). Studying PE environments, motor skills (Rink, 2013) and physical capacity (McKenzie & Lounsbery, 2013) have caught most attention. Collaborative PE teaching strategies, peer-assisted learning, and peer tutoring are different terms studied, which refer to students helping each other to learn have shown positive effect (Grenier, Dyson, & Yeaton, 2005). Research on such strategies and their effects is limited.

There are discrepancies in objectives for teaching PE and on what, when and how to assess student knowledge and skills in PE. A criterion-referenced curriculum was introduced into Swedish school in 1994 (Lpo 94). Teachers were left to their own devices to come up with assessment criteria. Tholin (2006) studied these assessment criteria, found a spelling mistake that made it a nonsense criterium, and discovered in a follow-up a few years later that the same spelling mistake still existed. This example shows an illustration of how disparate assessment criteria can be nationally and internationally. The national curriculum of 2011 (Lgr 11) includes assessment criteria, which leave a broad spectrum of interpretation. Svennberg, Meckbach, and Redelius (2018) report that although PE teachers feel more confident to assess knowledge and skills in PE today, they still struggle. Research on the assessment of students with disabilities is almost non-existing.

Self-efficacy has proved to have predictive and powerful effects on academic outcome and of outcomes in various fields affecting future life, not so commonly within disability research. Self-efficacy, aptitude to participate and functioning in adolescents with disabilities and their relationships with environmental factors need to be described and explored. Any mention of self-efficacy, aptitude to participate, or functioning throughout this thesis is

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5 Swedish misspelled assessment criteria _Att kunna klara sig i ökänd natur_ was Google translated into _Being able to survive in infamous nature_, where infamous was supposed to be _unfamiliar_
referring to students’ perceptions as reported by the students themselves and compared on group-level.
Aim

The overall aim of this thesis is to explore developmental processes of student perceived self-efficacy (PE specific and general), aptitude to participate and functioning (physical and socio-cognitive) in school-based Physical Education (PE) during secondary school, ages 12.5-15.5, with a special focus on students with disabilities.

Study specific aims

- To develop self-report measurements of student perceptions of self-efficacy, aptitude to participate and functioning in a PE context (study I)
- To describe and explore perceptions of self-efficacy (PE specific and general) and aptitude to participate and functioning in relation to PE teaching between three target groups, students with 1. Disabilities, 2. Low grades, and 3. High grades before transitioning into secondary school (study II)
- To describe student engagement in relation to teachers’ alignment of syllabus into PE lessons, and explore group differences in relation to environmental and contextual factors between the three target groups (study III)
- To explore developmental processes of self-efficacy (PE specific and general), aptitude to participate and functioning over time towards PE learning and final PE grade year 9 in the three target groups (study IV)

Hypotheses

Primary hypothesis: Student perceptions of PE specific self-efficacy indicates PE knowledge and skills over time and are related to their perceived general self-efficacy, aptitude to participate, engagement, functional skills and grades.

Secondary hypothesis: Teaching skills affect student learning in accordance with intended learning outcomes and their summative final grade is based on PE teachers’ acquired information about their students’ gathered knowledge and skills in PE
Methods

Research design

In this thesis, a quantitative, three-year longitudinal design was used with data from questionnaires, observations and student PE grades. Students’ self-rated perceptions of self-efficacy (PE specific and general), aptitude to participate and functional skills were collected at two timepoints, year 7 (T1) and year 9 (T3). PE teachers self-rated their teaching skills, teaching prerequisites and teaching climate at T1. Student engagement and teaching skills were observed in structured observations during PE lessons year 8. Information was collected about students’ spring PE grade year 7 and final PE grade year 9.

The student questionnaire measures were developed, tested, and analyzed in a pilot test on a separate sample, not included in the total sample of the current three-year longitudinal study (article I). In addition, the measures were evaluated on the first wave of the three-year longitudinal study. Data from the first wave of the student questionnaire was collected late autumn- or early spring-term of year 7 (article II). Structured observations of PE lessons took place spring term year 8 (article III). The second wave of the student questionnaire was conducted the last spring term, year 9 (article IV). Teachers self-rated their teaching skills in questionnaires at T1 aimed to measure level of teaching skills in terms of explicit alignment of syllabus intentions with actual teaching intentions. Observed teaching skills were categorized into high/low-level teaching skills depending on level of alignment of syllabus into the PE lessons observed.

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6 Information about grades are publicly accessible in Sweden
Setting

The secondary schools and PE teachers of 23/26 classes accepted to be included in the study, one PE teacher taught two of the classes. The total number of students at each school ranged from 113 – 544 schools from six cities with more than 200000 inhabitants, and 18 schools from towns with less than 50000 inhabitants. Students with disabilities were included in ordinary PE class in 21 classes. Most schools were run by municipalities within a 100-km range in the south of Sweden, one was a private school.

Samples and recruitment procedures

Pilot study (article I)

Personal contact with PE teachers from schools nearby resulted in a sample of convenience with a total of 47 students, 25 boys and 22 girls in year 7, aged 12,5-13. Students for the pilot study were recruited from two mainstream school classes and one group from a special school for students with intellectual disabilities. By coding gender and grades from year six and including a special school all three target groups were guaranteed to be represented. Five students with mild intellectual disability (special school), eight students with low grades, 22 students with high grades in PE and twelve classmates were included from the pilot study (article I). No identities can be traced from the data collection. Participants from the pilot study were not included in the current study. Results from the pilot study were later compared and evaluated with the first wave of data collection (T1) from the current study. Instruments were confirmed to be valid and reliable.

Current study (article I-IV)

The study sample consists of 121 students, representing three target groups of students with 1. Disabilities (n=30), 2. Low grades (n=36), and 3. High grades (n= 55), before transitioning into secondary school (article I-IV). Only students with completed parental consent forms were enrolled to participate actively and distributed into the target groups. First, students with disabilities were recruited. Secondly, schools were invited (head teachers and PE teachers) to participate in the study. Thirdly, information about the study was distributed with requests for classmates of the students with disabilities to agree to participate. Fourthly, the questionnaires were coded directly after data...
collection, identifying participants in the target groups. Background information about the classmates who did not actively consent to participate were destroyed in a shredder (n= 329 at T1, n=339 at T3). They were treated as a non-identifiable reference group (article I and II). PE teaching was self-rated by PE teachers (n=21) teaching the students of participating schools. Data from teacher questionnaires were compared with data from the student questionnaires (article II and IV). Observations were conducted on 40 PE lessons with students (n=94) and PE teachers (n=21) (article III).

Inclusion criteria and recruitment procedures
The recruitment procedure was first to locate, inform students with disabilities and both their parents about the study and inquire about consent to participate in the study. Schools, PE teacher networks, university networks, a sports conference, associations for individuals with disabilities, the regional habilitation center and other medical institutions, and personal connections were targeted by 287 e-mails, in a radius of 100 km. A one-year process of e-mailing with two reminders, telephone calls and personal visits followed. Inclusion criteria were student with diagnosed disability, year 7, included in mainstream schools (the group of students with disabilities). Secondly, the school was contacted (principal and PE teacher), informed, asked to agree to participate and assist in the study, and to supply information about addresses and grades in considered classes. Thirdly, the classmates and their parents of the recruited students in the disability group, were informed and asked for consent to participate in the study. They were distributed into either a group of students with low grades (D-F) or with high grades (A-C) in PE, year 6. The aim was to collect informed consent from at least one student of the same sex as the student in the disability group, in each group from each participating class, in total 150 targeted students, 50 students/group. All participants who actively agreed to participate and their classmates were offered to complete the questionnaires. They were informed that participation was voluntary. Filling in the questionnaire was interpreted as consent. To be able to identify the study sample who agreed to participate in the study, all students were asked to write their names and gender on the first page. All students were informed that once the study sample had been identified and coded, the remaining first pages with background information would immediately after collection be ripped off and destroyed in a shredder. Apart from gender of the reference group, which was recorded within the questionnaire, this group is non-identifiable. Beforehand, and at data collection they were also informed
about the ethical principles (information, consent, confidentiality, non-maleficence, beneficence). No students in the classes recruited declined to participate, but data collections were affected by student events e.g. choir, student meetings. The teachers represented in the classroom at data collection were equipped with questionnaires corresponding to number of missing students and a franked envelope. The instruction given was to offer students who were not present an opportunity to participate.

Student participants (article II-IV)

Informed consent was collected from three target groups of students with 1. Disabilities, 2. Low grades, and 3. High grades before transitioning into secondary school. Data from the total sample (see table 1) includes the identified study sample (n=121) and their classmates without any documented or saved background information, who completed the questionnaires.

<table>
<thead>
<tr>
<th>Data</th>
<th>N=</th>
<th>Male</th>
<th>Disability</th>
<th>Male</th>
<th>A-C</th>
<th>Male</th>
<th>D-F</th>
<th>Male</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Year 7</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total sample</td>
<td>450</td>
<td>228</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Study sample</td>
<td>121</td>
<td>67</td>
<td>30</td>
<td>22</td>
<td>55</td>
<td>22</td>
<td>36</td>
<td>23</td>
</tr>
<tr>
<td>Teachers</td>
<td>22</td>
<td>14</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Year 8</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total sample</td>
<td>444</td>
<td>188*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Study sample</td>
<td>105</td>
<td>59</td>
<td>28</td>
<td>20</td>
<td>47</td>
<td>20</td>
<td>30</td>
<td>19</td>
</tr>
</tbody>
</table>

Notes: Students from 26 classes, four schools denied participation at T1, two classes had the same PE teacher. A-C = high grades, D-F = low grades. *non-corresponding to total number, due to listwise deletion.

Participants with a diagnosed disability

The diagnosed disabilities were neuro-developmental disorders, mobility restrictions, neuro-developmental and one or multiple other, vision, hearing, and intellectual disability (see table 2). Represented diagnoses included in mainstream inclusive secondary schools in this study were:

- Neuro-developmental disorders: Autism, attention deficit hyperactivity disorder (ADHD), attention deficit disorder (ADD) and Asperger’s syndrome
• Physical impairments: cerebral palsy (CP), dwarfness, blindness, vision loss, hearing impairment, heart failure, paraplegia (wheelchair user)
• Intellectual disability (ID): only students with mild intellectual disabilities were included

Diagnosed disabilities affected participation in PE to various degrees. Some, especially combinations of diagnoses, rendered severe difficulties in PE. Two students were not included in ordinary PE class at T1 and T3 due to ID. One of them attended a special school within the facilities of a mainstream school. The other student transferred to a special school during the study. Another two students moved to another school; their classmates remained in the study. Nine students, 22%, actively rejected participation in the study, in communication with the researchers. One student withdrew at the first data collection, due to difficulties being too severe to attend ordinary PE lessons.

Table 2. Participants in the group of students with disabilities

<table>
<thead>
<tr>
<th>Type of disability</th>
<th>N</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neuro-developmental disorder</td>
<td>12</td>
<td>9</td>
<td>3</td>
</tr>
<tr>
<td>Mobility</td>
<td>6</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Neuro-developmental and one or multiple other disabilities</td>
<td>5</td>
<td>3</td>
<td>2*</td>
</tr>
<tr>
<td>Vision</td>
<td>4</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Hearing</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Intellectual disability</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>30</td>
<td>22</td>
<td>8</td>
</tr>
</tbody>
</table>

*one student withdrew at data collection.

Teacher participants (article II-IV)
Teacher questionnaires were collected from participating schools (n=22, 8 females). One teacher teaches two classes at the same school. Number of years teaching was equally distributed, six teachers (0-6), seven teachers (>16) and nine teachers (6-15) years in the occupation. Class size when teaching PE ranged from 11-36 (mean=21). All teachers had a teaching degree and perceived themselves to have knowledge and skills relevant to PE teaching, 15 were specialist PE teachers. 13 teachers experienced that they received appropriate support for inclusive teaching. PE teachers (n=21) were observed
at T2. When student questionnaires were collected a second time in year 9 (T3), 15 teachers remained the same as when the study started.

**Instruments**

**Questionnaires**

**Student questionnaire (article I, II, IV)**
Self-report questionnaires of student perceptions of self-efficacy (PE specific and general), aptitude to participate, and functioning are used in this thesis.

*General self-efficacy* was measured (ranging 1-5, where 5 is high) by using a validated 24-item instrument (Muris, 2001). The questionnaire was translated into Swedish (see article 1) and consists of subscales measuring academic, social, and emotional self-efficacy.

*PE specific self-efficacy* was developed for the study purpose to measure self-efficacy in PE (SEinPE, ranging 1-6 where 6 is high). It is based on common lesson content, with phrasings of how well do you perceive you succeed in or can (Bandura, 2006) e.g. choose, plan, carry out and evaluate your training and physical activity. Sub-scales of movement, health and lifestyle, and outdoor life and activities self-efficacy comprise 20 items. This scale corresponds to knowledge requirements and can be converted into grades A-F.

*Aptitude to participate in PE* consists of eight items of aspects in the learning environment affecting participation in PE (ranging 1-6, where 6 is high) e.g. if the student feels safe in the changing room. The scale was developed for the study purposes.

*Physical and socio-cognitive* functional skills were measured in a revised version of The Abilities Index (Simeonsson & Bailey, 1991). It was adapted to be relevantly self-reported in a total sample where a majority of the students have typical function.

**Teacher questionnaire (article II and IV)**
The teacher questionnaire was based on empirical evidence of quality teaching in general education and matters of accountability in PE. It was developed in collaboration with experienced PE teachers. The questionnaire included aspects concerning inclusion, participation and grading. Items were composed with the intention of measuring teaching skills in accordance with syllabus
intentions. Teachers self-rated their teaching on a scale with alternatives, yes, no, and partly. The items were dichotomized and summed into indexes of environmental factors that teachers have direct impact on, lesson- and long-term planning, and grading. Teachers understanding of the grading system accounted for differences in scores. Prerequisites for PE teaching and classroom social climate were also rated by PE teachers.

**Observations – Child/Teacher Observations in Physical Education (COPE/TOPE) (paper III)**

Participation in activity and level of involvement were measured in structured observations. The original versions were developed and tested in laboratory like conditions on preschoolers (research assistants are trained by observing preschoolers/-teachers through a glass ceiling). It is a structured time-sampling method, where the observer takes three-second snapshots of what the participant is momentarily doing. Table 3 shows an example of two separate sweeps of one participant. The procedure is:

- Observer studies first participant for three seconds
- Observer scores actions and interactions directly in ten categories
- Observer spots second participant, studies for three seconds, and scores activity
- One sweep is finished when all participants have been observed once.
- The procedure is repeated until each participant has been observed and scored in 20 sweeps (of whole day preschool activities).
Table 3. Two sweeps scored of one observed student

<table>
<thead>
<tr>
<th>Time</th>
<th>SW</th>
<th>Verbal</th>
<th>To Whom</th>
<th>Schedule</th>
<th>Emo state</th>
<th>Prox</th>
<th>Interact</th>
<th>Type Task</th>
<th>Invol</th>
<th>Material</th>
<th>Focus</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>L</td>
<td>N</td>
<td>WG</td>
<td>N</td>
<td>WG</td>
<td>NA</td>
<td>I</td>
<td>L</td>
<td>N</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>T</td>
<td>C</td>
<td>SG</td>
<td>H</td>
<td>SG</td>
<td>C</td>
<td>SQ</td>
<td>H</td>
<td>MM</td>
<td>D</td>
<td></td>
</tr>
</tbody>
</table>

Note: SW=sweep, Verbal=listening/talking, To whom= no one/child, Schedule=whole/small group, Emotional state=neutral/happy, Proximity= whole/small group, Interaction=nonacademic/cooperative, Type task=instruction/sequential, Involvement=low/high, Material=none/rhythm, Focus=none/dance.

The example in table 3 shows one sweep where the participant passively takes part when the teacher gives instructions to the whole group. The instruction is non-academic, e.g. information about the current activity, student engagement is low, no materials are used, and the lesson has no observable focus. In the next sweep the participant is highly engaged, talking to a peer, in a small group activity. Music for teaching purposes is used and dance and rhythm is focused.

The method has been adapted to and tested in Swedish preschool conditions on children with and without disabilities (Granlund, 2016; Lillvist, 2010). Further adjustments were necessary to adapt the instrument to study adolescents in a setting of physical activity, undertaken 40-60 minutes. Pilot testing resulted in the instruments Teacher/Child Observation in Physical Education (TOPE/COPE). Content observed has been changed in categories of scheduled activity, materials used, and focus of activity, but original codes are kept (see article III).

COPE data was extracted from individuals with at least 12 recorded sweeps from a total number of 2068 sweeps of students with 1. disabilities (n=23), 2. low grades in PE (n=27), 3. high grades in PE (n=44). TOPE data was extracted from a total number of 535 teacher sweeps (n=21). To assure a satisfactory number of sweeps of observations, students with disabilities and PE teachers were observed at more frequent intervals than the other participants.

The originators of the instruments, have found teaching quality indicators in observed teachers’ instructional quality (Fuhs, Farran, & Nesbitt, 2013), teachers’ affective tone (Spivak & Farran, 2016), and clear learning goals (Cameron & Morrison, 2011). Guided by findings that these quality indicators have effects on student engagement, TOPE was adapted to a context of PE. The objective was to measure the extent to which teachers aligned syllabus
intentions with their lessons. Based on the frequency of instructions in accordance with syllabus intentions and the components instructional level and instructional tone/affect, teachers were categorized into two groups, with high-level or low-level PE teaching skills.

Data Collection

This three-year longitudinal study consists of several data collections. Following pilot-testing of questionnaires (article I), ethical approval, and recruitment of participants the flow of data collection (see table 4) for the main study is described below.

Table 4 The flow of data collections.

<table>
<thead>
<tr>
<th>Year</th>
<th>Data collection</th>
</tr>
</thead>
</table>
| 1    | Grades in PE, year 6, target groups  
Student questionnaire T1 (late A and most of S year 7)  
Teacher questionnaire by e-mail, (late A and most of S, when students were in year 7) |
| 2    | COPE/TOPE pilot-testing (A year 8) and observations T2 (S year 8) |
| 3    | Student questionnaire T3 (S year 9)  
Spring term PE grades, years 7 and 9 |

Note: A=autumn term, S=spring term.

Year 1

a) Mapping of grades in PE, year 6, from students in the target groups were collected from all schools with student participants, by post or e-mail (article II-IV).

b) Mapping of student perceived self-efficacy (PE specific and general), aptitude to participate in PE, and functioning, late autumn and most of spring term year 7. The first wave of the student questionnaire was distributed. Data from the student questionnaires were collected in home classrooms (see article I) by the researcher (article I, II, IV). Teachers were asked to allocate time for absent students to complete the questionnaire and post it retrospectively. In exceptional cases and in telephone communication with students with disabilities (n=2), the researcher completed the questionnaires. An adapted questionnaire, easier to access was provided when needed (n=3). Some students with and without diagnosed disabilities were assisted by their teacher (see article I).

c) Mapping of teachers’ self-rated teaching skills (article II-IV). Data from teacher questionnaires were collected by post or e-mail, during
autumn term and early spring term when their students were in year 7.

Year 2

d) Pilot-testing autumn year 8 of COPE/TOPE. Observations of student engagement and teachers’ teaching skills during PE lessons spring term year 8. Data collected at one to three occasions, by researcher with or without assistant, depending on how many students in the study sample in each class to be observed, and if target students, were absent the first two waves. The aim was to gain at least 20 sweeps of each student and teacher (article III).

Year 3

e) Second wave of the student questionnaire (article IV). Follow-up of student perceived self-efficacy (PE specific and general), aptitude to participate in PE, and functioning, spring term year 9. Data collected as described in step two.

f) Mapping of grades, spring term years 7 and 9, from all schools with participating students in the study sample, by post or e-mail (article IV).

Statistical Analyses

Article 1
Instrument design, internal consistency and construct validity were examined in the pilot study. Indexing of scales are based on Principal Component Analysis. Direct oblimin rotation was chosen to find the most variation in factor structures. Cronbach’s alpha was used to evaluate internal consistency. Spearman’s rho was used to test stability of scores and assess item consistency. Educational experts and students were asked about wording and phrasings (not tested statistically) to test content validity. Convergent construct validity was tested for in the total scales of self-efficacy (PE specific and general), and divergent construct validity for all total and subscales.

Article 2
Spearman’s rho was examined for the total sample, and for each group of students separately, students with disabilities, with low grades, and high grades. Correlations between self-rated teaching skills, teaching prerequisites and teaching climate and students’ self-efficacy (PE specific and general), and aptitude to participate in PE were calculated. Correlations between the three student-groups were then compared using Fisher’s r to z transformation
To predict high self-efficacy (PE specific and general) and aptitude to participate in PE a series of logistic regression analyses were executed using socio-cognitive functioning, physical functioning and group (disability, low grades, high grades) as predictors.

**Article 3**
Analysis of variance, ANOVA (Bird, 2004) to index significant aspects of activity characteristics (proximity to teacher, scheduled activity, format, student interactions, student actions, lesson focus, and materials used) was used to investigate mean differences between average scores in the groups of students with disabilities, high grades and low grades. Principal component analyses (PCA) were conducted to combine codes within the categories into indexes in COPE. And to create quality indicators of teaching skills in TOPE. Characteristics of contexts, in which students showed high/lower levels of engagement were calculated using independent samples t-test (Field, 2013). Characteristics of PE lessons with high-level teaching skills were then examined using independent samples t-test (Field, 2013). Finally, observational data was integrated with previously collected data from teacher and student questionnaires (study II). Spearman’s rho was used to examine associations between observed teaching skills (mean score), and self-rated teaching skills (sum score ranging 0-14). In addition, observed student level of engagement was compared to their self-reported self-efficacy (PE specific and general), aptitude to participate in PE and functional skills using independent samples t-test (Field, 2013).

**Article 4**
To explore developmental processes of student self-efficacy (PE specific and general) and aptitude to participate, mean scores were calculated individually for each scale, excluding cases with more than 25% missing values. Spearman’s rho was used to examine correlations (Field, 2013) in the total study sample and each group separately. The correlations between the three student-groups were then compared using Fisher’s r to z transformations (Siegel & Castellan, 1988). How relationships between functional skills and self-efficacy and aptitude to participate changed over time, correlation strengths and differences between the groups were compared using Fisher’s r to z. The potential of being assigned a higher final grade in PE was then predicted using hierarchical multiple linear regression modelling. Partial
correlations were calculated to control for confounding factors on the final
grade.

**Ethical considerations**

Students with disability is a vulnerable group of human beings. Several ethical
issues must be considered. Equal access to education (United Nations, 2011)
has guided contemporary laws and regulation towards the inclusion of
students with disability in mainstream schools. Ethical approval is required
for students with disability to be studied specifically. For adequate and
relevant participation of students in need of special support, adapted
instruments are required. Key ethical principles in humanistic and social
science research are, the principle of information, consent, confidentiality, and
non-maleficent utilization of data (Swedish Research Council, 2002). Basic
ethical principles in biomedical research are respect for persons, beneficence,
and justice (Council for International Organizations of Medical Sciences
[CIOMS], 2002). Research including children without full autonomy (right to
make their own uncoerced choices) need extra consideration (Alderson &
Morrow, 2011). This thesis concerns adolescents with and without disability
in mainstream schools.

**Justice:** By studying students with disability as a specific group in
mainstream secondary school, the principle of justice has been considered.
Identification of this group and therefore of their experiences of school-based
PE is a largely overlooked issue (Fitzgerald, 2006; Haegele & Hodge, 2017).

**Information:** All students in all participating schools and classes, including
all their parents, i.e. the total sample of participants, have been informed about
the study purpose and proceedings. How integrity was protected, expected
degree of participation, that there were no uncomfortable situations predicted,
and no compensation. Participation was voluntary and could be terminated at
any point, and without explaining why, autonomy. A named contact person
was appointed (school nurse or class mentor), in case unpleasant incidents
would emerge.

**Consent:** To avoid stigmatization of students with disability, they were
addressed with separate information that they were the specifically targeted
group and if they agreed to participate, only themselves, the researchers, their
head-teacher, and PE teacher would know their identity. To prepare these
students for the data-collections the researcher sent a text-message to their parents. Informed consent was collected from students with disability and both their parents, and also from the participants and parents in the other two target groups. Enrolled participants in the study were categorized into three groups (with disability, low grades, high grades), to be studied on group-level, not as individuals.

Confidentiality: Participants were informed beforehand and at data collection that participation was voluntary and could be terminated at any point. Only researches would have access to the data and share no participants’ data with anyone else e.g. their PE teacher. To identify data from the target groups, all students had to write their name on the first page. All students were informed that only those who actively had agreed to participate in the study would be identified. Classmates of the target groups were told that by completing the questionnaires they agreed for their responses to be used as group-level reference data. Coding took place immediately after data collection and the questionnaires were stripped from information that could reveal student identities.

Non-maleficence: Data will neither be used for commercial purposes, nor shared in any way that would risk harming the participants. The identification coding key is stored in security approved archive.

Beneficence: Risk of stigmatization and ethical rigor connected to research on students with disability may result in them being excluded or giving inadequate replies to questions they do not understand. Pilot-testing instruments prepared the current study for how to best support students in need of special support to complete the questionnaires. Establishing measurement properties and procedures for data collection was necessary to ensure relevant and valuable self-reports on how students with disability perceive their self-efficacy, aptitude to participate in PE, and functioning.

In conclusion, research on the experiences of students with disability is important and necessary, but difficult. This study was approved by the Ethical Review Board, Linköping (2013/508-31). Apart from the official ethical approval, the researchers encountered individuals with their own personal ethical agendas in the recruitment process. Parents, head-teachers, and PE teachers are (and should be) gatekeepers to protect vulnerable adolescents from environmental threats (such as researchers). However, once contact had been established, and participation agreed, the data collection ran smoothly. The classrooms visited have been most welcoming, with an atmosphere of
students feeling they were being “selected”. The questionnaire contained no sensitive questions and student responses have mostly been sincere and accurate. Students were informed only to give one answer to each question within allocated space. When in doubt they asked the researcher, who provided an eraser when needed. On submission they were asked to check that they had answered all the questions, and not marked two alternatives or placed answers between two alternatives. To avoid stigmatization, communication researcher-student with disability has been scarce. Gathered from the rare occasions of interaction is a thankfulness for being listened to.
Results

Measurement development (article I)

Analyzing psychometric properties of the translated, developed, and adapted scales informed the process of producing an instrument, accessible for all students to successfully complete. The findings from the pilot study guided modifications, resulting in a reliable and valid instrument. This was confirmed by analyzing the first wave of data collection in the current study. In addition, the findings from the pilot study gave direction to future data analyses. Aiming at creating a self-report measure of student perceived self-efficacy (PE specific and general), aptitude to participate in PE, and functioning, the instrument was modified for students in mainstream, secondary schools (ages 12.5-15.5) in Swedish compulsory school. Strengths and weaknesses of the total scales and sub-scales were found by examining internal consistency, test-retest correlations, and factor structures. Findings from the pilot study revealed

- inconsistency in some items
- more missing values in the class that completed the questionnaire in the gym, compared to the class that was situated in the home classroom, especially in the latter part of the questionnaire
- a large amount of missing values in the special class

Indicated flaws were rectified in communication with educational professionals and students. As confirmed by repeating the analyses on data from the current study, modifications made had positive effects on the outcome. Minor changes of wording in the translated total scale general self-efficacy (with the sub-scales academic, social, and emotional self-efficacy), proved to be effective. Self-efficacy in PE (with sub-scales movement, health and lifestyle, and outdoor life and activity), displayed four factors. The clarifying examples, i.e. explaining item content, improved internal consistency. Correlations between aptitude to participate and self-efficacy in PE indicated that self-efficacy in PE was strongly related to whether the student was apt to participate or not. Aptitude to participate in PE and self-efficacy in PE showed high attrition. The adapted self-rated functioning scale displayed even higher attrition and indicated low factor structure in the pilot
study. Students in a mainstream school setting experienced high self-efficacy in PE, in aptitude to participate, and perceived their functioning to be high. Comparing means in the main scales, boys perceived significantly higher aptitude to participate than girls in the pilot test (n=47, 25 boys). Results from the pilot study gave indications on how to reason about and treat issues in the scales, sub-scales and specific items. Modifications such as rephrasing and adding explaining examples improved student understanding. Re-testing on the first wave of data collection in the current study, it was concluded that the scales were valid and reliable.

**Student perceptions of participation related constructs year 7 (article II)**

The object of study II was to describe and explore individual factors, student perceived self-efficacy (PE specific and general) and aptitude to participate in PE, in relation to student perceived functional skills. Additionally, relationships were explored between individual factors and environmental factors, PE teachers’ self-rated teaching skills (including lesson planning, long-term planning, and grading), teaching prerequisites and their ratings of the classroom social climate.

Studying patterns of associations between the groups (see table 5), correlations between self-rated teaching skills and student self-reported self-efficacy (PE specific self-efficacy and general), and aptitude to participate, there is a pattern of mainly negative associations in the group of students with disabilities. They reported low perceived general self-efficacy, aptitude to participate, and PE specific self-efficacy with its subscales if they had teachers who rated their teaching skills as high. Contrasting the self-reports of their typically functioning peers, who responded positively to high self-rated teaching skills.
Table 5. Correlations (Spearman’s rho) between teachers’ self-ratings and student self-reports in each group separately.

<table>
<thead>
<tr>
<th>Teaching skills</th>
<th>GSE</th>
<th>Part</th>
<th>SEinPE</th>
<th>Subscales of SEinPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disabili(ies n=25)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teaching Skills</td>
<td>−.230</td>
<td>−.100</td>
<td>−.057</td>
<td>−.185</td>
</tr>
<tr>
<td>Lesson planning</td>
<td>−.265</td>
<td>−.341</td>
<td>−.206</td>
<td>−.189</td>
</tr>
<tr>
<td>Long-term plan</td>
<td>−.294</td>
<td>.055</td>
<td>.056</td>
<td>.105</td>
</tr>
<tr>
<td>Grading</td>
<td>−.092</td>
<td>−.122</td>
<td>−.175</td>
<td>−.451*</td>
</tr>
<tr>
<td>Prerequisites</td>
<td>−.309</td>
<td>−.239</td>
<td>−.127</td>
<td>−.190</td>
</tr>
<tr>
<td>Climate</td>
<td>−.106</td>
<td>.266</td>
<td>.354</td>
<td>.338</td>
</tr>
<tr>
<td>A-C (n=55)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teaching Skills</td>
<td>.095</td>
<td>.063</td>
<td>.197</td>
<td>.190</td>
</tr>
<tr>
<td>Lesson planning</td>
<td>−.021</td>
<td>−.107</td>
<td>.066</td>
<td>.077</td>
</tr>
<tr>
<td>Long-term plan</td>
<td>.128</td>
<td>.045</td>
<td>.128</td>
<td>.221</td>
</tr>
<tr>
<td>Grading</td>
<td>.063</td>
<td>.203</td>
<td>.245</td>
<td>.157</td>
</tr>
<tr>
<td>Prerequisites</td>
<td>.081</td>
<td>−.035</td>
<td>.081</td>
<td>−.027</td>
</tr>
<tr>
<td>Climate</td>
<td>.199</td>
<td>.182</td>
<td>.150</td>
<td>.151</td>
</tr>
<tr>
<td>D-F (n=36)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teaching Skills</td>
<td>.053</td>
<td>.367*</td>
<td>.260</td>
<td>.317</td>
</tr>
<tr>
<td>Lesson planning</td>
<td>−.277</td>
<td>.064</td>
<td>.033</td>
<td>.044</td>
</tr>
<tr>
<td>Long-term plan</td>
<td>.035</td>
<td>.312</td>
<td>.173</td>
<td>.174</td>
</tr>
<tr>
<td>Grading</td>
<td>.266</td>
<td>.149</td>
<td>.217</td>
<td>.288</td>
</tr>
<tr>
<td>Prerequisites</td>
<td>.013</td>
<td>.425**</td>
<td>.252</td>
<td>.256</td>
</tr>
<tr>
<td>Climate</td>
<td>.060</td>
<td>.270</td>
<td>.124</td>
<td>.154</td>
</tr>
</tbody>
</table>

Note: Teaching skills=lesson plan, long-term plan and systematic grading. GSE=general self-efficacy, Part=aptitude to participate, SEinPE=self-efficacy in PE, MSE=movement self-efficacy, HSE=health self-efficacy, OSE=outdoor self-efficacy. ** p < .01, * p < .05.

Another pattern of non-significant correlations for PE teachers’ ratings of the classroom climate is displayed. Stronger associations were found for students with disabilities, compared to their peers in all but one measure, the exception being general self-efficacy, where students with disabilities was the only group to report low general self-efficacy in better classroom climates. Group differences in the correlations between PE teachers self-rated grading skills and movement self-efficacy were found to be significantly more negative among students with disability, compared to students with low grades.

In the total sample better socio-cognitive skills were associated with eight times higher odds of having high general self-efficacy, and four times higher odds for being apt to participate in PE (see table 6). Compared to the group of
students with disability, students with high grades were six times more likely to report better self-efficacy in PE.

Table 6. Binary logistic regression models with elevated GSE, SEinPE, and Part as outcome variables, and with socio-cognitive, physical and group (A-C and D-F, with disability as reference category) as independent variables in univariate models.

<table>
<thead>
<tr>
<th></th>
<th>Elevated GSE</th>
<th></th>
<th>Elevated SEinPE</th>
<th></th>
<th>Elevated Part</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OR (95% CI)</td>
<td>R²N</td>
<td>OR (95% CI)</td>
<td>R²N</td>
<td>OR (95% CI)</td>
<td>R²N</td>
</tr>
<tr>
<td>Elevated Socio-Cognitive skills</td>
<td>8.315 (2.913-23.737)</td>
<td>.217***</td>
<td>2.481 (1.057-5.825)</td>
<td>.051</td>
<td>4.062 (1.772-9.308)</td>
<td>.124***</td>
</tr>
<tr>
<td>Elevated Physical skills</td>
<td>1.246 (0.941-1.651)</td>
<td>.030</td>
<td>1.226 (0.947-1.586)</td>
<td>.028</td>
<td>1.457 (1.089-1.950)</td>
<td>.083*</td>
</tr>
<tr>
<td>A-C</td>
<td>2.277 (0.901-5.751)</td>
<td>.040</td>
<td>6.000 (2.060-17.479)</td>
<td>.139**</td>
<td>2.555 (1.021-6.393)</td>
<td>.045</td>
</tr>
<tr>
<td>D-F</td>
<td>1.295 (0.477-3.521)</td>
<td></td>
<td>1.989 (0.725-5.453)</td>
<td></td>
<td>1.796 (0.673-4.793)</td>
<td></td>
</tr>
</tbody>
</table>

Notes: GSE=general self-efficacy, Part=aptitude to participate, SEinPE=self-efficacy in PE; R²N=Nagelkerke’s pseudo R². ***p < .001. **p < .01. *p < .05.

In conclusion, students with disabilities were more sensitive to the classroom climate. Better teachings skills affected their self-efficacy (PE specific and general) and aptitude to participate negatively. Compared to the groups of students with high and those with low grades, movement self-efficacy in students with disability was negatively affected by teachers who rated their grading skills high. Physical functional skills did not impinge on neither their self-efficacy nor their aptitude to participate. The odds of students with disability experiencing high PE specific self-efficacy was six times lower than in students with high grades.

Observed student and teacher actions and interactions during PE lessons year 8 (article III)

All target groups were observed to be equally highly engaged during PE lessons. There was no significant difference in observed student engagement between the groups. Students with disabilities were observed more frequently in close communicative proximity to their PE teachers. The groups of students with disabilities and those with low grades were more off-task (see table 7). One non-significant tendency was that students with disabilities were socializing less with peers and observed to be more alone.
Compared to peers with high grades, who showed higher engagement in centers formats (small group or a choice of individual or group activity), the other two groups displayed higher engagement in whole group activities. These two groups engaged more enthusiastically when music was used for teaching purposes (e.g. dance, aerobic drills). Academically focused PE lesson content occurred in 15% of the observations. Students with disabilities were observed to show high engagement in such situations, but only in high-level teaching conditions.

PE teachers who more often aligned syllabus intentions with lesson content and used a vivid, vibrant tone when instructing were assigned into a category referred to as high-level teaching skills (n=10) and the colleagues who less often showed this behavior were assigned to another category referred to as low-level teaching skills (n=11). Analyses between high- and low-level teaching skills showed differences between the two categories (see table 8). Instructions were more common in lessons with high-level teachings skills. In high-level teaching skills students were observed to be more engaged. They practiced skills or were given instructions (and/or feedback/feedforward) more often and music for teaching purposes was more frequently used.

Significant associations were found between observed student engagement and previously self-reported PE specific self-efficacy $t(90) = 2.35, p = 0.021$, and aptitude to participate in PE $t(90) = 2.62, p = 0.010$ (study II). A moderate increase in engagement was also shown, as the students in high-level teaching skills displayed significantly improved performance in the post-test compared to the pre-test ($t(90) = 2.30, p = 0.024$). These findings indicate that high-level teaching skills may be a crucial factor in enhancing student engagement and performance in PE classes.
non-significant correlation $r_{(15)} = 0.38$, $p = 0.165$ between observed teaching and self-rated teaching skills (study II) was also found.

Table 8. Observed high-/low-level teaching skills and aspects of student participation in PE.

<table>
<thead>
<tr>
<th>Index</th>
<th>Lower (n=11)</th>
<th>High (n=10)</th>
<th>df</th>
<th>$t$</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student engagement</td>
<td>Mean %</td>
<td>SD</td>
<td>Mean %</td>
<td>SD</td>
<td>92</td>
</tr>
<tr>
<td>Student action</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Practicing skills</td>
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<td>19.74</td>
<td>52.6</td>
<td>17.53</td>
<td>92</td>
</tr>
<tr>
<td>Not practicing skills</td>
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<td>14.02</td>
<td>10.6</td>
<td>12.07</td>
<td>92</td>
</tr>
<tr>
<td>Being social</td>
<td>17.1</td>
<td>9.08</td>
<td>11.6</td>
<td>9.47</td>
<td>92</td>
</tr>
<tr>
<td>Being instructed or else</td>
<td>20.2</td>
<td>11.84</td>
<td>25.1</td>
<td>10.86</td>
<td>92</td>
</tr>
<tr>
<td>Proximity to</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teacher</td>
<td>27.5</td>
<td>16.78</td>
<td>40.8</td>
<td>21.20</td>
<td>92</td>
</tr>
<tr>
<td>Student/s</td>
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<td>19.71</td>
<td>49.6</td>
<td>19.43</td>
<td>92</td>
</tr>
<tr>
<td>Self</td>
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<td>18.57</td>
<td>9.6</td>
<td>9.22</td>
<td>92</td>
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<tr>
<td>“Being there”</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>On-task</td>
<td>43.1</td>
<td>20.26</td>
<td>48.7</td>
<td>19.05</td>
<td>92</td>
</tr>
<tr>
<td>Off-task</td>
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<td>20.01</td>
<td>42.2</td>
<td>14.99</td>
<td>92</td>
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<tr>
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<td>8.7</td>
<td>9.02</td>
<td>92</td>
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<td>6.83</td>
<td>0.4</td>
<td>1.25</td>
<td>92</td>
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<td>Focus</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical skills</td>
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<td>20.39</td>
<td>68.1</td>
<td>17.65</td>
<td>92</td>
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<td>Academic skills</td>
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<td>11.98</td>
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<td>15.91</td>
<td>16.4</td>
<td>16.68</td>
<td>92</td>
</tr>
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<td>51.0</td>
<td>22.99</td>
<td>62.6</td>
<td>18.44</td>
<td>92</td>
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<td>16.5</td>
<td>15.78</td>
<td>92</td>
</tr>
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<td>Transition</td>
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<td>9.51</td>
<td>16.0</td>
<td>10.04</td>
<td>92</td>
</tr>
<tr>
<td>Other</td>
<td>3.4</td>
<td>9.65</td>
<td>4.9</td>
<td>14.25</td>
<td>92</td>
</tr>
<tr>
<td>Materials used</td>
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<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>No</td>
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<td>22.00</td>
<td>49.1</td>
<td>18.45</td>
<td>92</td>
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<td>23.82</td>
<td>28.8</td>
<td>25.23</td>
<td>92</td>
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<td>17.9</td>
<td>17.79</td>
<td>21.1</td>
<td>19.32</td>
<td>92</td>
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<td>Technical device</td>
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<td>16.36</td>
<td>1.0</td>
<td>2.91</td>
<td>92</td>
</tr>
<tr>
<td>Teachers instructing*</td>
<td>28.6</td>
<td>13.83</td>
<td>50.1</td>
<td>13.05</td>
<td>19</td>
</tr>
</tbody>
</table>

Notes: In the observations with high-/low-level teaching skills, student engagement is an average of observed engagement. Other values indicate the mean percentage of observations. *The variable Teachers instructing derives from TOPE, all other data derive from COPE.

47
Associations between individual factors, environmental factors and final PE grade year 9 (article IV)

The developmental process of student perceived PE specific self-efficacy showed a general increase in the total group and in all three target groups. Aptitude to participate declined in students with disabilities over time and increased in the other two groups. But students with disabilities were the only group to report higher general self-efficacy (mean score) at timepoint three (T3). A significant increase of PE specific self-efficacy was found in students with low grades. Significantly lower general self-efficacy was found in students with high grades at T3 than at timepoint one (T1). The strong correlation between PE specific self-efficacy and aptitude to participate found at T1 was confirmed at T3 and associations between the three scales remained stable over time in all groups.

Socio-cognitive functional skills improve over time in the total sample and in the three target groups. At T1 socio-cognitive skills affected PE specific self-efficacy and aptitude to participate considerably. For students with disabilities the correlation between PE specific self-efficacy and socio-cognitive skills was non-significant at T1 and became stronger and significant at T3. The opposite was found in the other two groups with stronger and significant correlations at T1, and weaker non-significant at T3. The general self-efficacy of students with low grades was strongly related to socio-cognitive skills ($r=.807, p = .01$) in the beginning of secondary school. This impact became weaker over time but is still considerable ($r=.635, p = .01$). Physical skills hardly mattered at all year 7 to perceptions of self-efficacy (PE specific and general self-efficacy) and aptitude to participate for students with disabilities but were strongly related at T3. Physical skills mattered to some extent to the self-efficacy of students with low grades, but not to their aptitude to participate at T3. Very little impact of physical skills on any of these aspects was seen in students with high grades.

Criterion-referenced grades target certain goals in areas of movement, health and lifestyle, and outdoor life and activities. The blue lines in figure 3 shows the direction towards the final grade in the study sample (n=105). Final PE grades year 9 were predicted by student perceived PE specific self-efficacy year 7, their following year 7 PE spring grade, by their aptitude to participate year 9, and by lower reported levels of general self-efficacy year 9. Exploring group differences, bidirectional correlations were significant between PE
specific self-efficacy at T1 and final PE grade year 9 in the groups of students with disabilities and those with low grades. Significant correlations were also found between aptitude to participate at T3 and final PE grade year 9 in students with high grades. These results indicate that self-efficacy and aptitude to participate matter to the final grade but did not show group-level effects in the proposed model for students with disabilities and those with high grades. Having a certain spring PE grade year 7 was the only factor predicting the final PE grade year 9 in these groups. Yet one significant model was found for students with low grades. Final PE grade year 9 was predicted by the aptitude to participate at T1, PE grade year 7, self-efficacy in PE and lower levels of general self-efficacy at T3. Although functional skills to various degrees were associated with the measures, they did not show any impact on the final PE grade year 9. Neither did any of the environmental factors; classroom climate, self-rated and observed teaching skills. However, significant correlations between classroom climate and both PE grade year 7 and final PE grade year 9 were found in students with disabilities.

Figure 3. Hierarchical regression model of predictors of final PE grade year 9 in the study sample (n=105).

Notes: Black lines show partial correlations between scales at T1 and at T3 controlling for each scale separately, and within scales over time controlling for grade year 7. Blue lines show partial correlations in a hierarchical regression model including the variables PE specific self-efficacy (SEinPE) at T1, spring grade year 7 (GradeY7), aptitude to participate (Participate) and general self-efficacy (GeneralSE) at T3 and final PE grade year 9 (GradeY9), controlling for Participate and GeneralSE at T1 in step 1, also including SEinPE at T1 in step 2, and for all the variables in the model in step 3.
Discussion

Developmental processes of self-efficacy, aptitude to participate and perceived functioning are in the center of attention in this thesis. The discussion is framed within the family of participation-related-constructs (fPRC), which is guided by the bioecological systems theory (Imms et al., 2017). Persons (students) with disabilities in a PE context are specifically focused. The three-year longitudinal study was situated in Swedish mainstream inclusive secondary school, years seven to nine, ages 12.5-16.5 (context). Results were collected at four timepoints from the study sample (n=121) and compared between three separate groups of students with 1. Disabilities, 2. Low grades, and 3. High grades in PE before transitioning into secondary school (time). Data was also collected from their PE teachers (n=22). Environmental prerequisites for school-based PE are outlined first, followed by impacts of teaching skills (structuring of PE lessons, observed teaching skills according to curricular and PE syllabus intentions and classroom climate). Next, individual aspects, the developmental processes of self-efficacy (PE specific and general), aptitude to participate and functioning (physical and socio-cognitive skills) are described and how they are linked to the final summative outcome of PE learning (the final PE grade year 9). These aspects are then further expanded considering methodological challenges and implications for future practice and intervention research. Major results are highlighted in blue outlined boxes, linked to where they are being discussed.
Environmental prerequisites

Implementing international conventions and documents (UNESCO, 1994, 2000; United Nations, 1989, 2011) has made inclusion of students with disabilities in mainstream schooling common practice in many western countries. Inclusive mainstreaming works as a means to achieve an equitable school of democratic values (Nilholm, 2006) and to increase participation, community, compassion, and respect for diversity (Ainscow, 2012). The Swedish national curriculum emphasizes ‘a school for all’ and the PE syllabus of today has a more health-directed focus (The Swedish National Agency for Education, 2018). The school subject is called Physical Education and Health (PEH). The main purposes of PEH education are to provide students with opportunities to develop all-round motor competence and interest in being physically active indoors and outdoors. Expected learning outcomes are e.g. to plan, do and evaluate physical activities, to carry out outdoor activities and adapt to weather conditions, to prevent risks and to handle emergencies. Students are to gain knowledge and skills for a future healthy lifestyle and positive school-based PE experiences are vital to individual and societal end results (Engström, 2008). PE differs from typically academic subject in the sense that life-skills such as motor control, risk and injury prevention and handling life-saving situations are targeted. But also because physical, cognitive, social, and emotional gains are claimed in the subject (Bailey et al., 2009). The school is obliged to provide adequate services to supply students in need of special support with prerequisites for school success (SFS, 2010:800). Depending on student difficulties special support may be provided in-class or segregated from class. In PE all students are offered an opportunity to participate in prosocial activities, be physically active, interact with peers and develop functional skills. PE is therefore an important school context in which students with disabilities to a large extent are included. The results of this thesis indicate that students with disability show similarly high engagement in PE as their peers, but patterns of engagement are partly
different. Different aspects of the environment affect students with and without disability differently.

**The five A’s**

There are environmental aspects that PE teachers are in control of and others that are out of their control. One way of mapping the environmental prerequisites for participation is to use the five A’s (see table 9): availability, accessibility, accommodability/adaptability, affordability and acceptability proposed by Maxwell et al. (2012).

Table 9. The five A’s applied to a PE context.

<table>
<thead>
<tr>
<th>Availability</th>
<th>Referring to</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Availability</td>
<td>Is the activity offered?</td>
<td>Is there a forest, swimming pool or other activity specific facilities close to the school?</td>
</tr>
<tr>
<td>Accessibility</td>
<td>Can you access the specific facility?</td>
<td>Are there elevators, hearing loops or other technical aides in the gym?</td>
</tr>
<tr>
<td>Affordability</td>
<td>Is it worth the money or energy?</td>
<td>Is it worth the investment to participate in e.g. skiing trips arranged by the school?</td>
</tr>
<tr>
<td>Accomodability/adaptability</td>
<td>Is the activity adapted and/or equipment modified?</td>
<td>Does the obstacle run offer alternative pathways? Are there balls with noise bells?</td>
</tr>
<tr>
<td>Acceptability</td>
<td>Is your presence accepted by self or others?</td>
<td>Do perceived functional limitations contribute to or impede with the PE activity?</td>
</tr>
</tbody>
</table>

Availability concerns the physical environment. The PE syllabus contains grading criteria that require assessment-based information not attainable in the gym, e.g. swimming and orienteering. Due to school location, swimming facilities may not be available. The syllabus core content *outdoor life and activities* may also cause availability concerns in

“The physical environment was initially related to the aptitude to participate of students with low grades.”
urban schools. Self-rated PE teaching prerequisites are aspects PE teachers are not in control of, school obligations include the organizing of teaching to guarantee availability.

Accessibility Swedish gym facilities generally keep high standards in being accessible, that is if equipment and technical devices are well maintained. Outdoor environments may be problematic, e.g. forest, gravel-yard.

Accomodability/adaptability Accommodating students with disabilities in PE activities, require innovative solutions, e.g. alternative pathways in obstacle runs and/or modification of sports equipment. Organizational skills are measured in terms of self-rated teaching skills at T1 and observed teaching skills at T3.

Affordability in terms of insurmountable effort and energy may be avoided by lesson planning, long-term planning and systematic work with grading (self-rated teaching skills). The PE syllabus, with its grading criteria, provide teachers with broad possibilities for interpretation. Teaching (Bolic Baric et al., 2016) and grading (SFS (2010:800)) should be differentiated. Financial costs for PE activities arranged by schools are limited, in many schools banned. Choices of PE activities may be offered, at times and in mutual student-teacher communication in facilities segregated from the gym classroom activity.

Acceptability refers to the social environment. PE teachers can affect this environmental aspect. Their attitudes towards students with disabilities and relationships with students promote the classroom climate (Falkmer, 2013). Being a competitive environment by nature, PE teachers can impact the level of competitiveness. Unfavorable attitudes of PE teachers to accommodate students
with disability are according to themselves due to limited competence (Block & Rizzo, 1995) and limited training (Hodge, Ammah, Casebolt, Lamaster, & O’Sullivan, 2004; Smith & Green, 2004). Fostering a mastery climate with performance approach goals (opposing competitive skill-related goals) have been shown to improve physical self-concepts (Hagger, Chatzisarantis, & Biddle, 2001), motor skills (Valentini & Rudisill, 2004) and motivational outcomes (Harwood, Keegan, Smith, & Raine, 2015). Self-rated and observed teaching skills were created to encompass curricular intentions towards a health-directed PE learning. Teachers communication of knowledge requirement makes students understand what is expected from them. This provides students with perceptions of control over their learning, affecting strategy and capacity beliefs of effort, ability, relationship with teacher and luck (Skinner, 2016).

Framed in the fPRC, figure 4 shows associations between environmental factors and individual student factors. A relationship (non-significant) between self-rated and observed teaching skills was established in the study sample (study II and III) but showed little influence on the outcomes studied. Teaching skills were related to student aptitude to participate, and the classroom climate to all individual factors at T1 in the total sample (n=439). Group-level differences will be further discussed.

Figure 4. Influences of environmental factors framed in the fPRC (Imms et al., 2017).
Influences of environmental factors framed in the fPRC

At transition into secondary school, students encounter higher educational demands (The Swedish National Agency for Education, 2018). Empirical evidence of quality teaching and matters of accountability make out the ground on which self-rated teaching skills were indexed. Aligning syllabus intentions with lesson content and assessment require lesson planning, long-term planning and systematic work with grading. Teachers who work systematically with grading communicate what is expected from students and facilitate learning by incorporating the syllabus intentions into their lessons. By knowing what is being assessed and when, students can control their learning (The Swedish National Agency for Education, 2012). PE teachers’ ratings of their own teaching skills in this sense, were aggregated into two groups of teachers exhibiting high/low teaching skills. Environmental factors did not show any prediction for any long-term student outcome (study IV). However, significant correlations showed long-term bidirectionality between the classroom climate and PE grades in the group of students with disabilities, and the aptitude to participate at T3 in students with high grades (see figure 4). Bidirectionality was also found between environmental factors and self-efficacy (PE specific and general) and aptitude to participate at T1 in the total sample and in the group of students with low grades.

Students with disabilities, at the age of thirteen, who had PE teachers who rated their teaching skills as high reported lower PE specific self-efficacy than their peers at T1 (study II). The expectation was to find the opposite. But it seems that when teachers work in accordance with the syllabus intentions and clearly communicate knowledge requirements and grading standards, students with disabilities react negatively. If grading criteria are not differentiated to students’ restricted functioning, grading standards may feel invincible and cause the lower PE specific self-efficacy.

Teachers self-rated prerequisites (physical environment) for PE teaching and their ratings of the classroom climate (social environment) showed some relation at T1 to the groups of students with disabilities and with low grades. Indications of teaching prerequisites were initially that they were overall negatively associated with self-reports of students with disabilities across measures. Compared to the other groups, PE teaching prerequisites were significantly positively related to the aptitude to participate of students with low grades. Teachers’ ratings of the classroom climate seemed to work as a
quality indicator of the social environment at T1. A better classroom social climate was positive for all students across measures. The stronger associations found in students with disabilities imply that a good classroom climate benefit this group most (study II). Significant associations were also found in this group between classroom climate PE grade year 7 and final PE grade year 9 (study IV). The aptitude to participate of students with high grades at T3 was related to the social climate.

PE lessons with teacher and student participants were observed in study III. A structured multi time-sampling method was used to score frequency of teacher behaviors. Quality indicators for observed teaching skills were level of instruction, affective tone when instructing and aligning curriculum content into their instructions. To differentiate levels of teaching skills, teachers were assigned to either a group named high-level teaching skills (n=10) or low-level teaching skills (n=11). Results from the observations show that teachers with high-level teaching skills held more complex lessons with more instructions and materials used, e.g. music for teaching purposes. Students were more engaged and more on-task, practicing skills. Additionally, teachers with high-level teaching skills were more often in communicative proximity to their students, facilitating differentiation and additional support.

**Contextual differences**

One surprising finding was that more whole group formats were used in high-level teaching. Common practice to encourage learning in inclusive setting is to use a small group format (Webb, 2008). PE lessons are commonly structured into parallel activities, either by students active in the same or different activities with the gym split to keep team-, group- or individual activities apart. Students with high grades were the only group who were more engaged in centers formats (small group or a choice of individual or group activity). Centers formats may be used in case more advanced activities are targeted, or when students are to practice skills individually or in pairs/small groups. For students to fully engage, the activities should be adapted, or modified to fit appropriate levels of student skills (Tant & Watelain, 2016). And student engagement is predicted by autonomy support (Jang, Reeve, & Deci, 2010). PE teacher work alone, rarely assisted by teaching aids or personal assistants. Our results suggest that autonomy support in centers formats is insufficient for students to stay on-task and engage in small group formats. Teachers with high-level teaching skills may prefer to work with
whole group structures in activities with low complexity, to keep as many students as possible active at highest achievable levels of physical activity.

Complexity and efficiency
Differences in complexity showed first of all in the amount of instructions and materials used. And secondly, by the amount of differentiations made and supplied support mainly facilitated by the PE teachers’ closer proximity to their students. Students with disabilities were observed to be more frequently close to their PE teachers. Efficiency was displayed in level of instructions and the use of lesson time and gym space. There is a strong activation discourse in PE with emphasis on development of skills (physical focus, connected to the core content movement) rather than knowledge (academic focus, connected to the core content health and lifestyle) (Larsson & Nyberg, 2017). Teachers with high-level teaching skills instructed more. Content familiar to students require less instructions and often, but not always, less teacher preparation. Aligning content to curriculum for the first time and/or introducing new subject areas or activities, i.e. content unfamiliar to students, are examples of situations when more instructions and teacher preparations are required. Despite more instructions, students were more engaged in high-level teaching, independently on whether focus was physical or academic. They were observed to be more on-task, practicing skills, and socializing less. Instructions may have been more efficient and in their structuring of lessons into whole group or centers formats, high-level teaching seems to use gym space more efficiently. By initializing self-sustaining activities familiar to students, teachers may allocate their attention towards more advanced centers formats. The closer proximity to all students in high-level teaching imply that teachers were moving between students to supply individual support, feedback and feed-forward. This is one way of differentiating teaching; another is to modify activities or equipment to challenge students at their level of performance and create opportunities for success.

Materials and focus
Materials can be used for different purposes, activation and/or differentiation. Music can for example be used as a background factor inspiring activation, but also as a means to differentiate skills to practice for the intended learning outcomes concerning dance and aerobics. Materials were only used in 50% of the observation, but materials used to target learning goals, e.g. music for teaching purposes, almost only occurred in high-level teaching. Positive
learning effects is proposed by a better alignment of curriculum and assessment (Penney et al., 2009). To meet the needs of students with and without disabilities teachers are challenged to differentiate their teaching and in inclusive education insufficient support limits effects of policy documents (Pocock & Miyahara, 2018). Given that students with neuro-developmental disabilities may be highly affected by sensory impressions (Dunn, 2007), using music as a background factor may disturb their participation. To reach intended learning outcomes, music for teaching purposes necessarily needs to be attributed, the question of how should be closely considered.

Lesson focus was scored as physical, academic or non-focused. Applying an academic focus to PE lessons (e.g. prevention of risks/injuries), seemed to benefit the engagement of students with disabilities, who then were observed to be more engaged in conditions with high-level teaching skills. PE taught by teachers with high-level teaching skills seem to simultaneously encompass both knowledge and skill-based content into their lessons. Higher engagement was seen in all groups of students both in situations with physical and academic focus. Teaching needs to target learning goals, be student focused and build on communication and feedback (Aspelin, 2012) and meaningful learning experiences for students with disabilities may be provided by a positive learning environment (Haegele & Sutherland, 2015). It is possible that they by doing so, provide students with more meaningful and equitable learning, in which students disadvantaged by disability can participate in PE on more equal terms. If so and complemented with initial establishment and continuous communication of individually adapted learning standards (study II), it is reasonable to suggest that students with disabilities can develop at their own pace to reach their highest achievable potential.

In summary, results from study II indicate that PE teachers’ ratings of their PE teaching prerequisites may work as a quality indicator of the physical environment, and their ratings of the classroom climate as a quality indicator of the social environment. Concluded is that grading criteria already from the beginning of mainstream inclusive secondary school should comply with standards adapted to fit abilities of students with disabilities. In addition, the social climate has long-term effects on the PE grades of students with disabilities. Results from observations indicate that student engagement is higher in high-level teaching. Contextual differences were found in complexity and efficiency of PE lessons, and in materials used and lesson focus. Communicative proximity to teachers, whole group or small groups
formats, materials used for teaching purposes, and lesson focus may work as indicators of quality PE teaching. Students with disabilities are negatively affected by the environmental factor teaching skills at T1. Comparing groups, classroom climate showed stronger associations with individual factors in students with disabilities at T1 and long-term association with the final PE grade year 9 at T4. Yet, as seen in figure 4, environmental factors do not have much impact on the individual developmental processes and outcomes of final PE grade year 9 in the study sample as individual factors do.

Developmental processes of self-efficacy, aptitude to participate and functioning as individual factors

*Self-efficacy in PE*

Self-efficacy has been shown to predict academic outcome in subject areas other than PE (Friedel, Cortina, Turner, & Midgley, 2010; Gustafsson et al., 2010; Kitsantas et al., 2011; Pajares, 2003). Consequently, the intention in this thesis was to link intended learning outcomes with physical activities commonly occurring in PE. The instrument PE specific self-efficacy was created with subscales covering the three core content areas movement, health and lifestyle, and outdoor life and activities. The ratings were designed to correspond to the grading scale (ranging A-F). Students self-reported how well their perceived knowledge and skills were in various activities (e.g. participate in team sports and games, plan, do and evaluate their own training, orient themselves in unfamiliar environments) on a scale (ranging 1-6) from not at all good to very well (study I).

Students with disabilities were initially six times less likely, compared to students with high grades, and two times, compared to students with low grades, to report high PE specific self-efficacy (study II). Although the tendency of reporting lower PE specific self-efficacy than their peers remains, students with disabilities show a similar trend of increased PE specific self-efficacy over time as the other groups (article IV). The initial experience of PE specific self-efficacy remains stable over time in the group of students with low grades. They reported the highest overall increase in mean scores of PE specific self-efficacy (article IV). These findings support previous research that the "PE-specific self-efficacy increase in all groups"
students who gain most from school-based PE are those who are minimally physically active (Prochaska, Sallis, Slymen, & McKenzie, 2003), and those with motor skill restrictions (Ericsson, 2011). Since students with disabilities participate less in physical recreational activities than their typically developing peers (Woodmansee, Hahne, Imms, & Shields, 2016), school-based PE is an important context for these students to gain the benefits of physical activity (Block & Obrusnikova, 2007). Presumably this is also the case for individuals with low grades (also represented in the group of students with disabilities), who compared to their peers with high grades are less likely to be physically active outside school. In summary, the measurement of student perceived PE specific self-efficacy mirrors learning in PE in accordance with the PE syllabus (study I, II, IV). Initially the PE specific self-efficacy in students with disabilities is low if they have teachers who rate their teaching skills high. Over time PE specific self-efficacy increases similarly in the three groups (study II, IV). Students with low grades gain most from school-based PE (study IV).

**Relationships framed in the fPRC**

“PE-specific self-efficacy is related to PE grade year 7 for all groups. For the groups of students with disabilities and those with low grades this association became stronger with final PE grade year 9”

Revisiting the fPRC framework, sense of self was operationalized as perceptions of self-efficacy (PE specific and general) and preferences as aptitude to participate. Group-level differences of links between these constructs and observed engagement, PE grade year 7 and final PE grade year 9 are shown in figures 5a and 5b.

PE specific self-efficacy and aptitude to participate were relatively strongly related between the scales at both timepoints in all student groups (study IV).
Figure 5a. Group-level intra- and interrelationships framed in the fPRC at T1 to T4, with direct links to final PE grade year 9.

Notes: **Bolded text**=students with disabilities, blue text=students with high grades, *italics*=students with low grades ns=non-significant.

Figure 5a shows how student self-reported perceptions at T1 are intra-related with their perceptions at T3, and how PE grade year 7 is intra-related with their final PE grade year 9. Interrelationships are shown between students’ perceptions of PE specific self-efficacy at T1 and their PE spring grade year 7, and between PE specific self-efficacy and aptitude to participate at T1 and final PE grade year 9, T4.
Figure 5b. Group-level associations framed in the fPRC at T2 to T4 with direct links to final PE grade year 9.

Notes: **Bolded text=students with disabilities**, blue text=students with high grades, *italics=students with low grades* ns=non-significant.

Figure 5b shows associations between observed engagement at T2 and PE specific self-efficacy, and aptitude to participate at T3, and final PE grade year 9, T4.

**Aptitude to participate**

Participatory gains are yet another reason as to why students with disabilities so commonly attend mainstream secondary school-based PE, together with their classmates. Special schools are available only for students with intellectual disabilities, but due to circumstances they may be included in mainstream schools. Although students with severe disabilities are included in Swedish mainstream education, they may receive special support separated from their classmates most of their school hours. For every student to experience a sense of belonging and due to the nature of PE, opportunities to participate in regular PE are commonly made available. However, operationalizing participation measures are complicated. There exists a plethora of definitions, there are cultural differences and instruments measuring different aspects of participation, most commonly studied in school contexts is absenteeism (Organisation For Economic & Development, 2003).
Preferences for participation in PE in this thesis were operationalized as student self-reported aptitude to participate and participation as observed student engagement during PE lessons. The measurements correspond to the definitions of preferences and engagement proposed in the Family of Participation Related Constructs (fPRC) of participation as having two dimensions; presence and being involved while being there (Imms et al., 2017). The aptitude to participate (preferences) and observed student engagement were significantly related in the study sample (study II and III).

The group of students with disabilities showed lower aptitude to participate in PE at T1 (study II), compared to the other groups and the total sample (n=439). The aptitude to participate declined in students with disabilities at T3, whereas the opposite was found in the groups of students with high and with low grades (study IV). Reasons for this are probably due to functional limitation, which will be discussed later. There was no difference in observed student engagement, but students with disabilities tended to be socializing less with peers and seemed to be more alone (study III). The results imply that while peers can both participate and socialize in activities, the full attention of students with disabilities is projected towards joining in and fitting in with the ongoing activities. Students with disabilities were seen to be in closer communicative proximity to their PE teachers than their peers (study III). They may have asked for further instructions, or teachers may have chosen to position themselves close to these students. Either way, the need for additional support is signaled by this finding. Teaching strategies of peer-assisted learning in PE, involving peers in assisting each other’s learning show promising prospects of relieving PE teachers from being the sole resource of support, feed-back and feed-forward (Ward, Lee, & Lee, 2005). Involving peers in assisting students with disabilities in PE increased activity levels in all students (Klavina, Jerlinder, Hammar, & Soulie, 2013),
but teacher training is needed for implementation of such strategies and need further research to establish effects (Jenkinson, Naughton, & Benson, 2014).

Higher engagement was found in students with disabilities in formats of whole group activities, when balls and when music were used for teaching purposes, and when lessons had more academic focus (study III). Academic focus was scored when cognitive skills were challenged for deeper understanding of PE related knowledge. Examples of academically focused lessons are when lesson content and syllabus intentions were aligned in instructions or feed-back/feed-forward, or when students documented their performance in individual specifically purposed protocols. Findings imply that lesson complexity may be a barrier to student participation in some situations and a facilitator in others, depending on lesson complexity (discussed above with observed teaching skills). To summarize, the findings imply that learning in PE is reflected by student perceptions of self-efficacy, aptitude to participate (study II) and observed student engagement (study III). Support to students with disabilities is mainly provided by the teacher being in close communicative proximity. Being close to the teacher may feel comforting and ease the stress of functional short comings.

**General self-efficacy and perceived functional skills**

Functional skills, also referred to as functioning, were self-reported by the students themselves. Students rated their perceived functioning in relation to typically functioning peers. Socio-cognitive functional skills (general health, social skills, behavior, ability to understand others, make yourself understood, and problem-solving skills) had considerably stronger associations with all measures in all groups, than did physical functional skills (in hands, arms, legs) at T1 (study II). But perceived socio-cognitive functioning improves over time in all groups. Strongest associations of socio-cognitive functioning with general self-efficacy were found for students with low grades (studies II and IV). Students with disabilities report the highest improvement, whereas restricted physical functioning appears to affect this group negatively during secondary school
(study IV). If curricular intentions are aligned into PE lessons with subsequent assessment, student effort would be endorsed. However, feelings of being inferior to peers, due to physical shortcomings are understandable. Competition is unavoidable in PE environments, students compare their achievements with peers, rather than their effort. PE lessons where competitive games are adapted to profit skills other than physical, e.g. teamwork, problem-solving and precision, preferably combined with health-directed PE learning are likely to reduce negative experiences. Environments where collaboration is promoted and exclusionary games are limited are important for students to feel engaged and socially included in PE (Garn, Ware, & Solmon, 2011).

Comparing means between the groups, one trend is that students with disabilities is the only group that reports higher general self-efficacy over time (study IV). In line with previous findings there is a general decline in the other groups and in the total sample (Schunk & Pajares, 2010). This indicates that students with disabilities differ in terms of transitional outcome of maturity. Developmental changes concur at the transition into secondary school. Students with disabilities were more sensitive to environmental factors in the beginning of secondary school. Their general self-efficacy was negatively affected by the classroom climate (as rated by their PE teachers) and they reacted negatively to teachers who rated their teaching skills high on all scales measured (study II). Their peers were positively or hardly at all affected by classroom climate and teaching skills, signaling less environmental impact and thus early maturity in stabilizing person characteristics. Previous research has indicated slower developmental pace in students with disabilities, e.g. time-processing abilities (Janeslått, Granlund, & Kottorp, 2010) and effects of self-regulation on goal attainment (Wehmeyer, Yeager, Bolding, Agran, & Hughes, 2003). Maybe a slower maturity pace in students with disabilities makes it more difficult for them to read environmental cues to fitting in and joining in, which in turn cause overall negative feelings of self with indirect negative effects on PE specific self-efficacy and aptitude to participate in PE.
Students with disabilities were consistent in their ratings of their physical functional skills. Close to zero associations between physical functional skills and self-efficacy (PE specific and general) and aptitude to participate were found at T1 in all the groups. At T3 physical functional skills of students with disabilities are relatively strongly associated, with their perceptions of self-efficacy (PE specific and general) and aptitude to participate at T3 (figure 6, blue boxes). Although no significant direct impact of perceived functional skills on final PE grade year 9 were found in neither group, these findings imply indirect impact of perceived physical skills on the final PE grade year 9.

Figure 6. Influences of student perceived and self-reported functional skills (physical and socio-cognitive skills) factors framed in the fPRC (Imms et al., 2017)

“The experienced feeling of having physical restrictions became more strongly linked with perceptions of self-efficacy (PE-specific and general) and aptitude to participate over time”

Notes: T1=timepoint 1 year 7, T3=timepoint 3 year 9. Bolded text=students with disabilities, blue text=students with high grades, italics=students with low grades.

Additional strain linked to the outcome of final PE grade year 9, is the stronger indirect effect of socio-cognitive skills on PE specific self-efficacy at T1 (red outlined box). Although there is a general decline over time of the impact of
socio-cognitive skills across groups and across measures, they do have indirect consequences for the final PE grade year 9 of students in the study sample, via their perceived general self-efficacy at T3. Problems connected to socio-cognitive skills for students with low grades levelled out (figure 6, light orange boxes) as they matured and learned how to control this type of functional skills (study IV). However, the considerable impact of socio-cognitive skills on general self-efficacy at T3 for this group needs attention. Prospective gains should be considered when allocating resources. Providing socio-cognitive support, not only academic, would presumably improve individual perceptions of general self-efficacy and the final PE grade year 9 and probably affect the classroom social climate positively.

Maturity paces, or maturational differences, seem to play an important role in adolescent life. Faced with realizing that their options in life are different from their typically functioning peers probably cause students with disabilities to reevaluate their possibilities in future life. As they mature, they are entitled to additional support if needed all through their time in secondary school. With similar socio-cognitive skills as the total sample (study II), equal engagement during PE lessons as their peers (study III) and increased general self-efficacy over time (study IV) the provided support may have helped them balance expectations with attainable achievements and may thereby have promoted their general school self-efficacy.

**Comprehensive understanding**

School has two tasks, to teach and to foster their students into active, creative, competent and responsible individuals and citizens according to the Swedish national curriculum for the compulsory school, preschool class and school-age educare, revised 2018 (The Swedish National Agency for Education, 2018). Results from this thesis can confirm the hypothesis that student perceptions of PE specific self-efficacy indicates PE knowledge and skills over time and are related to their perceived general self-efficacy, aptitude to participate, engagement, functional skills and grades. It was further hypothesized that teaching skills affect student PE learning in accordance with intended learning outcomes and their summative final grade is based on PE teachers’ acquired information about their students’ gathered knowledge and skills in PE. This hypothesis is partly true and can neither be confirmed nor rejected.
Individual factors play a major (see figure 5a and 5b), environmental factors a minor role (see figure 4), in the developmental processes of adolescents (study IV). However, in acquiring knowledge and skills in PE, students with disabilities were initially more affected than their peers by environmental aspects of classroom climate and self-rated teaching skills (study II). The classroom climate had long-term effects. Their PE grades were affected in year 7 and remained over time (study IV). Student PE specific self-efficacy, i.e. perceived knowledge and skills in PE develop positively over time (study I, II, IV) and are closely related to their aptitude to participate (I, II, IV). The measurement of PE specific self-efficacy was designed to measure perceived knowledge and skills in PE, according to syllabus intentions (study I). A relationship was established that indicates that aptitude to participate is reflected in student observable engagement (study III). Two significant models of directionality were found (study IV). In the study sample PE specific self-efficacy at T1 predicted the final PE grades year 9 through PE grade year 7 and higher aptitude to participate and lower general self-efficacy at T3 (see figure 3). The final PE grades year 9 for students with low grades was predicted by the aptitude to participate in PE at T1 via the same variables. These findings emphasize the importance of boosting the students’ self-efficacy in PE, as well as how crucial participation already from the beginning is to the final outcome. Neither environmental factors, nor perceived functional skills showed any directionality.

Studying bidirectional relationships within the fPRC framework (figures 5a, 5b and 6) indicate that there are direct and indirect effects of student perceived self-efficacy, aptitude to participate and functioning at T1 on outcomes of the summative final PE grade year 9. Developmental processes of PE specific self-efficacy, general self-efficacy and functioning are interrelated. And student reports do not change over time, they are relatively stable. Indirect effects are probably due to the impact of functional skills. Better socio-cognitive skills were linked to higher aptitude to participate (study II), and consistent over time in students with disabilities (study IV). The implication seems to be that there are reciprocal relationships between self-reported PE specific self-efficacy, aptitude to participate and socio-cognitive skills (study IV). Strongest effect of physical functional skills on developmental processes

“Mastery climates in PE, encouraging effort before competition allay physical short-comings”
over time were not surprisingly found in students with disabilities (figure 6, blue boxes). Attention should be payed to the experience of having physical restrictions. Whether physical restrictions were temporary (e.g. a broken leg) or not, students’ perceptions of physical functioning do have implications for their participation in activities, especially in PE. Functional skills appear to affect grades indirectly through their effects primarily on student general sense of self-efficacy, which in turn affects developmental processes triggering learning and achievement. Attention should also be paid to the varying paces of biological development. Extreme injustice and frustration can be experienced by typically developing individuals when participating in competitive environments in early adolescence, due to body size in e.g. athletics. Adding physical impairments to these experiences call for PE teaching to adopt a mastery classroom climate, where effort is emphasized before performance (Harwood et al., 2015; Valentini & Rudisill, 2004).

Self-rated teaching skills and observed teaching skills were associated and higher levels of student engagement in PE was found in conditions where teachers more frequently were observed to align syllabus intentions with their teaching during PE lessons, referred to as high-level teaching skills (study II and III). Traditionally, the grading in PE has been based on physical performance and motor skills testing (Lopez-Pastor, Kirk, Lorente-Catalan, Macphail, & Macdonald, 2013). The shift from a norm- to a criterion-referenced grading system was introduced in the Swedish national curriculum of 1994 (Lpo 94) and the name of the school subject changed from Physical Education to Physical Education and Health. Swedish PE teachers had to re-evaluate what knowledge and skills to assess and, in line with international policy documents, direct their teaching towards a focus on health outcomes. Introducing the current national curriculum (Lgr 11) meant a new grading scale, A-F, where A=pass with distinction and F=fail. Svenberg et al. (2018) recently reported that PE teachers still struggle with what to assess and how, and that student characteristics, behavior and motivation are still factors valued in their assessments. Although knowledge and skills should make out the sole ground for student grades, findings from the study sample (n=105) in this thesis show that PE specific self-efficacy, aptitude to participate and socio-cognitive skills are interrelated and associated with PE learning.

Discrepancies were found when assuming that teachers’ alignment of curricular intentions into their PE lessons would affect students’ developmental processes so that their perceived PE specific self-efficacy
would be mirrored in final grade year 9. Findings in this thesis showed that this assumption is true if they had PE teachers, who rated their teaching skills lower. The conclusion being for PE teachers to use the PE specific measurement at the end of secondary school and the summed ratings of scores will show how to grade. The problem is that the difference between rating high versus lower PE teaching skills was that ratings of teaching skills were in relation to the extent to which the teacher aligned syllabus intentions into their PE lessons (study II). High-level teaching profited engagement in PE lessons (study III). Physical skills of the groups of students with disabilities and those with low grades limited their prospect of receiving a high final PE grade year 9 (study IV). A finding that rejects the hypothesis and the question arising is WHAT is being assessed in PE? In pure speculation, perhaps the final PE grade year 9 of lower teaching skills shows an assessment of the PE learning process, whereas teachers with higher teaching skills assess students’ acquired knowledge and skills.
Conclusion

Overall conclusions

Mapping the environment using the five A’s: availability, accessibility, affordability, accommodability and acceptability (Maxwell et al., 2018) in communication with students with disabilities would pinpoint the most eminent causes of participation restrictions.

Study I showed that efforts made to simplify text and add explaining examples made questionnaires easier to understand. Validity and reliability was certified by evaluating results from the pilot study on the first wave of data collection in the current study. The group of students with disabilities recruited for this thesis were a heterogeneous group, with different functional restrictions affecting their everyday life in school to different degrees. Personal assistance only occurred for three of the participants. The simplified questionnaire version created for students with a combination of low understanding and low persistence was only used at three occasions.

In study II, results showed that students with disabilities have a rough start in PE at transition into secondary school. They were six times less likely to have high PE specific self-efficacy compared to their peers with high grades. If they had teachers who aligned the PE syllabus with lesson content in PE and clearly communicate what was expected from their students, students with disabilities reported lower self-efficacy. Students with disabilities seem to be more sensitive to the classroom climate compared to their peers.

Observations of PE lessons in study III displayed that the student groups were equally and relatively highly engaged. Teachers who more often aligned syllabus intentions with lesson content differentiated their teaching more. There were also contextual differences of lesson complexity and lesson efficiency. In high-level teaching conditions students were in closer communicative proximity to their teachers. Teachers structured their lessons more into whole group activities, in which the groups of students with disabilities and those with low grades were more engaged. They also instructed more, materials for teaching purposes were more often used, and lessons were more focused. In low-level teaching students were less often observed to be on task, practicing skills, and more often seen socializing with each other.
Study IV, showed that perceived PE specific self-efficacy year 7 in the groups of students with disabilities and those with high grades predicted the final PE grade year 9. For students with low grades aptitude to participate in year 7 predicted the final PE grade. In both predictor models the direction towards the final PE grade year 9 went via PE grade year 7 and higher aptitude to participate and lower general self-efficacy year 9. Students in the study sample seem to compensate loss of general self-efficacy by participating in PE. PE specific self-efficacy, aptitude to participate and general school self-efficacy were related to each other at both timepoints and relatively stable over time. For students with disabilities the classroom climate, as rated by their PE teachers in year 7, is associated with the final grade year 9. Perceived functional skills, both socio-cognitive and physical affect students with disabilities most. A diagnosed disability in itself does not make a difference to the outcomes. However, student experiences of having functional restrictions, diagnosed or perceived, call for attention. Functional restrictions seem to impact final PE grade year 9 indirectly via perceptions of PE specific self-efficacy, aptitude to participate and general school self-efficacy.

In conclusion, test trials of questionnaires are most important to make sure that specific items are understandable. Although few students needed a further simplified version, it is one measure to take ascertaining availability. All students should have their say in studies aimed at total populations of students in mainstream inclusive secondary school. Adapted learning standards are required already from the beginning to boost PE specific self-efficacy, general school self-efficacy and aptitude to participate. They also need to be communicated in ways that make students understand that the adapted grading criteria are accessible and carry the same value as those nationally set for typically functioning students. Student perceived functional skills are linked to students’ overall school outcome. Support services and resources should be allocated to aide not only academic skills, but also to promote physical and socio-cognitive functional skills. Approaches to handle issues of accommodability with collaborative teams representing the student, PE teacher, parents, school, and school health professionals would bridge the gap between functional restrictions and everyday functioning. Special solutions in mutual teacher-student understanding with activities integrated with and segregated from class are likely to create meaningful learning situations and make efforts worthwhile and affordable. Feelings of failure and being different arise in a competitive high-stakes, criterion-referenced grading
system striving for equifinality. That is, all students are graded in relation to a fixed set of criteria, and life options are decided depending on the degree to which you reach these criteria. Such systems add further challenges to students restricted by functional restrictions already from the beginning. For students with disabilities initial PE specific self-efficacy is linked to their PE grade year 7, which in turn is strongly associated with their final PE grade year 9. They are stuck in the grading system. What does a system that does not reward improved knowledge and skills do to a person? Fortunately, students with diagnosed disabilities in the current study appear to be well catered for. Results prove positive outcomes of high engagement during PE lessons and increased PE specific self-efficacy. The group of students with disabilities is the only group, who does not report decreased general school self-efficacy. It seems they compensate the limited prospect of receiving a higher grade with participatory gains. Unfortunately, one unveiled difference in students with disabilities compared to their typically functioning peers is that the experience of what I am affects what I do seems to be discovered later by students with disabilities. The experience of having functional restrictions becomes obvious in PE, where students compare themselves to peers, rather than in relation to grading criteria. Support for students with disabilities in PE to surpass these negative experiences in PE is insufficient and affect their aptitude to participate negatively over time. Findings indicate that teachers, who more frequently align syllabus intentions with lesson content, try to compensate the lack of external support by activating students in less complex, self-sustaining whole group activities. By doing so, they facilitate individual support and student PE learning progression in more complex small group activities. Differences found between teaching styles imply questions about what students learn. Despite differences, PE teachers in this study seemed to foster a mastery climate, in which participation and effort were rewarded, before competition. By providing a climate of acceptance in the PE gym, students learn not only PE knowledge and skills, but also that doing things differently is ok. One conclusion drawn from this thesis is to listen to the voices and experiences of students with disabilities before taking intentional action. Aiming at facilitating participation, targeting the everyday school functioning of students with disabilities, would probably benefit not only students with disabilities, but all adolescents. And then, eventually, the voices of students with disabilities would create a feeling that being different is cool. The
participating students with disabilities in this thesis have shown that *different is cool!*

*The inviolability of human life, individual freedom and integrity, the equal value of all people, equality between women and men, and solidarity between people are the values that the school should represent and impart (The Swedish National Agency for Education, 2018)*
Methodological considerations

This thesis studies adolescents in an environment of school-based Physical Education and has a quantitative approach. The students are separated into groups based on personal characteristics of having a disability, high grades, or low grades in PE when transitioning into secondary school. Phenomena studied in this thesis have an innovative touch. The combination of disability, self-efficacy, participation, functioning, adolescence and PE environments has rarely been studied before in research. As a consequence, and especially when research concerns students with disabilities, there are several methodological considerations to address. Methodological considerations will be presented with regard to quantitative research, instrument adaptation, and longitudinal approaches. Comparing students with disabilities with groups of students with grades as the grouping factor entail distribution issues. This makes differences between groups difficult to discern. The group of students with disabilities contained students with both low and high grades in PE. Depending on PE grade before transitioning into secondary school the other students in the study sample were assigned to either a group of students with high or with low grades.

First, quantitative methods are exclusive in their nature (Haegele & Hodge, 2017). Exploration of student experiences need large samples to show significant effects. The large number of participants required excludes students with disabilities from partaking as a separate group (Alderson & Morrow, 2011). One large scale quantitative research study requested self-rated information about perceived disability (Ng et al., 2017), which aggregated considerable descriptive knowledge in comparisons between countries. Explorative research is still limited by the number of confounding variables to include. Presented are reasons why results in this thesis show trends and patterns rather than significance. These tendencies might well be sample-dependent, must be interpreted with caution and further investigated to be relevantly confirmed, before establishing conclusions. Due to the limited sample size in this thesis it was decided to focus on the target groups, rather than gender, for further explorative analyses. There is unequal distribution of gender in the target groups, which may have affected the outcome (more boys in the groups of students with disabilities and those with low grades and less in the group with high grades). In the total sample boys reported significantly higher physical skills at T1 (n=450, 228 boys), and significantly higher
physical skills and aptitude to participate at T3 (n=361, 188 boys). Studying students younger than fifteen, and vulnerable groups of students have ethical implications. The necessary process of collecting written consent from students and both their parents is a time-consuming and rather tedious process, which further restricts possibilities of random sampling (Qi & Ha, 2012). Research including the voices of students with disabilities commonly have low participant numbers, which generate results difficult to generalize (Pocock & Miyahara, 2018). One benefit with quantitative research is that more voices can be heard and are not as sensitive to bias as qualitative methods. Group-level changes are studied in this thesis, but results should not be interpreted as applicable to all (or separate) types of disabilities.

Secondly, disability research requires instrument adaptation and pilot testing. To be accessible and understandable questionnaires adapted to culture- and age-specific level of understanding are necessary. The quality indicating Consensus-based standards for the selection of health measurement instruments (COSMIN) (Mokkink et al., 2010) was therefore used in the process of developing questionnaires to assure validity and reliability and to guarantee appropriateness of conclusions. Measures taken to assure validity and reliability are comprehensibly described in study I. Notable to mention is that the test-retest trials during this process revealed item inconsistencies and to improve relevance items were removed or combined. Adjustments made, proved to be effective when analyses from the pilot study were compared with results from the main study (on which this thesis is based). Further confirmatory analyses of the instruments and its indexes and sub-indexes are needed for potential future use. Here follows a list of adaptations made and data collection procedures used in this project to assure accessibility, best achievable understanding and valid and reliable conclusions.

- Reduce the amount of text
- Reformulate items to more simplified wording
- Clarify with explaining examples
- Color responses on a Likert-style rating scale for students with low understanding and low persistence
- Ask professionals for help with the wording, e.g. students themselves and teachers teaching targeted age group
- Ask professionals for help, e.g. PE teachers, when developing subject specific self-efficacy measures
• Use a back-translation procedure when translating into language different from the original instrument (Brislin, 1976)
• Use a quality indicating checklist for assuring reliability, e.g. the Mokkink et al. (2010) COSMIN checklist
• Test-retest to control stability of ratings (on a minimum of 30 participants), and/or to compare different formats of delivery
• Inform students 1. To respond to every question, 2. To fill in one, not several replies, 2. To mark specified scale alternative, not between two scale ranges, 3. Ask the researcher for an eraser if mistakes are made, 4. Upon finalizing, to check if they filled in all items, 5. About what school-work to continue with once finished with the questionnaire
• Classrooms with adjacent group room is preferable to provide optional environments and opportunities to additionally assist students in need of special support
• Read questions aloud when needed
• Add additional time for students in need of special support
• Take pauses or partition the questionnaire in case of a combination of low understanding and low persistence to be completed in separate steps
• If further adjustments are needed, equip the student with a simplified version of the questionnaire, the personal assistants with the original version, and a pictogram

Thirdly, longitudinal approaches are needed to provide insight of effects and directionality of developmental trends over time (Sabiston et al., 2014). Developmental changes take place in processes that over time become more complex (Bronfenbrenner & Morris, 1998). One matter was overlooked, when designing the current project to study developmental processes according to Bronfenbrenner’s PPTC-model – the nature of change. Studying changes of developmental processes longitudinally require a minimum of three measurement occasions (Ployhart & Vandenberg, 2010). The two timepoint measurement of self-efficacy, participation and functioning in this thesis only show bidirectional relationships. Maturity related findings are indicated in this thesis, but the design does not contribute information about when changes occur, what direction they take and what effects the changes have. Early adolescence is considered to be a phase in life when the most rapid developmental changes occur (Roeser, Eccles, & Sameroff, 1998). Given that adolescents mature at different paces, more insight into the indirect impact of socio-cognitive skills on the developmental processes studied, especially on
general self-efficacy, would have been provided with a three timepoint design. Functional skills were self-rated on a six-range Likert scale, however the indexes of functional skills showed a ceiling effect, due to the way used to split students into groups. Students’ PE grade before transitioning into secondary school was used to assign classmates of students with disabilities into either a group with low grades or high grades. Greater variation of self-rated functional skills was found in students with disabilities, who may have low as well as high grades, than in the other two groups of typically functioning peers. This is a probable reason why little effects of functioning on the developmental processes studied were found. Using other ways of splitting students into groups, e.g. subjective age as an indicator of perceived maturity (Galambos, Kolaric, Sears, & Maggs, 1999), may have generated more information about effects of functional skills. Pace of maturity in different groups of students is likely an aspect to target in future research on developmental trajectories.

Another aspect of longitudinal research is that research about participation-related constructs have progressed during the time period covered in this thesis. Included in the instrument aptitude to participate are components for wanting to participate, e.g. preferences, safety issues, grading awareness. Although relatively weak, a significant association with observed engagement was found (study I, II and III). But with current knowledge about participation, items representing the two dimensions of participation, presence and being involved while being there, would more appropriately have captured the concept of student self-reported participation. Yet another aspect when studying changes over time in a complex context such as secondary school is that individuals are affected by a variety of personal and environmental influences on different levels. Unpredictable accidents, incidents and happenings in such contexts are not easy to control for, which may cause inconsistent conclusions. Examples of personal influences that occurred during this longitudinal study are shift of schools or school classes and major events in the life of persons with disabilities, like long term planned surgeries or loosing eyesight from ten to three percent of vision. One way of avoiding impact of personal influences is to use variable-oriented methods on group-level instead of person-oriented methods. One environmental influence that impacted all participating schools during this study to different degrees, was the arrival of considerable numbers of refugees. Questionnaires at T3 were collected from all students who volunteered to participate, but total sample
data was only used from data collected at T1. How schools, school classes and individual students were affected is not known. But as an example, one of the adaptations made for a student hard of hearing at the transition into secondary school was to reduce the class-size. As a means to solve extended needs to accommodate adolescent refugees into education the class-size went from 18 students at the first data collection to 25 at the second. The timing of this study was also affected by a general national lack of qualified teachers. Considerable employee turnovers occurred during the last year of this longitudinal study when experienced teachers moved, allured by work conditions hard to resist. This may have affected the individual factors (student self-reports) at T3, but as results in this thesis show, environmental factors (teaching skills) played little role in the developmental processes of adolescents.

Teacher questionnaires were developed inspired by the Delphi method, although not systematically operationalized. Experienced PE teachers were involved in the development and revision of items to capture different aspects of teaching, inclusion and participation of students in PE practices. A scale with the alternatives yes, no, partly was used to answer exclamation e.g. my students know what activities are being assessed in PE. Due to low variance, the scale was dichotomized in analyses. Lessons learned are to apply the Delphi method systematically in the instrument developing phase (Green, 2014) and use a Likert-style scaling (ranging 1-5 or 1-6) for more stringent responses. Synthesizing data, a discovery was made that self-rated teaching skills showed very weak links with students’ self-reports over time. Not captured in the questionnaire was aspects of HOW teachers align syllabus intentions into their lessons. Replying to exclamations of how and how frequently teachers work with instructional alignment, i.e. linking curriculum, instruction and assessment, would have provided a self-rated measure more appropriate to compare with what was subsequently observed. Additionally, the teacher questionnaire was only collected at one timepoint, T1, which is probably one reason as to why long-term effects of environmental factors such as teaching skills were not found.

Observations

The multi time-sampling observational instruments of Child and Teacher Observation in Physical Education (COPE and TOPE) were adapted and piloted to perform structured observations of school-based PE. The method
originates from the observation of student engagement (COP) and teaching behaviors (TOP) in preschool and has been developed in experimentally designed conditions. There are massive methodological considerations when adapting a rather new instruments to a different context of school-based PE. An overall, short summary of these considerations will therefore be presented.

COPE: The indexing of scales was based on factor analyses in categories scoring communicative proximity to teacher, what students were doing in what type of activity, engagement, materials used and lesson focus. Differences between groups of students were investigated using ANOVA analyses on a total number of 2068 three second snapshots (ten categories) of observed interactions.

TOPE: One index was created on the observations when teachers were instructing. A total number of 187 three second snapshots of observed interactions from three of nine categories were used for analyses. The degree to which teachers aligned syllabus intentions with their instructions, and the tone used made out indicators of high- and low-level teaching skills. Independent samples t-tests were then used in comparisons.

Time-sampling may have limitation in only showing frequencies of observed actions and interactions. Such methods can be used to describe what is going on during PE lessons. Interesting phenomena appear when categories are combined, and further explored in more advanced statistical analyses, e.g. regression analysis. Excessive amounts of observations from large scale studies are required for causal explanations. Despite limited sample size and number of observations, findings in this thesis detected aspects rarely studied before. Proximity to teacher and formats of whole group or small groups seem to have effects on the engagement of students. Notable is that a majority of the teachers were experienced PE teachers. The general impression of observed PE lessons was that they held high quality, as scored by the observers directly after the observations (not used in analyses). The dichotomization into high- and low-level teaching skills was based on the frequency of observable alignment of syllabus intentions into the PE lessons, only intended to be used to compare PE lessons as an environmental factor. Three-second snapshots of interactions in complex environments can undoubtedly be criticized for not showing “the whole picture” of what is going on during three years of PE education. Findings in this thesis showed associations between student self-rated aptitude to participate and observed engagement. There were also associations between self-rated and observed teaching skills. These are results
that prove time-sampling to be a useful tool that ought to encourage researchers to develop and refine the instruments for further use.

Implications for future practices

All students reported increased PE specific self-efficacy over time. The PE specific self-efficacy scale has shown to indicate learning according to intended learning standards. Measuring PE specific self-efficacy at the beginning would inform practice about gaps in knowledge and skills. The scale could further be used as an important feed-back tool to survey student progress and involve them in their own learning. In addition, the scale could be used by PE teachers to evaluate their own teaching efficiency. This would further help them identify what components of the intended learning outcomes to target, to best help their students achieve at their best.

Learning standards cannot be the same for all students. Students with disabilities suffer from a blow to their self-efficacy (PE specific and general) and aptitude to participate in the beginning of secondary school, probably due to them experiencing a feeling of hopelessness in succeeding to reach unachievable learning standards. Restricted functional skills, diagnosed as well as student perceived, must be regarded already from the beginning by establishing and communicating adapted learning standards. Adapted learning standards in view of the five A’s (Maxwell et al., 2018) need to be:

- **Availability**: established in communication between students with disabilities and stakeholders; PE teacher, parents, personal assistants, other professionals. Different diagnoses or long-term health conditions have specific implications for the participation in PE
- **Affordability**: tailored to fit the person’s abilities and adapted to specific needs, at times and in mutual teacher-student communication, performed segregated from class
- **Acceptability**: communicated in ways so that the student with disabilities understands that the activities they do carry the same value as the activities their typically developing peers do, although they may be different
- **Accommodability/adaptability**: aimed at specified goals in line with knowledge requirements and grading criteria (The Swedish National Agency for Education, 2018)
• **Accessibility**: broken down into clearly stated, accessible and assessable target goals on which progression feedback should be based

• Continually evaluated, revised and refined (Wehmeyer et al., 2003)

Participation from day one is important, especially for students who enter secondary school with a low PE grade. These students are those who sometimes, but not always, also do not participate in extracurricular physical activities and may be among those who have difficulties also in other school subjects. Additionally, they report significantly higher associations between socio-cognitive functional skills and general self-efficacy, compared to the other two groups. There are indications in this study that lack of general school self-efficacy may be compensated for by high PE specific self-efficacy. Specific self-efficacy may spread across domains (Bandura, 1994). PE specific self-efficacy and aptitude to participate in PE are relatively strongly related and students with low grades report strong stability in ratings over time. These findings provide quite strong arguments for allocating resources to provide support in a practical subject like PE. Aiming at participatory gains, targeting the improvement of socio-cognitive functional skills would probably positively affect student perceived general self-efficacy and the classroom social climate. School based PE offers unique opportunities to gain knowledge and skills important for future lifestyle and health. These life skills may be even more important for the group of students with low grades, than knowledge and skills learnt in typically academic subjects.

For PE teacher it is important to consider for what purpose they choose the contents of their lessons. Whether the focus is physical, motoric, social, emotional, cognitive, recreational or else, students with disabilities were more engaged in high-level teaching conditions if lessons were more academically focused. *The school should strive to promote equality* (The Swedish National Agency for Education, 2018) and by including more academic content into PE lessons it is possible that students with disabilities would be able to participate on more equal grounds. By saying this, the intention is not to change PE into a typically academic subject, the higher engagement of students with disabilities was only observed in academically focused *high-level* teaching situations). The intention is rather to open up discussions on how to merge academic knowledge into a subject with an emphasis on physical activation.
Implications for future intervention research

Hearing the voices of students with disabilities would be valuable in the initial phase of implementing health promoting interventions! Compulsory school is a valuable arena for all sorts of interventions since all students are obliged to participate. Early adolescence is a rewarding time of life for intervention aimed at influencing future trajectories. One recent trend was to introduce daily physical activity within the hours of the school day. The Swedish National Agency for Education has established this trend into *fundamental values and tasks of the school* of the national curriculum revised in 2018. The head-teacher is responsible for *drawing attention to health and lifestyle issues*, thus relieving the PE teachers from the sole responsibility of matters crucial to student future active health-promoting lifestyles. Framing interventions into Bronfenbrenner’s PPTC model with three timepoint measures seems to be an applicable design for this type of interventions. One suggestion, based on the results of students with disabilities fabricating similar developmental processes of participation-related constructs as the total sample, is to listen to the voices of students with disabilities first, across levels of disability. Gathering information about how their lifestyle would be influenced by daily physical activity would guide the subsequent implementation and evaluation. Recommended is to collect data about aspects such as how to:

- target different dimensions of physical activity in interventions aimed at changing future lifestyle trajectories
- create a participation enhancing intervention climate
- inspire and sustain high participation
- organize interventions for daily physical activity according to the five A’s (see below)
- structure main and optional activities (whole group, small groups)
- allocate staff resources (communicative proximity to students)
- boost student specific self-efficacy for stated target goals
- support restricted and promote physical and socio-cognitive functional skills
- best evaluate intervention outcomes (see suggestions above on how to implement adapted learning standards)

The dimensions to aim for could be practices of physical activity as being aerobic, playful and recreational, challenging and adventurous, skills developing, aesthetic, competitive or movement- and concentration enduing
(Engström, 2008). The classroom climate is more important to students with disabilities than to their peers (study II, IV). When organizing interventions including students with disability there are issues concerning availability, accessibility, adaptability, affordability (energy), and acceptance to be considered (Maxwell et al., 2012). Contextual aspects of whole/small group structures should be viewed in a perspective of how complex the activity is and allocate staff resources according to context specific special needs (study III). Interventions should target goals, with individual target goals to make progression visible to students and to base self-efficacy boosting feed-back on. Also, resource allocation would mean opportunities to support and empower student functional skills (study II). Finally, goal attainment (study IV) should be evaluated in a conscientious and relevant way, when intervention is aimed at influencing summative final PE grades or future life trajectories.
Summary in Swedish/
Svensk sammanfattning

Upplevelser av självtillit och delaktighet kan vara mer viktiga för elever än att få bra betyg i skolan. Självtillit innebär en upplevelse av kompetens och delaktighet en upplevelse av att få vara med. Syftet med denna avhandling är att studera hur elevers upplevda självtillit (generellt och i idrott och hälsa) och delaktighet i ämnet idrott och hälsa utvecklas under högstadietiden. Samband mellan elevers självtillit och delaktighet i idrott och hälsa och deras fungerande i vardagen samt lärarna i idrott och hälsa sätt att undervisa i förhållande till kursplanen studeras också. Elevers självskattade upplevelser jämförs mellan tre elevgrupper, elever med: diagnostiserad funktionsnedsättning (fysisk, neuropsykiatrisk, intellektuell), höga betyg, och låga betyg i idrott och hälsa.

Bakgrund
Skolresultat kan förutsägas med elevers skattnings av självtillit. Självtillit kan innebära en generell upplevelse av kompetens i skolan, att hantera skolarbete, sociala kontakter och sina känslor. Ämnesspecifik självtillit handlar om upplevelser av att kunna lösa en specificerad uppgift. I idrott och hälsa möts elever av nya utmaningar som kan vara fysiska, sociala, emotionella och kognitiva. Tidigare fysiska och motoriska erfarenheter, förebilder, uppmuntran och elevens känsloläge är avgörande för hur eleven tar sig an utmaningen. Avgörande för att lyckas är också att eleven försöker, tränar, och fortsätter träna tills denne har lärt sig. Lärarens uppgift är dels att erbjuda möjligheter till lärande dels att fostra och uppmuntra beteenden som leder till att eleven lyckas. Ämnets praktiska karaktär gör att elev möter en miljö där även andra förmågor, kunskaper och färdigheter, än teoretiska utvecklas. Genom att delta i undervisningen i idrott och hälsa får elever samverka och samspela med andra, samtidigt som de får förmågor att utöva olika fysiska aktiviteter och möjlighet att lära sig om fördelarna med att vara fysiskt aktiv. Upplevelser av självtillit och delaktighet i idrott och hälsa är avgörande för framtida val av livsstil.
Metod

Resultat
Elever med funktionsnedsättningar får en tuff start i högstadiet. De upplever lägre själv tillit (generellt och i idrott och hälsa) och delaktighet än sina klasskamrater om de har lärare som skattar sin förmåga att undervisa enligt kursplanen som hög. Undervisningsklimatet inverkar mer på dessa elever jämfört med deras klasskamrater. Detta inverkar inte på deras engagemang. Generellt är engagemanget under lektionerna i idrott och hälsa relativt högt och elever med funktionsnedsättning är lika engagerade som sina klasskamrater. Elever med funktionsnedsättningar och de med låga betyg är mer engagerade i helgruppsundervisning än när de är uppdela i smågrupper. Alla elever är mer engagerade om de har lärare som observeras att till högre grad undervisa enligt kursplanen. Dessa lärare har mer helgruppsundervisning och eleverna befinner sig närmare dessa lärare, i synnerhet elever med funktionsnedsättning. Samma lärare instruerar mer, använder oftare material i undervisande syfte och lektionerna är mer fokuserade. Över tid får eleverna högre själv tillit i idrott och hälsa och deras socio-kognitiva fungerande förbättras. Sambanden mellan upplevt socio-kognitivt fungerande och generell själv tillit är särskilt starka i gruppen elever med låga betyg. I motsats till sina klasskamrater sjunker inte upplevelsen av generell själv tillit hos elever med funktionsnedsättning under högstadietiden. Däremot är
upplevelsen av fysiskt fungerande stabilt över tid hos elever med funktionsnedsättning och detta påverkar viljan att delta i undervisningen i idrott och hälsa i årskurs 9, vilket i sin tur påverkar deras slutbetyg. I samtliga elevgrupper rapporteras viljan att delta på lektionerna i idrott och hälsa som stabil över tid vilket inverkar på slutbetyget.

**Implikationer**

Pilot testning av enkäter som riktar sig till samtliga elever i grundskolan är nödvändig. Detta för att säkerställa att alla elever förstår frågorna och därmed kan svara tillförlitligt på frågorna.

När kunskapskraven i åk 7 ökar och lärare kommunicerar betygskriterierna, som är samma för alla oavsett förutsättningar, som ska uppnås i årskurs 9, inverkar detta negativt på elever med funktionsnedsättning. Betygs kriterier behöver anpassas efter elever med funktionsnedsättningars förmågor, så att de blir uppnåeliga. De behöver också tydligt kommuniceras så att eleverna förstår att ”deras” anpassade betygskriterier har lika värde som de nationella, dvs att det är okej att utföra aktiviteter på olika sätt.

Undervisningsklimatet i klassen inverkar på elevers självskattade upplevelser av självtillit (generellt och i idrott och hälsa) och vilja att delta i lektionerna i idrott och hälsa. Aktiviteter som främjar klassens sociala undervisningsklimat är särskilt viktigt för elever med funktionsnedsättningar, eftersom det även inverkar på deras slutbetyg i idrott och hälsa.

Högre grad av undervisning i enlighet med kursplanen inverkar positivt på samtliga elevers engagemang i idrott och hälsa. Hur lektionen struktureras i hel- eller smågruppsundervisning och lärarens kommunikativa närhet till eleverna skulle kunna användas som kvalitetsindikatorer. Dessa faktorer påvisade skillnader vad gäller komplexitet (instruktioner och undervisningsmaterial) och effektivitet (fokus och flyt) i undervisningen i idrott och hälsa.

Elever med funktionsnedsättningar och elever med låga betyg är de som gynnas mest av undervisningen i idrott och hälsa. Undervisningskvalitet skulle kunna påverkas genom att kartlägga miljöfaktorer som påverkar delaktighet. Att först lyssna till elever med funktionsnedsättningars upplevelser av undervisningen i idrott och hälsa skulle bidra till skolans
systematiska kvalitetsarbete. Troligtvis skulle detta generellt påverka alla elevers upplevelser positivt, inte bara de som har diagnotiserad funktionsnedsättning.

Instrumentet som utvecklats för att mäta självtillit i idrott och hälsa indikerar lärande i idrott och hälsa. Mätning av elevers ämnesspecifika självtillit skulle kunna användas för att identifiera elevers kunskapsluckor. Elevers kunskapsutveckling synliggörs och instrumentet skulle kunna användas vid utvecklingssamtal för att göra eleven mer delaktig i sin lärandeprocess. Vidare skulle instrumentet kunna användas för att utvärdera effekter av lärarens undervisning.

Upplevelsen av att ha begränsad fysisk funktion ändrar sig inte över tid hos elever med funktionsnedsättningar. Sambanden ökar under högstadietiden från noll till relativt starka mellan upplevelser av fysiskt fungerande och självtillit (i idrott och hälsa och generellt) och viljan att delta i idrott och hälsa för elever med funktionsnedsättningar. Detta tyder på att fysiska funktionsnedsättningar alltmer upplevs som funktionshinder under högstadietiden. Skolans ska främja alla elevers utveckling och lärande och bör därför överbrygga elevers insikter om konsekvenserna av begränsad fysisk förmåga. Särskilt stöd för att öka elevers möjlighet till delaktighet i idrott och hälsa rekommenderas.

**Slutsats**
Det är coolt att vara annorlunda, i bemärkelsen att ha en funktionsnedsättning. Starten på högstadietiden är kämpig, men denna avhandling visar att under förutsättning att elever med funktionsnedsättning deltar i undervisningen i idrott och hälsa så blir de engagerade. Engagemang i idrott och hälsa visar starka samband med självtillit i idrott och hälsa, viljan att delta i idrott och hälsa och dessa elevers slutbetyg.
Acknowledgements

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The CHILD research group with its engaged, hardworking and friendly individuals. The atmosphere is a great source of inspiration. Professionally this group is a working machine, its productive achievements is far beyond
excellent (producing highest proportion of JU articles in international journals). Privately you are a bunch of nuts, always cracking up into blasts of laughter. You are my second family, My Kinda People, don't care if you're PhD, or GED, or ADD.

JU librarians Stefan Carlstein and Sofia Nodén, always so knowledgeable, patient and helpful.

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For valuable contribution to the development of the Abilities Index instrument, Anette Remäng, the back-translation of the instrument self-efficacy questionnaire for children, Patricia Jonasson and for proof-reading articles, Ner rolyn Ramstrand and Elaine McHugh.

Two groups of professionals are of special importance for PE teachers, janitors and cleaners, and in my experience, there is no grey zone, they are either good or bad! JU has the best ever in janitors Bo, Mats, Kennet and cleaners in Ida and Aferdita.

I would also like to thank all of you friends, relatives and neighbors who contributed birthday-money to my e-bike, Spobik Niklas with fellow repairmen, who have kept my bike and this thesis rolling (see appendix 3).

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brother Håkan and Dutch sister Joan with families. Bonus “daughters” Martina, Charlotta, Bella. The bonus brothers, sisters, children, and grandchildren I share with neighboring families Karlsson’s, Alzén’s, Andersson’s. It takes a village to raise a child! My in-laws Marita, Erika, Kjella with families. Ann-Louise, Nettan, Bettan, Maggan, Lena, Marianne and Marie for 31 years of companionship in “juntan”. Special thanks to my darling niece, for giving me the title of this thesis. The world needs more of you all!

My family balance my self-efficacy, participation and functioning in everyday life! Ulf, thank you for all the dinners you cook for me, for your love, support and endearing challenge you bring into my everyday life. In my opinion, it is every child’s right to once in their life own a pet. Thank you for enabling our children to gain this experience, with knowledge, skills and life qualities linked to the numerous species: rabbits, horses, sheep, peacocks, dogs, cats and all that they brought into our house. Elsa, Mathilda, and Hannes you are the joy of my life, jag älskar er till månen…å te’baks. Different is cool is dedicated to you!

Habo, September 2019

Karin Bertills


term illnesses or disabilities in 15 European countries. Adapted Physical Activity Quarterly, 34(4), 456-465.


The Swedish National Agency for Education. (2012). Bedömningsstöd i idrott och hälsa [Assessment support in Physical Education and Health]. Retrieved from https://www.youtube.com/watch?v=aWrGeOyttr0


Appendix
Appendix 1: Student questionnaire

**General self-efficacy**

The scale to measure general self-efficacy was translated into Swedish on the creator’s approval. Displayed is the original version, Self-Efficacy Questionnaire for Children (SEQ-C) with its subscales academic (items 1, 4, 7, 10, 13, 16, 19, 22) social (2, 6, 8, 11, 14, 17, 20, 23) and emotional self-efficacy (3, 5, 9, 12, 15, 18, 21, 24), ranging 1-5, 1=not at all, 5=very well (Muris, 2001).

1. How well can you get teachers to help you when you get stuck on schoolwork?
2. How well can you express your opinions when other classmates disagree with you?
3. How well do you succeed in cheering yourself up when an unpleasant event has happened?
4. How well can you study when there are other interesting things to do?
5. How well do you succeed in becoming calm again when you are very scared?
6. How well can you become friends with other children?
7. How well can you study a chapter for a test?
8. How well can you have a chat with an unfamiliar person?
9. How well can you prevent to become nervous?
10. How well do you succeed in finishing all your homework every day?
11. How well can you work in harmony with your classmates?
12. How well can you control your feelings?
13. How well can you pay attention during every class?
14. How well can you tell other children that they are doing something that you don’t like?
15. How well can you give yourself a pep-talk when you feel low?
16. How well do you succeed in understanding all subjects in school?
17. How well can you tell a funny event to a group of children?
18. How well can you tell a friend that you don’t feel well?
19. How well do you succeed in satisfying your parents with your schoolwork?
20. How well do you succeed in staying friends with other children?
21. How well do you succeed in suppressing unpleasant thoughts?
22. How well do you succeed in passing a test?
23. How well do you succeed in preventing quarrels with other children?
24. How well do you succeed in not worrying about things that might happen?

**PE specific self-efficacy**

PE specific self-efficacy was created by the author in accordance with the Swedish PE syllabus and its three core content areas movement, health and lifestyle, outdoor life and activities (subscales MovementSE, items 1-8, HealthSE, items 9-15, OutdoorSE, items 16-20). The items were based on commonly occurring activities in PE lessons. The scale (ranging 1-6, 1=not good at all, 6=very good) correspond to the grading scale (F-A). The original version is in Swedish.

*Report how you perceive your skills and abilities to...*

**MovementSE**

(1) …participate in dance
(2) …participate with pace and rhythm in fitness programs
(3) …participate in games
(4) …participate in athletics
(5) …participate in obstacle courses
(6) …participate in gymnastics
(7) …participate in ball games
(8) …swim in various types of strokes

**HealthSE**

(9) …set up goals for my training and physical activity
(10) …choose, plan, carry out and evaluate my training and physical activity
(11) …talk about my experience of activity and effects on health and physical capacity
(12) …prevent injuries associated with games and sports
(13) …describe risks associated with physical activity
(14) …handle emergencies
(15) …reason about how activities together with dietary and other factors can influence health and physical capacity

OutdoorSE
(16) …plan, organize and carry out outdoor life activities

(17) …act according to the rules of public access to land
(18) …adapt clothing to weather conditions
(19) …handle water emergencies
(20) …orient myself in unfamiliar environments using maps and other aides

Aptitude to Participate in PE
The scale aptitude to participate in PE was created to capture motivational aspects to participate and perform in PE, items 2,5,7,8 (The Swedish Schools Inspectorate, 2011), and prerequisites for engagement in PE, items 1,3,4 (Maxwell et al., 2012). The scale (ranging 1-6, 1= disagree, 6=fully agree) correspond to the grading scale (F-A). The original version is in Swedish.

Report how you perceive different activities in PE
I perceive that I...

(1) …usually CAN participate in PE
(2) …usually “do my best” in PE
(3) …feel safe in the changing room
(4) …CAN participate in competitive games
(5) …know what is expected from me in PE (knowledge and skills)
(6) …my final grade will be F (fail), E, D, C, B, A (excellent) item excluded
(7) …actively participate in a sports club
(8) …my teacher in PE encourages me

Functioning
A Swedish version (Roll-Pettersson, 2001) of the Abilities Index (Bailey, Simeonsson, Buysse, & Smith, 1993) was converted from being a proxy-rated into a self-report instrument of perceived functioning (ranging 1-6, 1=severely restricted function, 6=typical function). The scale was indexed into physical, items 2-4, and socio-cognitive, items 5-10, functional skills.

Physical functional skills

(1) Hearing (without hearing aid) item excluded
(2) Hands
(3) Arms
(4) Legs

Socio-cognitive functional skills

(5) General Health
(6) Social skills
(7) Behavioral skills
(8) Communicational skills, understand others
(9) Communicational skills, make myself understood
(10) Cognitive skills (thinking and reasoning)
(11) Tension and stress excluded item
(12) Vision (without glasses) excluded item
(13) I have glasses excluded item
(14) I use glasses excluded item
Appendix 2: Teacher questionnaire

Classroom climate was indexed into a measurement of the social environment and prerequisites into a measurement of the physical environment. The index self-rated teachings skills consists of the subscales lesson planning, long-term planning and grading. Items 1,3,6 (ranging 1-4, 1=very good/high, 4=bad/low), items 2,4,7-21 (yes, no, partly), item 5 (always, sometimes, never)

Classroom climate
1. I perceive the classroom climate (student attitude) to be…
2. Students are mainly helpful and usually assist their classmates
3. Students are dressed (in gym clothes) for class and attendance is…
4. During PE lessons the level of activity is mainly high

Prerequisites
5. I teach in gym adequately equipped with additional facilities connected to the gym
6. I have access to adequate gym materials (stationary/mobile equipment, music, sports gear e.g. balls, skipping ropes, cones, hula hoops etc.)
7. I perceive that adequate support is supplied to teach inclusively

Self-rated teaching skills
Lesson planning
8. PE classes mainly contain two parallel activities providing alternatives (one teacher, one class)
9. I consciously vary my instructions
10. Students are mainly prepared for what activity is planned
11. Students are to a high degree participating in planning PE lessons (student democracy)

Long-term planning
12. I have a long-term plan (at least one term)
13. I perceive I have time to plan PE lessons systematically so that my students can practice and develop in accordance with syllabus core content areas movement, health and lifestyle, outdoor life and activities
14. I perceive I can systematically implement the syllabus so that my students can practice and develop in core content areas movement, health and lifestyle, outdoor life and activities
15. My school’s local steering documents are continually developed and revised (systematic work with quality documents)

Grading
16. I plan what activities to grade in PE
17. I plan when activities are being graded in PE
18. Students know what activities will be graded in PE
19. Students know when activities are being graded in PE
20. When I grade, I consider all physical activities, also those performed outside school (PE teachers are to grade all gathered knowledge about their students)
21. When I grade, I consider all activities students do in class, e.g. helpful in setting and clearing materials, if the student behaves properly, does not tardy, and is nice to their classmates (personal characteristics are not to be graded)
Appendix 3: The bumpy ride to a become a doctor

I was born a PE teacher, I am a dedicated PE teacher, and I love teaching! Now I know what it takes to become a doctor – 15086.14 kilometers.

My PE teaching journey started in 1983 and summing up all my gathered knowledge and experiences into a thesis is a blessing. Ten years ago, I realized that my body would not last for PE teaching until retirement. I stepped into Professor Granlund’s office and said, “I want to become a doctor”. My teaching degree was out of date and the pragmatic Professor hired me on the spot, to assist in the research process resulting in, School, learning and mental health – a systematic review (Gustafsson et al., 2010).

Linking positive school outcomes established in the systematic review with my previous PE teaching experience, my main focus was set on self-efficacy. Mats has since been my main supervisor through bachelor, master and now finally this doctoral thesis Different is cool! He advised me to gather third-cycle education courses (research level) and guided me through applying for ethical approval, and for research funding from Stiftelsen Sunnerdahls handikappfond.

In 2014 I bought an electric bike, aiming at winter parking it at my sis-in-law’s in Umeå (1000 km). Easy piece of cake, and on return, I added an extra lap around lake Vättern before parking it at home for summer holiday. Then I decided to e-bike myself through the process of achieving a doctoral degree. My aim was to arrive at Alecia Samuels’ (fella researcher) doorstep in Cape Town, by the time I was finished. Welcome to join in on this bumpy ride:

Km Process

2014

February-March 2014, pilot testing of questionnaires
Ethical approval, 2014-06-03
0 Recruitment of participants with disabilities starts
390 Course: SIDR foundation course in disability research starts, 2014-09-24
480 CHILD research teamwork, Banyul-sur-Mer, 2014-10-06 – 09

2015

1000 Accepted as Phd-candidate for licenciate 2015-02-10
1894 Stiftelsen Sunnerdahls handikappfond, four-year funding for doctoral studies 2015-05-28
Validated courses: Sports sciences, Environmental assessments, Information Literacy and Scholarly Communication for Doctoral Students 2015-05-28
Course: SIDR Disability research finishes, 2015-05-28
1913 Course: HHJ Statistical methods pass, 2015-05-29
1930 Training of observation instruments TOP/COP starts (study III), 2015-06-01
1975 Course: Scale Development and evaluation finished, 2015-06-03
Cut-off recruitment of participants with disabilities (n=32 of 50 targeted) and their classmates, 2015-06-03
2570 Course: SIDR summer-course 2015. Advanced and longitudinal analysis methods for disability research, 2015-08-17 – 22
3432 Article 1 submission 1 IJRR, 2015-10-09
3452 CHILD research teamwork in Porto, Portugal, 2015-10-10 – 14
Article 1 submission 1, IJRR rejected, 2015-10-16
3548 Article 1 submission 2, MPEES, 2015-10-23
3586 Course: HHJ Research Strategies and Design Problems, 2015-10-26
3698 Article 1 submission 2, MPEES desk rejected, 2015-10-30
4489 Final pilot-testing TOPE/COPE, 2015-12-31

2016

Article 1 revision 1, submission 3, PESP, 2016-01-08
Article 1 submission 3, PESP rejected, 2016-02-12
Article 1 submission 4, 2016-03-04 EJSNE

4507 Article 1 submission 4, rejected, 2016-03-14 EJSNE

6291 Course: SIDR summer-course 2016. Regression analysis, 2016-08-22 - 26

7956 Validated courses: Research Ethics, Philosophy of Science, Scientific Theories and
Research Ethics, 2016-12-09

8069 Article 1 revision 2, submission 5, SJER, 2016-12-21

2017
8426 Article 1 submission 5, rejected, SJER, 2017-03-05
8958 Course: HHJ Qualitative methods, pass, 2017-05-02
Conference NNDR, Örebro, 2017-05-03 – 05

9573 Article 1 revision 3 (re-)submission 6, EJSNE, 2017-06-26

9731 Article 1 accepted if reduced from 8042 to a total of 5000 words, 2017-07-22

9842 Course: SIDR summer-course 2017. Quantitative meta-analysis, 2017-08-12 – 16

10000 Reached my aim of cycling the Youcleedian distance to Cape Town. Hej kompis!
Götebra! 2017-08-31

10210 Seminar 50%, 2017-09-08
10337 Article 1 revision 4, resubmission 7, EJSNE, 2017-09-15
10621 Article 1 published online, 2017-10-07
11107 Article 2 submission 1, 2017-11-01
11125 Conference AIESEP, Guadeloupe, 2017-11-07 – 10

2018

Article 2 accepted, 2018-01-23
Article 2 published online, 2018-02-22

12650 Article 3 submission 1, 2018-09-21
12803 CHILD research teamwork, Banyul-sur-Mer, 2018-09-30 – 10-04
12974 Conference AIESEP, Eindhoven, 2018-10-18 – 20

2019
13358 Article 3 submission 1, rejected, 2019-02-21
13963 Article 3 revision, submission 2, 2019-04-17
14166 Seminar 90%, 2019-05-23
14626 Article 3 accepted, 2019-07-08
14836 Article 3 published, 2019-08-16
15086 Doctoral thesis defence, 2019-11-2