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“Longitudinal differences in participation across physical activity contexts between adolescents with and without disability: A self-determination theory perspective”

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Abstract

Introduction: Participation in physical activity (PA) is considered to have a profound influence on the development, health, and well being of all children and adolescents. Nevertheless, individuals with disabilities seem to participate less frequently and be less involved in PA compared to peers without disabilities. Meaningful participation amongst youth with disabilities has been shown to incorporate elements related to Self-determination theory (SDT) (Ryan & Deci, 2017) and the experience of competence, autonomy, and relatedness. The three main PA contexts amongst Norwegian adolescents are physical education (PE), organized sport (OS), and self-organized physical activity (SOA). Exploring differences in participation in these contexts amongst adolescents with and without disabilities, in terms of perceived need fulfillment, is thus of relevance.

Aim: To explore the degree of fulfillment of basic psychological needs in the PA contexts of PE, OS, and SOA amongst adolescents reporting disability/long-term illness and whether they differ in relation to adolescents not reporting so, over a three-year time span.

Methods: The present quantitative and longitudinal study is based on data from the Norwegian research project “The Relevance of Physical Activity Contexts in the everyday life of adolescents” (REPAC). Participants were students of secondary- or upper secondary school in Norway. A context-specific adaptation of The Basic Psychological Needs in Exercise Scale (Vlachopoulos & Michailidou, 2006) was used to measure need fulfillment, and data was collected once a year for three years. At T1, participants (N=2979) were 13 and 16 years of age, whereof n= 328 reported having a disability/long-term illness, and n= 2651 reported no disability/long-term illness. Independent sample t-tests were conducted to assess differences between groups, and Cohen’s d was used to explore the effect size of differences.

Results: Findings showed that adolescents with disability/long-term illness reported significantly lower autonomy, competence, and relatedness in PE across all three time-
points. In OS, adolescents with disability/long-term illness scored significantly lower on all psychological needs at T1, in addition to lower autonomy and relatedness at T2. No significant differences between groups were found in perceived competence at T2, nor in any of the three needs at T3. There were no significant differences between groups in SOA across all three time points, with the exception of lower perceived autonomy amongst adolescents with disability/long-term illness at T2. The effect sizes of differences in all the respective significant findings were small.

**Conclusion:** The findings suggest that differences in need fulfillment between adolescents with and without disability seemingly vary depending on PA context and across time. PE, and in part OS, seems to be contexts wherein adolescents with disabilities are particularly vulnerable to reduced participation. Efforts to improve basic psychological need fulfillment, and essentially participation, amongst individuals with disabilities in these PA contexts, may be warranted.
Acknowledgements

When I first commenced my studies at The Norwegian School of Sport Sciences (NSSS), it was with the intention of staying there for one year. Little did I know at the time that I was to spend six coming years of my life there. During these years I have acquired valuable insights, perspectives, and knowledge from the field of sports science, I have gained new friendships, I have moved to Brisbane Australia and Rome Italy, I have felt overly stressed and immensely happy, and I have had experiences of which I am forever grateful. Now, after finishing a bachelor's degree and a succeeding one-year course in physical activity and disability, I am finally about to finish my master thesis, and with that, my final year at NSSS.

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<td>BPNES</td>
<td>Basic Psychological Needs in Exercise Scale</td>
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<td>fPRC</td>
<td>The Family of Participation Related Constructs</td>
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<td>OS</td>
<td>Organized Sport</td>
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<td>PE</td>
<td>Physical Education</td>
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<td>REPAC</td>
<td>The Relevance of Physical Activity Contexts in the every-day life of adolescents</td>
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1.0 Introduction

Participation is defined as “involvement in a life situation” by The International Classification of Functioning, Disability and Health (ICF) (WHO, 2001, p.10). Comprised of elements of both attendance and involvement (Imms et al., 2017), participation may be considered an expression of inclusion and a human right (Maxwell, Alves & Granlund, 2012). Further, participation is considered a central aspect in health, education, and policymaking, in addition to being a primary goal in rehabilitation (Imms & Granlund, 2014). Societal participation is also considered essential in the development and well-being of children and adolescents, providing opportunities for the evolvement of competence, sense of belonging, and meaning (Petrenchik & King, 2011). In particular, physical activity has been recognized as an arena in which participation is of special interest due to its pivotal role in somatic-, mental-, and social health promotion among children and adolescents (WHO, 2012).

The health benefits associated with participation in physical activity are considered universal for all adolescents, including individuals with disabilities (Murphy & Carbone, 2008). However, adolescents with disabilities seem to be more restricted in their participation in community life in general and physical activity specifically (Bedell et al., 2013). Compared to adolescents without disabilities, school-aged adolescents with disabilities have been shown to participate less frequently and be less involved in community activities. Organized and unstructured physical activity has been identified as two of the community activities showing the largest group differences between children and adolescents with and without disability (Bedell et al., 2013).

Self-determination theory (SDT) is a theoretical framework on motivation commonly utilized to understand and explain human behaviours such as physical activity. The theory proposes that humans have three basic psychological needs, namely competence, autonomy, and relatedness, which can be thwarted or facilitated through different social-contextual factors (Ryan & Deci, 2017). Meaningful participation in leisure activities among children and adolescents with disabilities has been shown to incorporate elements that are related to SDT and the experienced support of
competence, autonomy and, relatedness (Willis et al., 2017; Powrie et al., 2015). The way in which these psychological needs are nurtured and fulfilled is further considered to influence both individuals’ motivation for and engagement in behavior and their well-being (Ryan & Deci, 2017).

The three main activity contexts in which adolescents are commonly involved in during their everyday lives are physical education (PE), organized sport (OS), and self-organized physical activity (SOA) (The Norwegian School of Sport Sciences [NSSS], 2019). Thus, exploring the way in which the need for competence, autonomy, and relatedness is perceived fulfilled amongst adolescents with disabilities in these three major activity contexts, in comparison to adolescents without disability, is of interest. Further, these differences explored over time are of relevance to provide indications as to whether perceived need fulfillment in PE, OS, and SOA systematically differ amongst adolescents with disability in comparison to adolescents without disabilities. Ultimately, optimizing participation for adolescents with disabilities is not only of relevance to those individuals experiencing the disability, but also surrounding family, health practitioners, educators, and policy makers (Imms & Granlund, 2014).
2.0 Background

2.1 Physical activity and physical activity contexts

*Physical activity* is a complex and multifaceted behaviour commonly defined as “any bodily movement produced by skeletal muscles that require energy expenditure” (Caspersen, Powell & Christenson, 1985, p. 126). This implies that physical activity is a diverse behaviour that essentially encompasses the majority of human movements in which an individual engages in (Nerhus, Anderssen, Lerkelund & Kolle, 2011), ranging from light household task to strenuous modalities of physical exercise. Hence, physical activity is used as an overreaching term encompassing a wide variety of activities across different levels of intensity (Howley, 2001).

The complexity of physical activity is largely based on the different underlying components that comprise the behaviour, including characteristics such as frequency, duration, intensity, and mode (Howley, 2001). Frequency and duration typically refer to how often and for how long an activity is being performed, whereas intensity indicates the level of effort associated with the execution of an activity (Howley, 2001). Mode refers to the type of activity being executed and comprises a range of different activities. These include activities such as running, walking, playing sports, or doing yard work (Nerhus et al., 2011). Physical activity can also be undertaken in several different contexts and is thus often classified into different activity domains reflecting the context of daily life in which activity is performed (Caspersen et al., 1985). This includes occupational activity, domestic activity, commuting activity, and leisure-time physical activity (LTPA) (WHO, 2010).

LTPA refers to all physical behaviours that are undertaken during an individual’s discretionary time that are not essential to the activities of daily living (WHO, 2010). As such, LTPA comprises activities that an individual opts to engage in on the basis of personal needs and interests (Howley, 2001) and include sports participation, structured exercise, and other recreational physical activities (WHO, 2010). Participation in OS has become a popular leisure-time activity for adolescents in Scandinavian countries in
general (Støckel, Strandbu, Solenes, Jørgensen & Fransson, 2010) and in Norway particularly (Haugen, 2015). Sport can be understood as a form of physical activity characterized by a set of rules and involve elements of achievement, structure, and competition (Støckel et al., 2010). The Norwegian Olympic and Paralympic Committee and Confederation of Sports (NIF) is a national and non-governmental association holding the overreaching organizational authority of sport in Norway. Sporting activities are provided in local clubs, and more than 11,000 voluntary sports clubs are operating under NIF (NIF, 2017). Participation in OS holds a strong position amongst Norwegian adolescents, with 75 percent of youth aged 13-18 years reporting currently being active or having been active in OS during their teenage years (Bakken, 2019).

Physical activity can also be performed in a self-organized context, and SOA is one of the major physical activity contexts in adolescence (Haugen, 2015). In contrast to OS, SOA is performed under less structured regimens and is often self-initiated by children and adolescents. Thus, SOA is commonly coordinated without the presence of coach supervision and alternatively referred to as unorganized physical activity, self-structured leisure activities (Haugen, 2015), or free play (Wiium & Säfvenbom, 2019). Generally, SOA refers to the physical activities an individual engages in outside of OS and the educational school setting. Entwined in SOA are activities such as skateboarding, parkour and surfing, training at fitness centers, free play, and other self-organized activities (Støckel et al., 2010; Gilchrist & Wheaton, 2017; Wiium & Säfvenbom, 2019). Some forms of SOA have previously been associated with unfavorable youth development due to the lack of structure and adult supervision (Osgood, Anderson & Shaffer, 2005). However, Säfvenbom, Wheaton & Agans (2018) argue that SOA may serve as an asset in increasing physical activity participation while simultaneously fostering positive development in young people. Moreover, the promising potential of SOA may be specifically due to, and not despite of, the absence of formal regimes, leaders, and rules (Säfvenbom et al., 2018).

Adolescent’s physical activity is organized within a continuum from informal sector to state initiative. Whereas SOA represents one informal extremity of this axis, PE is found at the opposite end (Stockel et al., 2010). As opposed to the volitional nature of OS and SOA, PE is a school subject compulsory for all Norwegian children across 13 years of
schooling (Erdvik, Haugen, Ivarsson & Säfvenbom, 2019). The Norwegian Directorate of Education and Training regulates PE, and the practical implementation of the subject is conducted according to the directive of the PE curriculum (Utdanningsdirektoratet, 2015). PE is a practically oriented school subject attending to both traditional and untraditional modalities of physical activity. This means that adolescents are supposed to be engaged in a versatile PE, encompassing elements such as sport, fair play, dance, outdoor life, movement, and play. The overall aim of PE as postulated by the Norwegian Directorate for Education and Training is to “… inspire physical activity in all aspects of life and inspire lifelong enjoyment of being physically active” (Utdanningsdirektoratet, 2015, p. 2).

### 2.1.1 Physical activity and the promotion of adolescents’ health

Regular physical activity has become a well-established means in health promotion for people across all stages of life, including adolescence (Physical Activity Advisory Committee [PAGAC], 2018; Janssen & LeBlanc, 2010). Maintenance of a physically active lifestyle in adolescence is associated with several positive health indices. These include enhanced muscular and cardiopulmonary fitness, favourable skeletal qualities, and improved cardiometabolic health. Further, evidence demonstrates that higher levels of physical activity are central in weight management and adiposity status in adolescents (PAGAC, 2018). Moreover, accumulating evidence indicates the role of physical activity in eliciting promising outcomes in cognitive development, academic achievement, and prosocial behaviour (Commonwealth Department of Health, 2019).

A growing body of scientific evidence also supports the notion that regular physical activity may be associated with improved mental health in adolescents (Biddle, Ciaccioni, Thomas & Vergeer, 2019). Physical activity may be effective in the management of mental disorders such as depression, and exercise has been shown to reduce adolescents’ depressive symptoms, particularly in clinical samples (Carter, Morres, Mead & Callaghan, 2016). Furthermore, regular participation in physical activity has been associated with improvements in several mental health-related dimension in adolescents, such as self-worth (Hagen, Säfvenbom & Ommundsen, 2011), self-esteem (Ekeland, Heian, Hagen, Abbott & Nordheim, 2004), and quality of life (Lacy et al., 2012; Gopinath, Hardy, Baur, Burlutsky & Mitchell, 2012).
International recommendations have been developed to summarize the current evidence on the dosage and type of physical activity required to exploit the health-enhancing qualities of physical activity. These recommendations are population-based, and WHO (2010) states that children and youth should accumulate a daily minimum of 60 minutes of moderate-to-vigorous physical activity (MVPA). Nonetheless, the prevalence of adolescents meeting these recommendations is low. A recent cross-national pooled analysis, including more than 1.6 million students aged 11-17 years, showed that 81% of adolescents were insufficiently active (Guthold, Stevens, Riley & Bull, 2020). Further, evidence suggests that physical activity levels decrease with increasing age, with a noticeable downturn from childhood to adolescence (Kumar, Robinson & Till, 2015; Nader, Bradley, Houts, McRitchie & O’Brien, 2008; Dumith, Gigante, Domingues & Kohl, 2011).

These physical activity trends are worrying for several reasons. Low levels of physical activity are associated with adverse health outcomes (Lee et al., 2012), and physical inactivity has been recognized as the fourth leading cause of global mortality (Kohl et al., 2012). Further, childhood and adolescence might represent an incubation period in which several disorders of adulthood originate (Forrest & Riley, 2004). For instance, adiposity in childhood and adolescence is associated with increased morbidity and mortality later in life (Reilly & Kelly, 2011). Conversely, higher levels of physical fitness and a healthier body composition in childhood and adolescence have been shown to have predictive validity for a favourable cardiovascular profile and lower mortality risk in adulthood (Ruiz et al., 2009). Adolescence is also considered a critical period for the establishment of health behaviours and habits that may track into adulthood (Kumar et al., 2015). Consequently, WHO states that increasing participation in physical activity among adolescents is of great public health interest. Further, identifying factors that motivate or prevent participation in adolescence is central to promote participation in physical activity across the lifespan (Currie et al., 2012). The applicability of this notion is not solely limited to so-called typically developing youth, but it is also highly relevant amongst individuals with disabilities.
2.2 Disability

*Disability* is commonly used in colloquial conversation as though the term has a universal meaning and applicability. However, disability, both as a term and as a concept, has been the subject of ambiguity and longstanding discourse in the scientific literature (Grue, 2011). Disability has been a prominent topic in disciplines ranging from anthropology and sociology to medicine, yet the utilization and comprehension may differ greatly across disciplines. This accentuates the complexity of the phenomenon, and disability is neither easily defined nor consistently utilized (Grue, 2011). The conceptualization varies relative to the perspective one holds when addressing disability, and three distinct perspectives are traditionally prominent in the scientific literature. These are the medical model, the social model, and the relational model of disability (Tøssebro, 2015).

2.2.1 The medical model of disability

The medical model of disability represents one of the most traditional societal ways of understanding disability. In this model, disability is regarded as a result of biological or psychological illness, injuries, or malfunctions (Tøssebro, 2015). This view is based on a normality principle of which some forms of bodily functions and structures are to be considered normal, whereas others are regarded as abnormal. The latter reflects functioning, structures, or ways of being deviating from an objective and statistical societal norm (Grue, 2016). As such, a medical model of disability tends to understand disability or illness as a biomedical deviation from normality (Grue, 2001).

Another important characteristic of the medical model is related to the individualization of disability. The model regards disability as a problem residing within the individual (Tøssebro, 2015). In extension, this implies that interventions or efforts to improve the lives of individuals with disabilities concern measures on the individual level. This may include medical treatment, rehabilitation, or allocation of mobility- or other technical aids. Essentially, these measures are concerned with minimizing the discrepancy between the structural or functional abilities of the individual with disability and the societal perception of normality (Grue, 2016). This medical perception of disability has dominated the general societal understanding of disability and the shaping of policy and
service provision. However, the model has also been a matter of contention for being overly individualized and medicalized (Oliver, 2004).

The ICF, developed by WHO (2001), constitutes a framework for classification of functioning, disability, and health with great societal influence. ICF represents an attempt to provide a biopsychosocial understanding in which health and disability are perceived as an interaction between functional and contextual factors (WHO, 2001). Essentially, functional factors represent aspects of bodily functions and structures, in addition to aspects of activity (execution of tasks) and participation (involvement in life situations). The contextual factors comprise aspects of the environment, whether physical, social, or attitudinal, in addition to personal factors. Within the ICF framework, disability is defined as an umbrella term synthesizing impairments, activity limitations, and participation restrictions (WHO, 2001). Thus, the ICF represents an effort to recognize the environment as a possible important contributor to disability (Tøssebro, 2015). Nonetheless, it has been argued that the ICF still promotes a medicalized perspective on disability where bodily functions, bodily structures, and perceptions of normality and deviations are the central concern (Grue, 2016; Tøssebro, 2015).

2.2.2 The social model of disability
As opposed to understanding disability as the functional limitations of individuals, the social model draws attention to how society creates disability. In this approach, disability is understood as a form of discrimination where the physical and social environment imposes limitations and societal exclusion upon specific groups of individuals (Grue, 2016). Hence, the social model regards disability as a social construction. Essentially, an individual who uses a wheelchair for mobility is not disabled due to his inability to walk. Rather, the individual becomes disabled due to the inadequacies of the physical environment to accommodate the needs of the diversity of human functioning and capabilities (Grue, 2016). Consequently, measures to improve the lives of disabled individuals within a social perspective attempt to produce social and political change. Such efforts are concerned with government initiatives and modifications to disabling environments, barriers, and cultures (Oliver, 2004).
While the social model of disability has gained substantial support in both politics and among the general public, the model has simultaneously been the subject of considerable criticism (Grue, 2016). Much like the medical model, the social model has been criticized for advocating a simplistic understanding of disability (Tøssebro, 2015). The critique primarily centers on the inadequacy of the model to acknowledge the actual and sometimes painful realities of impairment. This includes the seeming disregard of the subjective experiences impairment and disability may evoke in the individual (Oliver, 2004). Further, it has been stated that although measures to decrease disabling barriers are highly relevant, it seems irrational to assume that social measures solely will solve all the problems and challenges an individual with disability may face (Tøssebro, 2015).

2.2.3 The relational model of disability

Both the medical and the social model have been criticized for failing to provide a comprehensive understanding of disability (Tøssebro, 2015). In contrast, the relational model of disability can be understood as a perception in which both medical and social dimensions of disability are emphasized. In a relational conceptualization, a dynamic interaction between individuals and the environment forms the foundation of disability (Tøssebro, 2004). Specifically, disability can be defined as “a mismatch between the person’s capabilities and the functional demands of the environment” (Tøssebro, 2004, p. 4). Thus, the relational model regards disability as a gap or disparity between societal and environmental demands and individual level of functioning. The level of disability may be attenuated by breaking down barriers and providing universal design or by providing individual facilitation and aids supporting the pre-existing condition or capabilities of the individual (Norwegian Official Report [NOU] 2016:17).

A relational approach to disability has been gaining increasing attention in international contexts. For instance, a person-environment interaction constitutes the rationale for The Convention on the Rights of Persons with Disabilities provided by the United Nations in 2006. In the first article of the convention, persons with disabilities are defined as “…those who have long-term physical, mental, intellectual or sensory impairments which in interaction with various barriers may hinder their full and
effective participation in society on an equal basis with others” (United Nations, 2006 p. 4). The relational model of disability has also gained substantial attention in Scandinavian countries and is present in NOUs (NOU 2001:22; NOU 2016:17) and White Papers (Ministry of Social Affairs, 2003). A relational understanding thus represents the premise for the development of present political strategies and legislations concerning disability in Norway (NOU 2016:17; Ministry of Children, Equality and Social Inclusion, 2015).

Regardless of different perspectives that may be basal to the understanding of disability as a concept, it is generally a joint understanding that disability, either being a bodily impairment, socially constructed phenomenon or as a discrepancy between environmental demands and functional capabilities, might place constrictions on an individual's opportunities for everyday and societal participation.

2.3 Participation

Participation is often considered an ultimate goal for children and adolescents in general, and in rehabilitation of individuals with disabilities specifically (Imms & Granlund, 2014). Participation has also emerged as a central concept in international legislation concerning the rights of children, such as The Convention on the Rights of the Child (United Nations, 1989). Further, the participation construct is evident in international policy documents designed specifically to secure the rights of individuals with disabilities, including the Salamanca Statement (UNESCO, 1994) and the Convention on the Right of Persons with Disabilities (United Nations, 2006). However, despite gaining increasing attention in rehabilitation, research and policy, there is still ambiguity concerning the conceptualization of participation, and participation is considered a multidimensional construct which is both complex to understand and difficult to measure (Whiteneck & Dijckers, 2009).

The ICF defines participation as “involvement in a life situation” (WHO, 2001, p. 10). This definition has had an appreciable impact on a traditional understanding of participation, but it has also been the subject of discoureser in the scientific literature. The critique against ICFs definition of participation has largely been directed towards
the lack of conceptual clarity in the operationalization of participation (Whiteneck & Dijckers, 2009). The definition expressed in the ICF postulate that participation is related to attendance in specific situations in everyday life. Arguably, participation is comprised not only of an attendance aspect, but also an aspect related to subjective experiences of involvement while attending the situation or performing the task (Granlund, 2013).

The different aspects of participation have been further addressed in a recently proposed framework developed to accommodate the warranted efforts to improve the conceptualization of participation. This framework is referred to as the Family of Participation Related Construct (fPRC) (Imms et al., 2017). Attendance and involvement are considered the two main components comprising participation within the fPRC. Whereas attendance refers to “being there”, involvement represents the participation experiences while attending. Consequently, attendance can be considered the objective dimension of participation, commonly measured in terms of frequency or range of activities in which one engages, whereas involvement is related to a subjective dimension of participation. The latter might further include elements such as motivation, social connectedness, engagement, persistence, and affect. Although the two components are distinct, they are still embedded in the sense that attendance is a prerequisite, but not necessarily sufficient to guarantee involvement (Imms et al., 2017).

The fPRC further postulates constructs that are closely related to and influence participation, while still representing distinct constructs. These constructs are differentiated into an intrinsic and extrinsic level of influence, respectively, referring to different factors within and external to the individual (Imms et al., 2017). The intrinsic factors are person-centered and involve preferences, sense of self, and activity-competence. Preferences refer to activities or interests considered valuable or meaningful to the individual, while sense of self refers to intra-personal factors related to individual perception of self-esteem, confidence, satisfaction, and self-determination. The last intrinsic factor, activity competence, includes physical-, cognitive- and affective skills and abilities and represents the ability to perform an activity in accordance with an expected standard (Imms et al., 2017).
Further, participation is always undertaken within a contextualized setting and in an environment, which represents the extrinsic factors postulated in fPRC (Imms et al., 2017). These factors are believed to both provide and regulate individuals’ participation. Whereas context includes the place, activity, objects, people and time in which participation is situated, environment refers to the broader objective social and physical structures in which one lives. A key aspect of the fPRC is the bi-directionality of the relationship between the different participation constructs, implying that participation can be considered not only an “end” but also as a “means to an end” in educational and health services. Further, the different elements are believed to influence future participation, while simultaneously being influenced by current and previous attendance and involvement in participation (Imms et al., 2017).

The concept of participation, as expressed in fPRC, shows strong similarities to the concept of inclusion (Maxwell et al., 2012). By means of inclusion, all individuals are to be provided with opportunities to not only access, but actively take part in, and benefit from engaging in, different societal arenas and institutions (Standal, 2015). Despite the common belief that inclusion is an effort mainly directed towards individuals with disabilities, inclusion is fundamentally about equality and valuing diversity in such a way that non-discriminatory practices are provided for all individuals in society (Aniscow, Booth & Dyson, 2006). Clearly, this also encompasses individuals with disabilities, and inclusion is commonly used as a guiding principle for reducing barriers and improving participation among individuals with disabilities in societal contexts such as PE and OS (Kiuppis, 2016). As such, participation can be considered a central aspect of inclusion. Furthermore, it has been argued that, when understood as a concept related to individuals’ attendance and involvement in specific activities and situations, participation may even serve as an expression of the level of inclusion experienced by individuals with disabilities (Maxwell et al., 2012; Maxwell, Granlund & Augustine, 2018).
2.3.1 Participation in physical activity amongst adolescents with disability

Participation in activities and situations of everyday life is fundamental to the positive development of children and adolescents, providing opportunities for the development of competencies, sense of self, and a sense of connectedness to a group or community at large (Petrenchik & King, 2011). Participation and inclusion across childhood and adolescence further facilitate the development into a meaningful adulthood (Gorter, Stewart & Woodbury-Smith, 2011). The benefits of physical activity participation are considered universal for all children and adolescents, regardless of the presence of disability (Murphy & Carbone, 2008). However, children and adolescents with disabilities show lower activity levels and seem to be more restricted in their participation in physical activity compared to individuals without disabilities (Rimmer & Rowland, 2007).

A cross-sectional study, including 576 parents of school-aged children, showed that children with disability partake less frequently and are less involved in a range of different community activities (Bedell et al., 2013). Organized and unstructured physical activity have been identified as two of the community activities showing the largest group differences, with 37% of youth with disabilities reporting never participating in organized physical activity and 24% reporting never participating in unstructured physical activity. Comparably, the percentage of youth without disabilities who never participated in organized or unstructured physical activity was 10% and 2%, respectively (Bedell et al., 2013). Young people with disabilities are also considered to be underrepresented in OS participation (Ingebrigtsen & Aspvik, 2010), and a study exploring health behaviours amongst young showed significantly lower rates of OS participation in individuals with disabilities relative to those without disabilities (Neter et al., 2011).

Similarly, differences in patterns of activity participation have been observed in a comparative study including adolescents with cerebral palsy (CP) (Maher, Williams, Olds & Lane, 2007). When compared to aged-matched peers without disabilities, adolescents with disabilities were less physically active across all measured weekly time points, including activity in PE, during school lunchtime, after school, evenings during the week and during the weekend (Maher et al., 2007). When active, adolescents with CP also tend to report more involvement in less structured and lower intensity physical
activities relative to those without disability (Maher et al., 2007). These findings are similar to those of Law and colleagues (2006), showing that children and adolescents with disabilities participate more frequently in informal rather than formal leisure-time and recreation activities. Further, different patterns of participation have also been observed in a systematic review wherein habitual physical activity levels in young people with disabilities were below recommended guidelines and 13-53% lower than that of their typically developing peers (Carlon, Taylor, Dodd & Shields, 2013).

Several studies have investigated the relationship between disability severity and physical activity participation. A scoping review concerning the participation of children and adolescents in out-of-school activities identified level of functioning as the greatest influencer of patterns of participation (Tonkin, Ogilvie, Greenwood, Law & Anaby, 2014) and severity of injury was identified as a significant predictor of change in participation in individuals with acquired brain injury (Anaby, Law, Hanna & Dematteo, 2012). Amongst children and adolescents with CP, level of impairment was significantly associated with participation in a range of everyday activities, including participation in sport and non-sporting activities, with an observable decrease in participation with increasing impairment (McManus, Corcoran & Perry, 2008). Anaby and colleagues (2014) argued that the number of functional issues, rather than the sole presence of disability, was predictive of the participation of children and adolescents with disabilities through both direct and indirect pathways of influence. This is in accordance with earlier findings of Law et al. (2004) suggesting that the level of functional ability is more important in influencing the participation of children and adolescents with disabilities compared to diagnostic category.

2.3.2 Barriers and facilitators to participation amongst adolescents with disability
The underlying reasoning for participation in physical activity amongst children and adolescents with disabilities is multifactorial and complex, and several different barriers and facilitators to participation have been identified (Bloemen et al., 2015; Shields, Synnot & Barr, 2012). A systematic review including youth with a wide range of both physical and intellectual disabilities showed that the level of physical activity participation was influenced by factors across personal-, social-, environmental-,
program- and policy level of influence (Shields et al., 2012). Identified barriers were related to negative societal and staff attitudes towards disability, lack of support from peers, lack of individual knowledge and skills, parental behaviours, and lack of transport. Important barriers further included insufficient staff capacity and inadequacy of accessible and convenient facilities and activity programs (Shields et al., 2012). Interestingly, several facilitators to physical activity partition have been identified as being based on comparable constructs to those hindering participation, such as support from peers, skilled staff, and facility accessibility. Additionally, family support, desire to be active, and acquire skills and activity opportunities accommodation the needs of youth with disabilities have been identified as salient participation facilitating factors amongst children and adolescents with disabilities (Shields et al., 2012).

Environmental factors are recognized as having a specifically pivotal role in the participation amongst youth with disabilities, and aspects of the physical, social, attitudinal, familial and institutional environment have been shown to comprise elements that are central to facilitating or impeding their participation (Anaby et al., 2013). Aspects of the environment have also been shown to serve as a mediator for participation amongst adolescents with and without disabilities across home, school, and community settings (Anaby et al., 2014). Individuals with disabilities may however, experience more environmental barriers in comparison to individuals without disabilities. For instance, Bedell and colleagues (2013) found that a significantly greater number of parents of children with disabilities perceived the environment as a barrier, making activity participation harder, compared to parents of children without disabilities. Further, 36% of parents of children and youth with disability reported lack of adequacy or availability of programs and services, in comparison to only 3% of parents of children without disabilities (Bedell et al., 2013).

According to the fPRC, differences in participation between individuals or settings, and change in participation across a life course is likely attributable to a complex interrelatedness of the context in which participation occurs, the development of individual factors and the overreaching environment in which individuals conduct their lives (Imms et al., 2017). Hence, barriers and facilitators to participation may be found in all elements included in the fPRC, and addressing these barriers and facilitators by
means of interventions aiming at improving participation amongst adolescents with disability is of importance. If adolescents with disabilities experience fewer opportunities for participation and engagement in activities, the development of a range of skills and abilities are likely to be negatively influenced. In turn, this may further reduce the contexts in which those individuals can partake, indicating a vicious circle. Interventions aiming at enabling positive attendance and involvement amongst children and adolescents with disabilities need to consider the full complexity of participation in order to promote health and well being (Imms et al., 2017). Further, this complexity of adolescents’ physical activity participation might also involve insight from motivational psychology. During recent decades, there has been an emergence of a growing number of psychological theories aimed at understanding and influencing complex human behaviours such as physical activity, one of which is SDT.

2.4 Self-determination theory

SDT is an empirically based psychological theory concerned with human behaviour, motivation, and development (Deci & Ryan, 1985). From the early development in the mid 1980s, SDT has steadily emerged as one of the most influential theories of behavioural science in contemporary time (Ryan & Deci, 2017). The theory constitutes a theoretical framework for understanding how the inherent human capacities for psychological growth are influenced by biological, social, and cultural conditions (Ryan & Deci, 2017). Hence, SDT is concerned with factors that either facilitate or hinder vitality, engagement, motivation, social integration, and well-being in humans. Essentially, SDT is comprised of six mini-theories grasping different aspects of human motivation and functioning whereof the concept of basic psychological needs is salient construct within the SDT framework (Ryan & Deci, 2017).

SDT and the concept of basic psychological needs are based on the assumption that an inherent tendency towards growth and development is a fundamental human quality. This innate tendency drives individuals to be curious, to explore, engage, and be proactive (Ryan & Deci, 2017). Yet, this propensity is also conditional, requiring continuous support of what SDT entitles basic psychological needs. These psychological needs are specific social and psychological factors essential in human
flourishing or degradation (Ryan & Deci, 2004). The concept of needs differs from other motivational concepts such as desires, wants, and preferences, in the sense that needs are integral to organismic well-being when fulfilled, and organismic ill-being when thwarted (Ryan & Deci, 2017). Thus, basic psychological needs can be understood as “… critical psychological satisfactions necessary for the healthy development of self as the individual engages the world within and around him- or herself” (Ryan & Deci, 2017 p. 8).

SDT posits that there are three basic psychological needs, namely the need for autonomy, competence, and relatedness. *Autonomy* refers to the perceptions of choice or self-endorsement in initiation and regulation of actions and behaviours (Ryan & Deci, 2017). This self-endorsement is usually related to a sense of congruency between behaviours and personal interests and values. Autonomy is thus concerned with the experience of volition in behaviours in which individuals engage. However, the SDT framework explicitly differentiates the concept of autonomy from the concept of independence. Indeed, SDT presses the notion that individuals can be autonomously dependent, independent or interdependent. Further, the framework states that the opposite of autonomy is not dependence, but rather heteronomy, indicating a sense of coercion when acting. Moreover, behaviours may be considered controlled or constrained and emanating from sources external to the self if autonomy is not present (Ryan & Deci, 2017).

The need for *competence* concerns an individual’s sense of capabilities and effectiveness in achieving desired outcomes and in ongoing environmental interactions (Ryan & Deci, 2004). This is prominent in an individual’s propensity to engage and seek optimally challenging tasks, thus serving as a source of energy in behaviour and learning processes. Rather than being an objective expression of skill attainment and abilities, competence refers to a subjective sense of mastery. Lastly, the need for *relatedness* refers to a sense of connectedness and belongingness with other individuals or groups (Ryan & Deci, 2004). This includes the degree to which an individual feels connected to and cared for by others. Yet, equally important is perceiving oneself as a significant, sensitive, and contributing individual to others. Hence, relatedness is
concerned with feelings of reciprocal belongingness and care in the social environment surrounding an individual (Ryan & Deci, 2017).

One of the fundamental aspects of SDT is related to the way in which fulfillment or frustration of the basic psychological needs influence human behaviour and development (Ryan & Deci, 2017). SDT states that different social-contextual factors have the ability to either support or undermine basic psychological needs. Environments in which autonomy, competence, and relatedness are being supported facilitate individuals’ growth, intrinsically motivated behaviour, and well-being. Conversely, undermining of need fulfillment is associated with cognitive, affective, motivational, and psychological decrement. This includes a diminishment of vitality and motivation, in addition to psychopathology and ill-being (Ryan & Deci, 2017). SDT also advocates for the absence of a hierarchy of needs, implying that although different in conceptualization, autonomy, competence, and relatedness are highly intercorrelated needs. Further, need fulfillment is eminently context-dependent and fluctuates over time. Hence, supporting all three basic needs across the lifespan and in different contexts are salient to promote optimal psychological and social human functioning (Ryan & Deci, 2017).

A second core aspect of SDT concerns a distinction between qualitatively different types of motivation and behavioural regulations. SDT postulate that motivation occurs in a continuum spanning from amotivation, through extrinsic- to intrinsic motivation (Ryan & Deci, 2000). Whereas amotivation refers to a state where motivation is not present or one acts without intentionality, extrinsic motivation commonly refers to engagement in behaviours due to separable or external consequences. Extrinsic motivation is further differentiated into varied types of behavioural regulations, namely external (acting for the sake of obtaining awards or avoiding punishment)-, introjected (acting for the sake of guilt/shame avoidance and enhancement of self-esteem/worth)-, identified (acting for the sake of the behaviour being personally important)- and integrated regulation (acting for the sake of the behaviour being assimilated with personal needs, goals, and values)(Ryan & Deci, 2004). In contrast, intrinsic motivation refers to a state where engaging in behaviours emanate from a subjective perception of
the behaviour being interesting and enjoyable, purely for its own sake (Ryan & Deci, 2017).

The motivational continuum presented within SDT represents a process of internalization whereby behaviours and values become increasingly more personally integrated into the self (Ryan & Deci, 2000). Consequently, this also involves a transition from more controlling to more autonomous and self-determined motivational regulations. This process of internalization is facilitated by means of psychological need fulfillment. Specifically, satisfaction of the need for autonomy, competence, and relatedness is believed to mediate the relationship between social-contextual factors and behavioural motivation. Importantly, more autonomous motivation is considered favorable and SDT proposes that greater internalization manifests itself in enhanced behavioural quality and psychological well-being. Additionally, autonomous motivation is associated with greater engagement and persistence in activities, in which the fulfillment of basic psychological needs has a prominent role (Ryan & Deci, 2017).

2.4.1 Self-determination theory applied within the physical activity context

The applied significance of SDT has been an area of increasing scientific interest. The framework has been utilized across varied life domains, including education, employment, psychotherapy, and health care. Additionally, SDT has been shown to have particular applicability in physical activity contexts, and both observational and experimental research exploring SDT in relation to physical activity has accumulated during the recent decades (Ryan & Deci, 2017).

PE is one of the physical activity contexts in which the relevance of SDT and need fulfillment has received empirical support. Standage, Duda & Ntoumanis (2005) found perceived need fulfillment to be positively predictive of intrinsic motivation, which in turn facilitated positive motivational consequences in PE among 950 British students of secondary school. Contrarily, need satisfaction was negatively associated with amotivation, which consequently positively predicted unhappiness in PE (Standage et al., 2005). Similarly, perceived need-support from PE teachers was positively and significantly correlated with need satisfaction, intrinsic motivation, and physical activity
participation in US middle-school students (Zhang, Solmon, Kosma, Carson & Gu, 2011). The research group further advocated the importance of providing need-supportive environments in PE to stimulate intrinsic motivation, which may further facilitate participation in physical activities transcending the school setting (Zhang et al., 2011).

Comparable relations have been observed in Norwegian samples, whereof autonomous motivation, and perceived competence was shown to be indirectly and significantly predictive of PE participation and performance through the utilization of constructive learning strategies. Furthermore, these motivational constructs were mediated by the adolescents’ perceived satisfaction of basic psychological needs (Ulstad, Halvari, Sørebo & Deci, 2016). Similar findings have been further corroborated in a recent systematic review and meta-analysis synthesizing the current available evidence concerning SDT applied to the PE context (Vasconcellos et al., 2019). By including 265 relevant studies, analyses revealed strong positive correlations between the satisfaction of autonomy, competence, and relatedness, and students’ autonomous motivation. In extension, autonomous motivation positively correlated with adaptive outcomes comprised of affective, behavioural and cognitive constructs. Hence, students showing greater autonomous motivation were more likely to report positive experiences and learning outcomes in PE. Conversely, autonomous motivation was negatively associated with maladaptive outcomes, with students being more likely to report unfavorable PE experiences (Vansconcellos et al., 2019).

Interestingly, there has also been growing empirical support for the premise of a trans-contextual model in which perceived support for autonomous motivation in PE might transfer to physical activities in leisure contexts (Hagger & Chatzisarantis, 2012). This has also been substantiated in findings from a sample of Norwegian adolescents whereby basic need satisfaction in PE was positively linked to LTPA, and moreover, general psychological well-being (Bagoien, Halvari & Nesheim, 2010). Specifically, Bagoien and colleagues (2010) showed that perceived autonomy support from PE teachers was positively related to need satisfaction and autonomous motivation for PE participation with consequent significant paths to autonomous motivation and perceived competence in the LTPA context. In turn, these findings were associated with exerted
effort in LTPA as well as psychological well-being (Bagoien et al., 2010). The authors thus highlighted the pivotal role of perceived need satisfaction as a link between need-supportive environments and motivation for physical activity, and additionally, the importance of need satisfaction in improving physical activity participation among young (Bagoien et al., 2010).

The SDT framework has also been applied within contexts of more self-organized modalities of physical activity and exercise. As SDT postulates, intrinsic motivation, facilitated by means of psychological need fulfillment, may be among the most prominent factors for participation and adherence in physical activity (Ryan & Deci, 2017). The value of more autonomous forms of behavioural regulation in relation to physical activity facilitation was consistently supported in a systematic review comprising 66 studies (Teixeira, Carraca, Markland, Silva & Ryan, 2012). The review also revealed that compared to behavioural regulation, basic psychological needs were given less attention in the scientific literature. Yet, evidence indicated that need fulfillment, and specifically satisfaction of competence, was positively related to participation in physical activity across diverse samples and contexts (Teixeira et al., 2012). Similarly, a meta-analytic review concerning children and adolescents specifically found that relations between autonomous and controlled forms of motivation and physical activity were moderately positive and small negative, respectively (Owen, Smith, Lubans, Ng & Lonsdale, 2014). However, the study did not explore the specific role of need fulfillment in the aforementioned associations. Consequently, increased scientific attention towards basic psychological need satisfaction and physical activity among children and adolescents was warranted (Owen et al., 2014).

The application of SDT has also been explored within the context of sport. A great amount of this research is concerned with autonomous motivation, whether in relation to psychological need fulfillment or in relation to performance, athletes’ well being and sport adherence (Ryan & Deci, 2017). In accordance with percepts of SDT, research has documented the positive associations between autonomous motivation and persistence in sport participation, and contrarily, controlled motivation and the association with sport dropout (Hagger & Chatzisarantis, 2007). Calvo, Cervelló, Jiménez, Iglesias &
Murcia (2010) showed that perceived fulfillment of autonomy and relatedness were significant predictors of sport adherence in Spanish adolescent soccer players. Further congruence for these findings was found in a cross-national study including more than 7000 youth soccer players from five European countries (Quested et al., 2013). Results showed that the degree of basic psychological need satisfaction positively predicted sport enjoyment while negatively predicting non-participation through sport dropout. These findings provided further empirical underpinning for the salient potential of applying SDT tenets to improve enjoyment and adherence to physical activity and sport participation among young (Quested et al., 2013).

By considering the concept of participation as postulated in fPRC (Imms et al., 2017) in relation to tenets of SDT, interesting associations might be drawn. Specifically, one of the two main components of participation within fPRC is involvement. As previously mentioned, the conceptualization of involvement concerns the subjective experiences of attending. As such, “involvement” emphasizes the importance of experiencing oneself as participating. Further, the degree to which an individual experiences involvement is related to elements such as motivation, engagement, affect, and social affiliation (Imms et al., 2017). Interestingly, these elements may relate to central aspect of SDT and basic psychological needs.

Such similarities may also be observed in other key components within fPRC, including the intrinsic construct of sense of self. Sense of self encompasses personal perceptions of confidence, self-esteem, self-determination, and satisfaction with participation (Imms et al., 2016). Arguably, these dimensions may resonate with the basic needs of perceived competence, autonomy, and relatedness expressed in SDT (Ryan & Deci, 2017). This is relevant as fPRC conceptualization of sense of self appears to be highly interrelated with, and facilitative of, activity participation (Imms et al., 2016; Imms et al., 2017).

In essence, there seem to be elements in the core participation constructs, as well as surrounding and influencing constructs of fPRC, that assimilate with the concept of basic psychological needs. Further, a central aspect of SDT concerns the way in which satisfaction of basic needs influence participation in behaviours such as physical activity
(Ryan & Deci, 2017) and there is growing empirical support for the role of basic needs satisfaction in motivation for, and participation in, physical activity (e.g. Ntoumanis, 2005; Bagoien et al., 2010; Zhang et al., 2011; Quested et al., 2013; Vasconcellos et al., 2019). Arguably, satisfaction of basic needs might not only be important to participation, but the degree to which basic needs are perceived fulfilled may represent an indirect indicator of participation. As such, the perceived fulfillment of basic needs among adolescents might potentially be considered an expression of their participation.

2.4.2 Self-determination theory, physical activity, and disability

Most of the aforementioned scientific evidence is based on samples where distinctions between individuals based on functional ability or disability are not made. However, a central tenant of SDT is the universality of basic psychological needs. As such, the basic needs act as essential nutrients for human growth and well-being, regardless of personal characteristics and level of functioning (Ryan & Deci, 2017). Nonetheless, research specifically concerning SDT in relation to individuals with disability exists, although the evidence base seems somewhat scarce in comparison to research on able-bodied. For instance, SDT has been tested in a rehabilitation context amongst young Norwegian adults with physical disabilities (Saebu, Sørensen & Halvari, 2013). Results showed need satisfaction to be positively and significantly related to changes in autonomous motivation for physical activity, which in turn was associated with increased physical activity during the course of the rehabilitation stay. Further, results also provided indications of need satisfaction being positively predictive of total physical activity levels 12 weeks after the stay (Saebu et al., 2013).

Research has also demonstrated that meaningful participation in physical activity amongst children and adolescents with disability is linked to dimensions of SDT and need fulfillment. A systematic evidence synthesis comprising 12 articles revealed four themes central to leisure participation among young with disability: fun (enjoyment and pleasure), freedom (of choice and from constraints), fulfillment (discovering, developing and displaying potential), and friendship (social connectedness and belonging) (Powrie et al., 2015). Similar elements emerged in a scoping review by Willis and colleagues (2017) in which the meaningful participation experiences of
children and youth with disability included perceptions of fun, success, belonging, freedom, learning and friendship. Both studies resonated their findings to SDT and drew associations between their emerging themes to the satisfaction of the need for autonomy, competence, and relatedness. Consequently, the findings further corroborated the potential importance in exploring and incorporating the support of autonomy, competence, and relatedness to facilitate meaningful participation for children and adolescents with disabilities (Powrie et al., 2015; Willis et al., 2017).
3.0 Aims and research questions

The objective of the present research is to gain a better understanding concerning how adolescents with disabilities experience autonomy, competence and relatedness in three major physical activity contexts. Gaining such insight might provide valuable knowledge regarding elements of PE, OS, and SOA that may or may not be accommodating to the nurturing basic psychological need fulfillment in individuals with disabilities in adolescence, which may further influence their physical activity participation.

Specifically, the overall aim of the thesis is to explore the degree of fulfilment of the three basic psychological needs in the physical activity contexts of PE, OS, and SOA among adolescents reporting having a disability or long-term illness and whether they differ in relation to adolescents not reporting so. Secondly, the aim is to explore these differences over a three-year time period. The following research questions have been developed:

- **RQ1:** Is there a difference in perceived competence, autonomy, and relatedness amongst adolescents reporting disability/long-term illness and adolescents not reporting so, in physical education, organized sport, and self-organized physical activity?

- **RQ2:** Are potential differences in need fulfillment in physical education, organized sport, and self-organized physical activity amongst adolescents reporting disability/long-term illness and adolescents not reporting so, persistent over a three-year time span?
4.0 Methods

4.1 REPAC
The data utilized in this current thesis originates from the Norwegian research project “The Relevance of Physical Activity Contexts in the every-day life of adolescents” (REPAC) (NSSS, 2019). REPAC is a multi-contextual, longitudinal, and multi-methodological study examining the way in which three major physical activity contexts, PE, OS, and SOA, influence development and behaviour during adolescence. RECAP comprises three integrated sub-studies with different methodological approaches: an experimental study involving an interest-based and self-determined PE intervention, a qualitative study exploring the lived experiences of PE, and a longitudinal study assessing adolescents involvement in PE, OS, and SOA in relation to variables reflecting development and behaviour (NSSS, 2019).

The current thesis is based on data extracted from the longitudinal sub-study of REPAC. The original sample of the longitudinal study consisted of 3049 students aged 13-19 years, attending secondary ($n=1592$)- or upper secondary school ($n=1457$) in four different Norwegian counties. Data collection was conducted once a year, from the first year of secondary- or upper secondary school in 2014 until the students finished school three years later, in 2016. The original online survey provided data on several different variables, including activity level and eagerness for activity engagement, sense of belonging, emotions, situational motivation, and basic psychological needs (NSSS, 2019).

4.2 Study design
The present thesis is based on a quantitative research design. The REPAC-data that is derived due to its considered relevance in the thesis mainly concerns variables related to the innate psychological needs of competence, autonomy, and relatedness, as stated in the SDT (Ryan & Deci, 2000), in the physical activity contexts of PE, OS, and SOA. Longitudinal data from the three waves of REPAC data collection is used in order to test for differences between adolescents reporting disability/long-term illness in comparison to adolescents not reporting so, in perceived need fulfillment in each of the
three psychological needs within the three physical activity contexts across a three-year time period.

4.3 Sample
The sample was drawn by means of a clustered sampling procedure with schools constituting the primary sampling unit. Schools were further stratified on the basis of number of students, study program, centrality, and region. A total of 42 schools from four counties located in the Eastern parts of Norway were included, of which 23 and 19 were secondary- and upper-secondary schools, respectively.

A total of 2979 students provided sufficient information concerning whether they experienced disability or long-term illness at T1. These students constitute the sample included in the statistical analyses of the present study. Of these, 328 reported having a disability/long-term illness, and 2651 reported no disability/long-term illness. The gender distribution was relatively equal for the group reporting no disability/long-term illness with 49% (n = 1283) of students being boys and 52% (n =1362) being girls, whereas the percentages were 42% (n =137) and 58% (n =189) respectively for boys and girls amongst the students reporting disability/long-term illness.

4.4 Data collection
Data was collected between March and May for three consecutive years at each of the respective schools included in the study. An electronic questionnaire was delivered during regular school hours, with a completion time of approximately 60-90 minutes. All responses were anonymized. A project researcher and a teacher were present during data collection, available for answering student questions and making sure that the survey was conducted in accordance with data collection protocol. Participants were informed of the voluntariness of study participation and were free to withdraw from the study at any given time without providing a rationale. Students who chose to withstand participation were asked to leave the room and proceed according to the daily school schedule.
4.5 Measures

Perceived competence, autonomy, and relatedness was measured using a Norwegian adaptation of the Basic Psychological Needs in Exercise Scale (BPNES) (Vlachopoulos & Michailidou, 2006). BPNES is a domain-specific instrument designed to assess need fulfillment by means of self-report. The scale originally contains 12 items divided into the three subscales of autonomy, competence, and relatedness. Each subscale comprises four items with an item response format of a 5-point Likert scale ranging from 1 (totally disagree) to 5 (very strongly agree) (Vlachopoulos & Michailidou, 2006). BPNES has previously been shown to be a valid and reliable measure in assessing need fulfillment in exercise contexts in both Greek (Vlachopoulos & Michailidou, 2006) and British adult populations (Vlachopoulos, Ntoumanis & Smith, 2010) and in PE amongst Brazilian school-aged children (Costa, Maroco & Vieira, 2017). Moreover, the scale has previously been used in a sample of young Norwegian adults with disabilities (Sæbu, Sørensen & Halvari, 2013). Due to the shortness of the scale, ease of administration, and promising single- and cross-cultural validity, BPNES has been suggested as a useful measure when examining need fulfillment in exercise contexts (Vlachopoulos et al., 2010).

Minor alterations were made to BPNES to make the scale more suitable for the population and contexts of interest in the REPAC study. The phrasing of questions was adapted to fit the three different activity contexts being studied (PE, OS, and SOA). For instance, the phrasing of a competence item varied in relation whether the context studied was PE (e.g., “I feel I can handle the tasks given in PE classes”), OS (e.g., “I feel I can handle the tasks given during training”) or SOA (e.g., “I feel I can handle the tasks in the activity”). Further phrasing of questions within the two remaining subscales of autonomy and relatedness respectively could be “I feel strongly that I have the opportunity to make choices with respect to the activities in the PE classes” (PE) and “I feel very comfortable when with the other exercise participants” (SOA). Adolescents were asked to give their responses on a 7-point Likert scale. In this scale, 1 was corresponding to “totally disagree” whereas 7 was corresponding to “totally agree”.

Data was collected in spring 2014 (T1), 2015 (T2), and 2016 (T3). Separate need fulfillment scores for autonomy, competence, and relatedness in each activity contexts and at each time point were calculated by averaging the sum of the four items in the
three subscales. These mean values represent the main dependent variables utilized in the statistical analyses in the present thesis.

4.5.1 Internal consistency

Internal consistency is a central and integral aspect of the reliability of a scale and is an assessment of the degree to which the items in a scale measure the same underlying constructs (Hassmén & Hassmén, 2008). Internal consistency is based on inter-item correlations in relation to the number of items in a scale, and Cronbach’s alpha coefficient is one of the most commonly used indices (Kline, 2005). According to Vlachopoulos & Michailidou (2006), the initial validation of BPNES yielded good internal consistency with Cronbach’s α of .84, .81, and .92 for autonomy, competence, and relatedness, respectively. This internal consistency was further supported in a validation of the British version of BPNES in which Cronbach’s α-values for autonomy, competence, and relatedness were .75, .80 and .86, respectively (Vlachopoulos et al., 2010). Similarly, Saebu et al. (2013) showed acceptable Cronbach’s Alpha Coefficients when applying BPNES in their Norwegian sample of young adults with disabilities (Autonomy = .88; Competence = .71; Relatedness = .90).

Analyses were performed to check the reliability of the Norwegian adaptation of BPNES for the specific sample included in the current thesis, and Cronbach’s α was assessed at all three time points and in the three activity contexts studied (Table 1). Scores for autonomy was ranging from .89 - .93, and scores for competence and relatedness were ranging from .90- .93 and .86-. 91 respectively. According to Kline (2011), although the lower threshold for a satisfactory reliability coefficient is .70, Cronbach’s α-value above .80 is preferable to signify good internal consistency reliability. Thus, the Cronbach’s α-values calculated in this thesis implies that the adapted BPNES used in the present Norwegian study sample has acceptable internal consistency.
Table 1: Cronbach’s Alpha in the autonomy, competence, and relatedness subscales of BPNES in PE, OS, and SOA across three time points

<table>
<thead>
<tr>
<th>Subscale</th>
<th>No. items</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autonomy PE</td>
<td>4</td>
<td>.89</td>
<td>.90</td>
<td>.91</td>
</tr>
<tr>
<td>Autonomy OS</td>
<td>4</td>
<td>.89</td>
<td>.91</td>
<td>.93</td>
</tr>
<tr>
<td>Autonomy SOA</td>
<td>4</td>
<td>.90</td>
<td>.91</td>
<td>.91</td>
</tr>
<tr>
<td>Competence PE</td>
<td>4</td>
<td>.90</td>
<td>.91</td>
<td>.91</td>
</tr>
<tr>
<td>Competence OS</td>
<td>4</td>
<td>.92</td>
<td>.93</td>
<td>.93</td>
</tr>
<tr>
<td>Competence SOA</td>
<td>4</td>
<td>.92</td>
<td>.92</td>
<td>.93</td>
</tr>
<tr>
<td>Relatedness PE</td>
<td>4</td>
<td>.87</td>
<td>.89</td>
<td>.89</td>
</tr>
<tr>
<td>Relatedness OS</td>
<td>4</td>
<td>.86</td>
<td>.89</td>
<td>.91</td>
</tr>
<tr>
<td>Relatedness SOA</td>
<td>4</td>
<td>.89</td>
<td>.91</td>
<td>.90</td>
</tr>
</tbody>
</table>

Note. $\alpha = $ Cronbach’s Alpha

4.5.2 Additional measures

Adolescents reported whether they had a disability or long-term illness by answering a yes/no question. This information was collected at all three time-points and the answers were used to group individuals into “adolescents with disability/long-term illness” and “adolescents without disability/long-term illness”. This categorical variable represents the main independent variable of the statistical analyses.

Additional information deemed pertinent to the content of the thesis was related to gender, year of birth, physical activity level, and participation in OS and SOA. Year of birth was reported by respondents in order to distinguish between individuals commenced in secondary- and upper-secondary school. Physical activity level was measured by respondents answering the following question: “Approximately how many hours per week are you engaged in physical activity that makes you warm or breathless, including physical education, organized sport, activities with family and self-organized physical activity?” Answers were given in categories of 0, 1-2, 3-4, 5-7, 8-10 of >11 hours per week. Yes/no answers were requested to gain data on participation in OS (“do you train or compete in a sports club?”) and SOA (“do you engage in any type of
training/physical activity outside of sports clubs or physical education that makes you warm or breathless. E.g., skate, parkour, cycling, cross-country skiing, swimming, running, gym?”). This aforementioned data was derived and included in the thesis as demographic characteristics of the study sample.

4.6 Ethical aspects

Ethics is a central aspect encompassing all forms of scientific work. Research ethics aims to preserve and protect the rights and well-being of all participants throughout the entire research process by addressing principles related to human value and dignity. As such, ethics presents the standards of conduct for scientific research (WHO, 2011). One of the most influential ethical guidelines concerning health and medical research involving human subjects is The Helsinki Declaration of 1964 (World Medical Association [WMA], 2013). This declaration constitutes guiding principles for how ethically sound research should be conducted, and include aspects such as informed consent, burden and risk, anonymity and confidentiality and granted approvals (WMA, 2013).

These aforementioned ethical principles have also been considered in the present study. Prior to the study commencement, participants were provided with written informed consent forms that were to be signed for the students to be considered eligible for study participation. Students were informed of the study objectives, the voluntariness of participation, and the freedom of choice to withdraw from the study at any given time, without providing a reason. Independent consent was obtained from students aged 15 years or older, whereas parental consent was obtained for students under the age of 15 years. This is in line with ethical guidelines from The Norwegian Centre for Research Data (NSD) (2018).

As accentuated in The Helsinki Declaration (WMA, 2013), research involving human subjects acquires careful assessment of the potential risk and burdens associated with study participation. Further, these risks and burdens must be considered in relation to foreseeable benefits. Research is only to be conducted if the benefits and importance of the objective outweigh the risks (WMA, 2013). The present study utilized survey
methodology, and no elevated physical harm were associated with study participation. Further, no highly sensitive subjects were addressed in the survey, and students were allowed to leave the classroom and withdraw from participation if they felt the need too. However, as data was collected at school during school hours, this may have placed added pressure on some students to participate, despite study participation fundamentally being volitional.

Data was collected and handled according to NSD’s ethical guidelines for data collection, to preserve the confidentiality and anonymity of study participants. The students’ questionnaire answers were anonymized, and the file used for data processing in the present study contained no identifiable data such as name, personal ID, or other distinguishable background information. The data collected was only to be used by individuals whereof access was relevant and authorized. Further, only an essential and limited number of REPAC personnel had access to the file linking personal ID to study identification number. The principals provided appropriate participation permissions for their respective schools, and The REPAC study attained formal approval from NSD (Appendix 2).

4.7 Statistical analysis
All statistical analyses were conducted using IBM SPSS Statistical Software Version 24.0. Little’s MCAR test was utilized to assess possible patterns of missing data on item-level, while independent sample t-tests were performed to further test possible patterns of missing data on variable level. Cronbach’s Alpha was used to assess the internal consistency of the four items within each three of the BPNES subscales. The distribution of the variables was assessed through analyses of skewness and kurtosis to determine the normality of distributions. Inferential statistics and hypothesis testing were conducted by means of independent sample t-tests to assess differences between the groups. Cohen’s $d$ was used to calculate the effect size of the differences, and evaluation of the magnitude of the effect size was done according to Sawilowsky’s (2009) revised rules of thumb. These rules of thumb suggest that the effect size ranges from very small ($d .01-.19$), small ($d .20-.49$), moderate ($d .50-.79$), large ($d .80–1.19$) to very large ($d 1.20-2.0$). Statistical level of significance was set to a $p$-value of < .05 in all analyses.
5.0 Results

5.1 Preliminary analyzes
Data was screened by means of preliminary analyzes assessing systematics of missing data and normality distribution. Little’s MCAR test was performed to assess the assumption that missing data was missing completely at random. Results indicated that MCAR assumption was violated, implying that data was not missing completely at random ($\chi^2 = 79417.294, df = 74484, p < .001$). Consequently, independent sample t-tests were conducted to explore possible differences between students responding at one or two time points (‘non-completers; n= 1356) in comparison to students responding at all three time points (“completers”; n= 1623) in relation to each of the three dimensions of BPNES in each activity context. Completers showed significantly higher scores in autonomy, competence, and relatedness in PE across all three time-points. Similarly, completers scored significantly higher in all basic psychological needs in SOA at T1 and T2 when compared to non-completers. In OS, results showed that autonomy, competence, and relatedness at T1, in addition to relatedness at T3, were significantly higher among completers in comparison to non-completers. Calculations of Cohen’s $d$ effect sizes indicated that these statistically significant differences were in the ranges of .10 - .28, which according to Sawilowsky (2009) is corresponding to small effect sizes. (Detailed results presented in Appendix 1, Table 1).

Further, chi-square tests for independence with Yates Continuity Correction were performed to explore possible associations between completers/non-completers in relation to school level, gender and whether the students reported disability/long-term illness. A significant relationship was found between completers/non-completers and reporting of disability at T1 ($\chi^2(1, n = 2979) = 5.092, p = .024$). The results indicated that students reporting disability/long term illness were more likely to be non-completers than were students without disability/long-term illness. However, there were no significant relationships between completers/non-completers and disability/long term illness at T2 ($\chi^2 (1, n = 2819) = 1.544, p = .214$) or T3 ($\chi^2 (1, n = 2617) = 1.522, p = .217$). In relation to the test assessing school level and completers/non-completers a significant relationship was found ($\chi^2 (1, n = 2979) = 270.538, p < .001$) and non-completers were more likely to be students of upper-secondary school. The results
yielded no significant relationship between completers/non-completers and gender ($\chi^2(1, n = 2971) = 1.814, p = .178$).

The normal distribution was assessed through analyzes of skewness and kurtosis for each of the four items within each BPNES subscale, in each activity context across the three time-points. Results showed that skewness for all the BPNES dimensions in PE at T1, T2 and T3 ranges from -.188 to -.926, whereas kurtosis ranges from -.766 to .343. In OS, skewness and kurtosis were ranging from -1.662 to .909 and .424 to 2.854 respectively. Ranges in SOA across the three time-points were from -1.242 to -.743 and -.191 to 1.265 for skewness and kurtosis, respectively. According to Kline (2011), skewness should be between -3 and 3 for the data to be considered normally distributed, whereas acceptable standards for kurtosis are considered to be within the ranges of -10 to 10. Thus, all variables included in the present study are considered to have a normal distribution, which further enables for hypothesis testing by means of parametric tests.

A total of 2979 students were included in analyses from the first wave of data collection (T1). Participants’ demographic characteristics, including distribution of sex, age (secondary or upper-secondary school cohorts), physical activity level, and participation is OS and SOA, are summarized in Table 2. Table 3 displays categorizations of the type of disability or long-term illness reported by the participants at T1.
Table 2: Demographic characteristics of study sample per disability group

<table>
<thead>
<tr>
<th></th>
<th>No disability/long-term illness</th>
<th>Disability/long-term illness</th>
</tr>
</thead>
<tbody>
<tr>
<td>( n )</td>
<td>2651</td>
<td>328</td>
</tr>
<tr>
<td>Gender, ( n (%) )</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boys</td>
<td>1283 (49)</td>
<td>137 (42)</td>
</tr>
<tr>
<td>Girls</td>
<td>1362 (52)</td>
<td>189 (58)</td>
</tr>
<tr>
<td>School level, ( n (%) )</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Secondary</td>
<td>1398 (53)</td>
<td>157 (48)</td>
</tr>
<tr>
<td>Upper-secondary</td>
<td>1253 (47)</td>
<td>171 (52)</td>
</tr>
<tr>
<td>OS, ( n (%) )</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Participating</td>
<td>1395 (55)</td>
<td>144 (46)</td>
</tr>
<tr>
<td>Not participating</td>
<td>1122 (45)</td>
<td>169 (54)</td>
</tr>
<tr>
<td>SOA, ( n (%) )</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Participating</td>
<td>1838 (74)</td>
<td>220 (71)</td>
</tr>
<tr>
<td>Not participating</td>
<td>647 (26)</td>
<td>90 (29)</td>
</tr>
<tr>
<td>PA level, ( n (%) )</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0h</td>
<td>27 (1)</td>
<td>4 (1)</td>
</tr>
<tr>
<td>1-2h/week</td>
<td>289 (11)</td>
<td>48 (15)</td>
</tr>
<tr>
<td>3-4h/week</td>
<td>601 (23)</td>
<td>85 (26)</td>
</tr>
<tr>
<td>5-7h/week</td>
<td>772 (29)</td>
<td>108 (33)</td>
</tr>
<tr>
<td>8-10h/week</td>
<td>610 (23)</td>
<td>50 (15)</td>
</tr>
<tr>
<td>&gt;11h/week</td>
<td>336 (13)</td>
<td>32 (10)</td>
</tr>
</tbody>
</table>

Note. Percentages represent the valid percent of responses within each category. Some respondents did not answer all questions and missing cases was present in the categories of gender (.8%), PA level (.9%), OS participation (9.7%), and SOA participation (11.8%). School level represents student’s ages. Secondary= 13 years; Upper secondary= 16 years.
Table 3: Type of disability/long-term illness reported at T1

<table>
<thead>
<tr>
<th>Type of disability/long-term illness</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Muscle/skeletal disorders</td>
<td>125 (38)</td>
</tr>
<tr>
<td>Asthma/pulmonary disorders</td>
<td>106 (32)</td>
</tr>
<tr>
<td>Other</td>
<td>26 (8)</td>
</tr>
<tr>
<td>Allergy</td>
<td>21 (6)</td>
</tr>
<tr>
<td>Diabetes</td>
<td>11 (3)</td>
</tr>
<tr>
<td>Dyslexia</td>
<td>10 (3)</td>
</tr>
<tr>
<td>Unspecified</td>
<td>9 (3)</td>
</tr>
<tr>
<td>Migraine</td>
<td>7 (2)</td>
</tr>
<tr>
<td>Visual impairment</td>
<td>6 (2)</td>
</tr>
<tr>
<td>Dysmelia</td>
<td>3 (1)</td>
</tr>
<tr>
<td>Cerebral palsy</td>
<td>3 (1)</td>
</tr>
</tbody>
</table>
5.2 Differences between groups

Differences in perceived need fulfillment between groups in PE, OS, and SOA at T1, T2 and T3 were assessed by means of independent sample t-test (Table 4).

Table 4: Descriptive statistics for the study variables and results from independent sample t-test

<table>
<thead>
<tr>
<th>Context</th>
<th>Time</th>
<th>n</th>
<th>M (SD)</th>
<th>n</th>
<th>M (SD)</th>
<th>Sig</th>
<th>d</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>No disability/long-term illness</td>
<td></td>
<td>Disability/long-term illness</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Autonomy</td>
<td>T1</td>
<td>2340</td>
<td>4.46 (1.42)</td>
<td>287</td>
<td>4.03 (1.50)</td>
<td>.000</td>
<td>.29</td>
</tr>
<tr>
<td>Competence</td>
<td>T1</td>
<td>2363</td>
<td>4.93 (1.33)</td>
<td>292</td>
<td>4.52 (1.42)</td>
<td>.000</td>
<td>.30</td>
</tr>
<tr>
<td>Relatedness</td>
<td>T1</td>
<td>2270</td>
<td>5.12 (1.31)</td>
<td>284</td>
<td>4.88 (1.33)</td>
<td>.003</td>
<td>.18</td>
</tr>
<tr>
<td>Autonomy</td>
<td>T2</td>
<td>2228</td>
<td>4.87 (1.36)</td>
<td>276</td>
<td>4.36 (1.51)</td>
<td>.000</td>
<td>.35</td>
</tr>
<tr>
<td>Competence</td>
<td>T2</td>
<td>2212</td>
<td>4.87 (1.36)</td>
<td>276</td>
<td>4.36 (1.51)</td>
<td>.000</td>
<td>.35</td>
</tr>
<tr>
<td>Relatedness</td>
<td>T2</td>
<td>2171</td>
<td>5.11 (1.36)</td>
<td>269</td>
<td>4.57 (1.51)</td>
<td>.000</td>
<td>.38</td>
</tr>
<tr>
<td>Autonomy</td>
<td>T3</td>
<td>2049</td>
<td>4.43 (1.47)</td>
<td>221</td>
<td>3.89 (1.54)</td>
<td>.000</td>
<td>.36</td>
</tr>
<tr>
<td>Competence</td>
<td>T3</td>
<td>2047</td>
<td>4.95 (1.34)</td>
<td>222</td>
<td>4.39 (1.51)</td>
<td>.000</td>
<td>.39</td>
</tr>
<tr>
<td>Relatedness</td>
<td>T3</td>
<td>2006</td>
<td>5.21 (1.34)</td>
<td>223</td>
<td>4.68 (1.52)</td>
<td>.000</td>
<td>.37</td>
</tr>
</tbody>
</table>

(Continued.)
### Table 4: Continued

<table>
<thead>
<tr>
<th>Context</th>
<th>Time</th>
<th>n</th>
<th>M (SD)</th>
<th>n</th>
<th>M (SD)</th>
<th>Sig</th>
<th>d</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>OS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Autonomy</td>
<td>T1</td>
<td>1259</td>
<td>5.94 (1.05)</td>
<td>131</td>
<td>5.60 (1.22)</td>
<td>.003</td>
<td>.30</td>
</tr>
<tr>
<td>Competence</td>
<td>T1</td>
<td>1266</td>
<td>5.96 (1.02)</td>
<td>136</td>
<td>5.66 (1.15)</td>
<td>.004</td>
<td>.28</td>
</tr>
<tr>
<td>Relatedness</td>
<td>T1</td>
<td>1227</td>
<td>5.95 (1.07)</td>
<td>129</td>
<td>5.57 (1.33)</td>
<td>.002</td>
<td>.32</td>
</tr>
<tr>
<td>Autonomy</td>
<td>T2</td>
<td>1050</td>
<td>5.96 (1.13)</td>
<td>109</td>
<td>5.67 (1.32)</td>
<td>.031</td>
<td>.24</td>
</tr>
<tr>
<td>Competence</td>
<td>T2</td>
<td>1046</td>
<td>5.95 (1.10)</td>
<td>110</td>
<td>5.72 (1.32)</td>
<td>.082</td>
<td>.19</td>
</tr>
<tr>
<td>Relatedness</td>
<td>T2</td>
<td>1031</td>
<td>5.96 (1.16)</td>
<td>107</td>
<td>5.59 (1.36)</td>
<td>.006</td>
<td>.29</td>
</tr>
<tr>
<td>Autonomy</td>
<td>T3</td>
<td>825</td>
<td>5.99 (1.11)</td>
<td>75</td>
<td>5.80 (1.45)</td>
<td>.292</td>
<td>.15</td>
</tr>
<tr>
<td>Competence</td>
<td>T3</td>
<td>828</td>
<td>5.95 (1.08)</td>
<td>75</td>
<td>5.87 (1.40)</td>
<td>.613</td>
<td>.06</td>
</tr>
<tr>
<td>Relatedness</td>
<td>T3</td>
<td>822</td>
<td>6.01 (1.16)</td>
<td>72</td>
<td>5.85 (1.39)</td>
<td>.352</td>
<td>.13</td>
</tr>
<tr>
<td><strong>SOA</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Autonomy</td>
<td>T1</td>
<td>1574</td>
<td>5.75 (1.22)</td>
<td>190</td>
<td>5.59 (1.20)</td>
<td>.083</td>
<td>.13</td>
</tr>
<tr>
<td>Competence</td>
<td>T1</td>
<td>1571</td>
<td>5.72 (1.18)</td>
<td>184</td>
<td>5.59 (1.22)</td>
<td>.153</td>
<td>.11</td>
</tr>
<tr>
<td>Relatedness</td>
<td>T1</td>
<td>1517</td>
<td>5.58 (1.33)</td>
<td>179</td>
<td>5.41 (1.37)</td>
<td>.126</td>
<td>.13</td>
</tr>
<tr>
<td>Autonomy</td>
<td>T2</td>
<td>1486</td>
<td>5.77 (1.21)</td>
<td>177</td>
<td>5.55 (1.14)</td>
<td>.018</td>
<td>.19</td>
</tr>
<tr>
<td>Competence</td>
<td>T2</td>
<td>1467</td>
<td>5.72 (1.17)</td>
<td>176</td>
<td>5.55 (1.14)</td>
<td>.066</td>
<td>.15</td>
</tr>
<tr>
<td>Relatedness</td>
<td>T2</td>
<td>1418</td>
<td>5.61 (1.35)</td>
<td>173</td>
<td>5.41 (1.35)</td>
<td>.067</td>
<td>.15</td>
</tr>
<tr>
<td>Autonomy</td>
<td>T3</td>
<td>1292</td>
<td>5.83 (1.18)</td>
<td>139</td>
<td>5.75 (1.28)</td>
<td>.437</td>
<td>.07</td>
</tr>
<tr>
<td>Competence</td>
<td>T3</td>
<td>1279</td>
<td>5.74 (1.17)</td>
<td>143</td>
<td>5.67 (1.27)</td>
<td>.519</td>
<td>.06</td>
</tr>
<tr>
<td>Relatedness</td>
<td>T3</td>
<td>1239</td>
<td>5.58 (1.32)</td>
<td>134</td>
<td>5.48 (1.52)</td>
<td>.770</td>
<td>.07</td>
</tr>
</tbody>
</table>

*Note. n= number of respondents; SD= standard deviation; Sig= p-value; d= Cohen’s d effect size*
5.2.1 Physical Education

Results showed that adolescents with disability/long-term illness reported significantly lower autonomy ($M= 4.03$, $SD= 1.50$), competence ($M= 4.52$, $SD= 1.42$), and relatedness ($M= 4.88$, $SD= 1.33$) in PE at T1 compared to adolescents without disability/long-term illness (Autonomy: $M=4.46$, $SD=1.42$, $t(2625)= 4.752$, $p < .001$; Competence: $M= 4.93$, $SD= 1.33$, $t(2653)= 4.984$, $p < .001$; Relatedness: $M= 5.12$, $SD= 1.31$, $t(2552)= 2.936$, $p = .003$). The effect sizes of the differences were small, with $d$-values of .29, .30 and .18 for autonomy, competence, and relatedness respectively.

Compared to adolescents without disability/long term illness (Autonomy: $M=4.37$, $SD=1.48$; Competence: $M=4.87$, $SD=1.36$; Relatedness: $M=5.11$, $SD=1.36$), adolescents with disability/long-term illness reported significantly lower autonomy ($M=3.93$, $SD=1.50$, $t(2495)= 4.608$, $p < .001$), competence ($M=4.36$, $SD=1.51$, $t(333.259)= 5.411$, $p < .001$), and relatedness ($M=4.57$, $SD=1.51$, $t(323,617)= 5.503$, $p < .001$) in PE at T2. Cohen’s $d$ showed that effect sizes of the differences in autonomy (.30), competence (.35), and relatedness (.38) were small.

Statistically significant group differences were also observed in all BPNES subscales in PE at T3. Adolescents with disability/long-term illness reported significantly lower scores in autonomy ($M=3.89$, $SD=1.54$), competence ($M=4.39$, $SD=1.51$) and relatedness ($M=4.68$, $SD= 1.52$) in comparison to adolescents without disability/long-term illness (Autonomy: $M=4.43$, $SD=1.47$, $t(2268)= 5.176$, $p < .001$; Competence: $M=4.95$, $SD=1.34$, $t(260,493)= 5.280$, $p < .001$; Relatedness: $M=5.21$, $SD=1.34$, $t(262.105)= 4.941$, $p < .001$). Effect sizes were small, with $d$-values of .36, .39, and .37 for autonomy, competence, and relatedness respectively.
5.2.2 Organized sport

In OS, adolescents reporting disability/long-term illness showed significantly lower scores for autonomy ($M=5.60$, $SD=1.24$), competence ($M=5.66$, $SD=1.15$), and relatedness ($M=5.57$, $SD=1.33$) at T1 in comparison to those not reporting so (Autonomy: $M=5.94$, $SD=1.05$, $t(149.984)=2.975$, $p=.003$; Competence: $M=5.96$, $SD=1.02$, $t(158.523)=2.951$, $p=.004$; Relatedness: $M=5.95$, $SD=1.07$, $t(146.004)=3.177$, $p=.002$). Cohen’s $d$ calculations indicated that differences in autonomy (.30), competence (.28), and relatedness (.32) showed small effect sizes.

At T2, adolescents with disability/long-term illness reported significantly lower levels of autonomy ($M=5.67$, $SD=1.32$) and relatedness ($M=5.59$, $SD=1.36$) in OS when compared to adolescents without disability/long-term illness (Autonomy: $M=5.96$, $SD=1.13$, $t(124.930)=2.177$, $p=.031$; Relatedness: $M=5.96$, $SD=1.16$, $t(122.651)=2.777$, $p=.006$), with effect sizes being small for both autonomy (.24) and relatedness (.29). Conversely, there was no statistically significant difference in perceived competence in OS at T2 between individuals reporting disability/long term illness ($M=5.72$, $SD=1.32$) and those not reporting so ($M=5.95$, $SD=1.10$, $t(125.470)=2.177$, $p=.082$, $d=.19$).

There were no statistically significant differences between groups in neither autonomy (Disability/long-term illness: $M=5.80$, $SD=1.45$; No disability/long-term illness: $M=5.99$, $SD=1.11$, $t(81.976)=1.061$, $p=.292$) competence (Disability/long-term illness: $M=5.87$, $SD=1.40$; No disability/long-term illness: $M=5.95$, $SD=1.08$, $t(82.206)=.508$, $p=.613$), or relatedness (Disability/long-term illness: $M=5.85$, $SD=1.39$; No disability/long-term illness: $M=6.01$, $SD=1.16$, $t(79.872)=.935$, $p=.352$) in OS at T3. Effect sizes of the differences were small, with $d$-values of .15, .06, and .13 for autonomy, competence, and relatedness respectively.
5.2.3 Self-organized physical activity

There were no statistically significant differences between groups in SOA, in autonomy (Disability/long-term illness: M=5.59, SD=1.20; No disability/long-term illness: M=5.75, SD=1.22, t(1762)=1.733, p=.083) competence (Disability/long-term illness: M=5.59, SD=1.22; No disability/long-term illness: M=5.72, SD=1.18, t(1753)=1.430, p=.153), or relatedness (Disability/long-term illness: M=5.58, SD=1.33, t(1694)=1.837, p=.067) at T1. Effect sizes were small, with d-values of .13, .11, and .13 for autonomy, relatedness, and competence respectively.

Adolescents with disability/long term illness reported significantly lower autonomy (M=5.55, SD=1.14) in SOA at T2 in comparison to adolescents without disability/long-term illness (M=5.77, SD=1.21, t(1661)=2.369, p=.018), with a small effect size of .19. No statistically significant difference was observed amongst groups in perceived competence (Disability/long-term illness: M=5.55, SD=1.14; No disability/long-term illness: M=5.72, SD=1.17, t(1641)=1.837, p=.066) or relatedness (Disability/long term illness: M=5.41, SD=1.35; No disability/long-term illness: M=5.61, SD=1.35, t(1589)=1.831, p=.067) in SOA at T2. Effect sizes were small, with d-values of .15 for both competence and relatedness.

There were no statistically significant differences between groups in neither perceived autonomy (Disability/long term illness: M=5.75, SD=1.28; No disability/long-term illness: M=5.83, SD=1.18, t(1429)=.777, p=.437, d=.07) competence (Disability/long-term illness: M=5.67, SD=1.27; No disability/long-term illness: M=5.74, SD=1.17, t(1420)=.645, p=.519, d=.06), or relatedness (Disability/long-term illness: M=5.48, SD=1.52; No disability/long-term illness: M=5.58, SD=1.32, t(155.510)=.770, p=.443, d=.07) in SOA at T3.
6.0 Discussion

The main aim of the present study was to explore the perceived fulfillment of basic psychological needs in the physical activity context of PE, OS, and SOA among adolescents reporting disability/long-term illness and whether they differ in relation to adolescents not reporting so. Further, the aim was to explore these differences over a three-year time period to study possible systematical patterns of difference.

Findings from independent sample t-test showed that adolescents with disability/long-term illness reported significantly lower autonomy, competence, and relatedness in PE compared to adolescents without disability/long-term illness. Findings were consistent across all three time-points. However, results in the context of OS were somewhat more inconclusive. Adolescents with disability/long-term illness reported significantly lower scores in all three psychological needs at T1. At T2, adolescents with disability/long-term illness showed significantly lower autonomy and relatedness. Nonetheless, there were no significant differences between groups in perceived competence at T2, nor in any of the basic psychological needs in OS at T3. In SOA, there were no differences in perceived need fulfillment between groups across all three time-points with one exception: adolescents reporting disability/long-term illness showed significantly lower autonomy at T2 in comparison to adolescents not reporting so.

6.1 PE – a difficult context?

The results presented in this thesis imply that adolescents with disability experience reduced participation in PE, perceiving the context as less nurturing to their basic psychological needs. Although there seems to be a paucity of specific comparisons of need fulfillment in physical activity contexts amongst adolescents with and without disabilities in the scientific literature, similar trends have been observed in previous research. Robinson & Liberman (2004) applied the SDT framework in their exploration of opportunities for self-determination across varied life domains, amongst students with visual impairment. Findings showed that students with disabilities experienced low levels of self-determination while partaking in PE. Although self-determination is a
representation of the need for autonomy, Robinson & Liberman (2004) did not assess the need for relatedness or competence in their students.

However, indications of lower perceived competence among adolescents with disability in the PE context can be observed through Bertills’ (2019) findings of self-efficacy differences. Banduras (1994) concept of self-efficacy refers to an individual’s belief in own abilities and competencies for goal achievement and thus closely relates to SDT’s conceptualization of competence. Hence, Bertills (2019) findings of lower likelihood of experiencing high self-efficacy in PE among adolescents with disabilities compared to typically developing peers indicated that the need for competence might be more suppressed in this population. Bertills (2019) also identified trends in which adolescents with disability were less socially engaged and spent more time alone during PE, although differences were statistically nonsignificant. Nonetheless, previous research has demonstrated that social isolation and lack of positive peer interactions pose a challenge in the PE context (Place & Hodge, 2001; Goodwin & Watkinson, 2000; Qi & Wang, 2018), which may relate to the findings of lower perceived relatedness in PE amongst adolescents with disability in the current study.

Findings of differences in participation, as indicated through suboptimal need fulfillment amongst adolescents with disabilities in the PE context, may suggest that these students have less favorable experiences of participation in PE. Such findings have been identified in previous research in both international (Blinde & McAllister, 1998; Goodwin & Watkinson, 2000; Fitzpatrick & Watkinson, 2003; Wang, 2019) and Norwegian populations (Bredahl, 2012; Svendby, 2013). Although young with disabilities have varied experiences in PE, the preponderance of these experiences seems to be negatively shifted (Martin, 2018). Svendby (2013) examined the PE experiences of Norwegian children and adolescents with disabilities, their parents, and their PE teachers. Interviews revealed that students with disabilities generally considered themselves to be competent, but their resources were neither acknowledged nor appreciated in PE. Consequently, a common notion was that students with disabilities were left with a feeling of “not fitting in” in the PE context (Svendby, 2013).
Similarly, Bredahl (2012) qualitatively and retrospectively explored the physical activity experiences of 20 Norwegian adults with disabilities. Findings showed that the majority of negative physical activity experiences had occurred in school PE, suggesting that PE was a particularly challenging context for individuals with disabilities (Bredahl, 2012). In some of the earlier research concerning the experiences of inclusive PE from the perspective of young with disabilities, Goodwin & Watkinson (2000) found that adolescents with disability experienced both good and bad days in PE. Whereas bad days were centered on experiencing social isolation, questioned competence, and restricted participation, good days were related to feelings of belonging, shared benefits, and skillful participation. Interestingly, the findings of Goodwin & Watkinson (2000) may resonate with the students’ perception of autonomy, competence, and relatedness, suggesting that the level of need satisfaction is central to the shaping of positive or negative experiences of PE participation.

Furthermore, Goodwin & Watkinson’s (2000) “good and bad days” can be understood as experiencing meaningful- and less meaningful participation in PE, respectively. Consequently, the findings may also provide support to the notion suggesting that the degree of perceived autonomy, competence, and relatedness may represent an indicator of the level of meaningful participation among adolescents. This salient role of basic psychological needs in relation to physical activity participation among youth with disabilities has been corroborated in succeeding research (Powrie et al., 2015; Willis et al., 2017).

6.2 PE, OS, and SOA – contextual differences and similarities

As previously addressed, analyses of the current study showed that adolescents with disabilities consistently experience diminished PE participation, expressed through lower need satisfaction. However, differences between groups were inconsistent in the OS context and nonsignificant in the context of SOA. These findings of variations in need fulfillment across different physical activity contexts support the central SDT notion positing that satisfaction of basic needs is both dynamic and context-dependent (Ryan & Deci, 2017). Further, by looking at the mean scores of autonomy, competence, and relatedness across contexts, a pattern of differences in participation between
contexts became evident. In particular, descriptive data might indicate a trend in which adolescents seem to report lower mean values in all psychological needs in PE, compared to the two other activity contexts. Moreover, these trends are not solely visible in the adolescents reporting disability/long-term illness, but also their peers. Hence, these findings may be suggestive of differing qualities of PE, OS, and SOA that, to a lesser or greater extent, are accommodating the basic psychological needs of adolescents.

Despite the occasional parental prompting and initiation, participation in OS and SOA is generally considered volitional. In contrast, PE is a compulsory school subject where the students’ participation is expected and required. This mandatory nature of PE presents a promising opportunity for the promotion of positive physical activity experiences in young (Erdvik et al., 2019). However, it may also be plausible that this obligatoriness can affect students’ perceptions of need satisfaction. For instance, the autonomy of some adolescents may be suppressed even prior to commencing PE lessons due to the lack of choice in participation. Säfvenbom, Haugen & Bulie (2014) postulate that the mandatory qualities of PE may make the context more vulnerable to psycho-psychological processes and negative peer interactions compared to OS. As such, the mandatory nature of PE may, in fact, serve as a double-edged sword. In addition, PE represents the first encounters with physical activity engagement for many children, and associations between PE experiences and future physical activity participation have been observed (Hashim, Grove & Whipp, 2008; Kjenniksen, Fjørtoft & Wold, 2009). As a result, fostering environments that are need-supportive and facilitative of positive activity experiences seems particularly relevant within this context, and the current findings of suboptimal need fulfillment in PE are thus a cause for concern.

The possible influence of differing volitional qualities between contexts may also be observed by assessing the longitudinal data and the way in which group differences changes over time. As previously mentioned, group differences in PE were significant and stable across the three-year time span. This may be due to the obligatoriness enforcing adolescents to sustain participation, even though they may experience unsatisfactory basic need fulfillment. Contrarily, findings yielded no significant
differences between groups in SOA over time, a context whereof participation generally is voluntary. In the context of OS, differences between groups were significant during the first wave of data collection while gradually becoming nonsignificant during the course of the study. Simultaneously, descriptive data shows a sizable reduction in the number of respondents within the OS variables from T1 to T3 (See table 4).

As OS participation is volitional, one can thus hypothesize that students who did not experience adequate need fulfillment in OS chose to withdraw from participation. This is not implausible as associations between need fulfillment, sport participation, and drop out have previously been acknowledged (Hagger & Chatzisarantis, 2007; Calvo et al., 2010; Quested et al., 2013). Interestingly, looking at descriptive data also indicate a slight increase in mean scores in OS among adolescents with disability from T1 to T3. This may suggest that adolescents with disabilities who chose to continue their sport participation may also be the ones who perceived the OS context as more need-accommodating. Group differences within this context might have diminished over time accordingly, which could potentially have been attributable to the non-compulsory nature of OS and the students’ volition to discontinue participation if basic needs were left unsatisfied. However, it should be duly noted that detecting within-group changes over time was outside the scope of the present study, and appropriate statistical analyses of change has not been conducted. Although merely observations, these tendencies nonetheless initiate a possibly fruitful line of thought that may be further explored in future empirical work.

In addition to differences in the volitional or compulsory nature of the activity context, there may be other differing qualities of PE, OS, and SOA relevant to the varying degree of group differences found in the present study. The organizational practices of PE in Norway may still be dominated by hegemonic discourses that are not compatible with the idea of an inclusive PE environment (Svendby, 2013). It has been argued that by maintaining practices overly focused on traditional sports, competition, and health (Svendby, 2013; Säffvenbom et al., 2014), PE reproduces values of performance, body-perfection, and normality. PE thus becomes an arena in which certain abilities, skills, bodies, and functional qualities are favoured, whereas others are at the risk of being marginalized. Within such narrow normality perceptions and practices, there may not be
enough room for the functional diversity that individuals with disabilities bring into the PE setting. Ultimately, the participation of these individuals may be diminished (Svendby, 2013).

Comparably, the OS context has also been the subject of criticism due to dominating discourses that may facilitate marginalizing practices. Elnan (2010) states that there are social mechanisms within OS that affect the level of inclusion or exclusion experienced by individuals with disability while participating in the sporting domain. Such mechanisms include socially constructed ideals as well as attitudes amongst other athletes, coaches, and in society at large. According to Apelmo (2013), OS represents an institution in which ideals of masculinity, strength, and bodily ableness are praised. Similarly, Schell & Rodriguez (2001) points to OS as a “nondisabled domain” where ableist stereotypes prevail. It is plausible that such discourses may have practical consequences for the practices in OS, the lived experiences of participation, and the degree to which basic needs are perceived satisfied. As such, individuals with disability may also be at the risk of marginalization and unfavorable experiences in OS, as their functional qualities fall short of the insinuated dominant normality ideals. This may in part be observed in the present study findings, whereof adolescents with disability reported lower mean scores in perceived need satisfaction, although differences were only significant at T1 and partly at T2. However, as previously addressed, OS participation withdrawal due to non-satisfactory need fulfillment might be a possible reason for group differences turning nonsignificant over time.

Further, it has been suggested that a discrepancy between governmental ideals of inclusion of individuals with disabilities and actual practices exists, both in the context of OS (Elnan, 2010) and in PE (Svendby, 2013). In the late 1990s to early 2000s, Norwegian sport underwent an extensive reorganizational process in which disability sport was to be integrated into, and provided through, mainstream sport organizations. The overall aim was to enhanced inclusion, belonging, and participation amongst people with disabilities (Sørensen & Kahrs, 2006). “Sport for all” has gradually become a central aspect in Norwegian sport policy, but an incongruity between policy and adolescents’ perceptions of local sport club seems to be present (Säfvenbom, Gledhof &
Haugen, 2013). Similarly, in a report concerning disability sport in Norway, Elnan (2010) states that despite governmental intentions of sport for all, the question remains as to whether these intentions are adequately enforced in the organizational practices of sport.

This may also appear to be the case in PE. After the introduction of the Salamanca Statement (UNESCO, 1994), schools were committed to provide inclusive education for all individuals, regardless of differences or level of impairments. Despite that this ideal of inclusive schooling also encompasses the PE classroom, Svendby’s (2013) findings accentuate a troubling discrepancy similar to the one observed in OS (Säfvenbom et al., 2013; Elnan, 2010). She states that PE is constructed in a way that facilitates “a gap between the rhetoric of inclusive schooling and what is actually taking place in PE lessons” (Svendby, 2013, p. -vi-).

Another contextual quality that should be mentioned concerns the varying degree of external leadership in the different activity context. A key characteristic of both PE and OS is that activities are organized, led, and supervised by other individuals. In PE, this is primarily a PE teacher, whereas a coach usually organizes sporting practices. The way in which these individuals lead activities and are able to develop prosperous interpersonal relationships with their students or athletes is considered crucial for the experiences and participation of young with disability (Svendby, 2013; Orr et al., 2018; Wilhelmsen, 2019).

There is, however, reason to believe that competencies for providing optimal adaptations accommodating functional and bodily diversity may be inadequate amongst some coaches and teachers. PE teachers have previously reported lack of disability knowledge and competence in teaching adaptations and feelings of being unprepared for the successful inclusion of individuals with disabilities in PE (Block & Obrusnikova, 2007; Tant & Watelain, 2016). This also becomes clear through adolescents’ own experiences of inadequate adaptation and feelings of being the source of the problem when participation becomes restricted (Svendby, 2013). Comparable perceptions have been reported in OS, wherein sports personnel have identified lack of confidence, training, and skills to include young with disability as barriers to participation and inclusion (Shields & Synnot, 2014).
Contrary to PE and OS, SOA is conducted without the presence of external control and supervision from a coach, teacher, or leader (Haugen, 2015). This also implies that this context may be less prone to the different ways activity leaders, through their attitudes, structural organization of activities, and interpersonal relationships may shape the experiences and participation of adolescents with disabilities. Although contextual and environmental aspects still act as facilitators or barriers to participation in SOA as postulated within fPRC (Imms et al., 2017), it may be likely that this is more related to other dimensions of the physical and social environment than that created by a coach or a teacher. Interestingly, it has even been suggested that the lack of formal leaders and structure is part of what makes SOA more appealing to some adolescents (Säfvenbom et al., 2018). It is thus possible that the absence of formal leadership might have influenced the current findings, in which group differences in perceived need fulfillment in SOA were nonsignificant.

One may also argue that SOA is a context where adolescents initiate and choose activities more exclusively on their own terms. Comparably, although OS is predominantly volitional, some adolescents may experience parental prompting and persuasion for OS participation, and PE is a set part of the school curriculum with specific knowledge requirements. This may also imply that participation within these contexts might, at times, be based on more external or introjected forms of behavioural regulation, as postulated in SDT motivational continuum (Ryan & Deci, 2017). For instance, participation might be due to compliance, external reinforcements, or for avoiding or gaining the disapproval or approval of significant others. In contrast, as the word implies, SOA is self-organized, allowing adolescents to choose the specific activities engaged in more freely. Thus, it is also plausible that adolescents with disabilities partaking in SOA choose to engage in activities they perceive as more accommodating to their personal preferences, values, basic needs, and capabilities. In turn, this may contribute to the present findings of nonsignificant differences in participation between groups in the context of SOA. However, it might be important to note that earlier research has shown that young with disabilities participate less frequently and are less involved in unstructured physical activities compared to peers without disabilities (Bedell et al., 2013). Thus, despite current findings of nonsignificant
group differences in SOA, this does not necessarily mean that SOA is an entirely unproblematic context for individuals with disabilities.

In essence, there might be different contextual qualities of PE, OS, and SOA, including all of the attributes mentioned herein, that may influence the perception of basic need satisfaction within the respective context and, in turn, the findings reported in the present study.

6.3 Facilitating need-supportive environments – a path to improved participation in physical activity?

Thus far, the current study findings have been addressed and further discussed in relation to previous research and different contextual qualities. Although participation differences between adolescents with and without disability seem to vary between contexts and across time, the findings also accentuate a possible potential for improvement of basic need satisfaction among adolescents. In this regard, the findings have practical implications whereby a focus on ameliorating basic need satisfaction among adolescents with disabilities in physical activity contexts are warranted. The next consideration thus becomes how? Specifically, which efforts can and should be made to improve basic need satisfaction, and essentially participation, among adolescents with disabilities in physical activity?

According to SDT, interpersonal contexts, and orientations from teachers, instructors, coaches, and peers are critical in facilitating or hindering need-support across physical activity contexts (Ryan & Deci, 2017). This notion has been commonly explored in the scientific literature. For instance, perceived need-support from coaches has been positively linked to the satisfaction of basic psychological needs among typically developing youth athletes (López-Walle, Balaguer, Castillo & Tristán, 2012; Isoard-Gautheur, Guilett-Descas & Lemyre, 2012; Quested et al., 2013). Contrarily, experiences of need-thwarting, and controlling coaching behaviours have been associated with need-suppression with consequent unfavourable influences on well-being and ill-being outcomes among adolescent athletes (Bartholomew, Ntoumanis, Ryan & Thørgersen-Ntoumani, 2011). Similar relations have been observed in the
context of school PE, in which the degree of perceived need-support from teacher-created social contexts have been associated with need satisfaction, and in turn self-determined motivation and adaptive participation related outcomes (Standage et al., 2005; Ntoumanis, 2005; Cox & Williams, 2008; Zhang et al., 2011; Bagoien et al., 2010; Ulstad et al., 2016).

In addition to support from coaches, teachers, and parents, peers have been identified as an important contributor to the shaping of the experiences of physical activity participation among young (Smith, 2003; Vazou, Ntoumanis & Duda, 2005; Keegan, Spray, Harwood & Lavallee, 2010). By qualitatively exploring peer motivational climate in youth sport, Vazou and colleagues (2005) demonstrated that peer relationships and interactions were relevant to adolescents’ motivation for sports participation. Further, some important dimensions of the peer motivational climate were related to the way peers could either facilitate or hinder the support of autonomy, relatedness, and the evaluation of competence (Vazou et al., 2005).

Peers have also been shown to have a key role in the physical activity experiences among adolescents with disabilities (Orr et al., 2018). Adolescents with disability experience peers as a source for both need-thwarting and need-support during their participation in physical activity. When encountering need-supportive peer interactions, individuals with disabilities expressed greater self-efficacy, activity enjoyment, desire to try new sports, and motivation for continued physical activity participation. In contrast, when encountering peer environments in which the need for autonomy, competence, and relatedness was thwarted, individuals expressed more unenjoyable activity experiences, external motivation, participation withdrawal, and reduced willingness to maintain sport participation (Orr et al., 2018).

The role of significant others in the perceived need fulfillment in physical activity contexts among adolescents is highly relevant as the degree to which basic needs are perceived satisfied has been linked to intention to participate in LTPA (Standage et al., 2003; Ntoumanis, 2001), future sport (Pelletier et al., 1995) and PE (Ntoumanis, 2005). A substantial load of fostering inclusive and need-supportive activity environments seemingly is borne on the shoulders of teachers, coaches, and instructors, and
simultaneously, they report feeling unprepared and inept of providing inclusive physical activities for youth with disabilities (Block & Obrusnikova, 2007; Tant & Watelain, 2016; Shields & Synnot, 2014). Further, as activity leaders generally report being positive towards the inclusion and participation of individuals with disabilities in mainstream activity contexts, the challenges seem to lie in adequately doing so (Rekaa, Hanisch & Ytterhus, 2019; Martin, 2018). Indeed, as discussed in this thesis, it appears to be in the activity contexts’ practical organization that adolescents with disabilities seem more prone to draw the shorter end of the straw and experience diminished participation. Evidently, increasing the knowledge and competencies of activity leaders, in a way that extends beyond promoting positive attitudes towards adolescents with disabilities as active and able beings, may be propitious.

Specifically, individuals in charge of leading physical activity may derive benefits from SDT and exploitation of basic need satisfaction in their organizational practices. They should not only be aware of the importance of adolescents with disabilities experiencing autonomy, competence, and relatedness while partaking in physical activity but also their own salient role in facilitating need-supportive environments. More importantly, efforts focusing on how to practically work with young individuals with impairments in physical activity context appear to be warranted. This includes increased knowledge on how to adapt activities and programs to individual needs and functional diversity in a way that supports the basic psychological needs, and ultimately the participation, of adolescents with disabilities in physical activity.

Coach-, teacher- and program instructor education emphasizing the provision of supportive physical activity environments for young with disabilities has also been stressed in previous research (Orr et al., 2018). However, the question seemingly remains as to how, where, and by whom this education should be provided, highlighting a matter for further exploration in later research. Essentially, improving participation in physical activity amongst adolescents with disabilities, in terms of increased basic-need satisfaction, seems highly relevant, but evidently, there is a necessity of increased research attention, both longitudinal and experimental, directed towards this matter.
6.1 Strengths and limitations

The present study is subject to both strengths and limitations that should be acknowledged. First, the initial sample size at T1 was close to 3000 students from four different Norwegian counties. Within quantitative longitudinal research, it is generally proclaimed that greater sample sizes are required to increase the chances of providing credible findings. In addition, a large sample size is also warranted to account for the inevitable attrition vulnerability associated with longitudinal designs (Cockcroft, Goldschagg & Seabi, 2019). The number of participants included in the present sample is thus to be considered a study strength. Second, the three-year duration and longitudinal study design also lend considerable strength to the findings of the study. There are several advantages associated with this type of study design, and longitudinal research is generally considered to produce scientific evidence of a higher quality (Barry, 2005). In the current study, the data analyzed is not solely derived at one cross-sectional instance, but rather a total of three data collection time points spanning across three years. Hence, this longitudinal design allows for a better exploration of possible patterns of differences in the basic psychological need variables assessed in the study.

A third strength is related to the setting in which data was collected. Participants were provided with the survey at their respective schools during regular school hours. If the survey was to be collected through i.e. local sports clubs, it is plausible that the majority of the sample would comprise students who mostly enjoy physical activity, as they were already involved in leisure-time sport. As a result, some students with more negative attitudes towards physical activity could be excluded. This is despite the fact that they too possess information highly valuable to the overall experiences of physical activity participation in adolescence. Choosing the school as the context for data collection enabled the study to: (a) reach a greater number of adolescents due to compulsory schooling, and (b) include a sample with possibly more diverse experiences of physical activity participation.

Lastly, the current study explores all three basic psychological needs postulated within SDT. This is relevant as SDT proclaims the absence of a hierarchy of needs whereof satisfaction of all basic needs is a necessity for human flourishing (Ryan & Deci, 2017). Moreover, thwarting of any of the needs within a given domain, even at the rational of
satisfying another, will elicit negative experiential and functional consequences. According to Ryan and Deci (2017) “…people cannot psychologically thrive by satisfying one need alone, any more than people can live healthily with water but not food…” (p. 92). Further, autonomy, competence, and relatedness were analyzed as separate variables in the study’s statistical procedures as opposed to analyzing a merged mean score of overall perceived need satisfaction. This allows for a greater understanding of specific dimensions of the physical activity contexts that support or undermine the basic needs of the students, lending strength to the present study.

However, despite appreciable strengths, the empirical findings presented herein are also subject to certain study limitations. As previously mentioned, while the longitudinal design represents a study strength, the design also poses considerable challenges. One of the most notable challenges in utilizing longitudinal study designs concerns missing data and attrition (Barry, 2005). Missingness in survey methodologies may be a result of item nonresponse (missingness within returned surveys) or survey nonresponse (missingness due to eligible participant withdrawal) (Buhi, Goodson & NeiIands, 2008). The latter is also commonly referred to as mortality or attrition and represents the loss of participants prior to completion of data collection due to drop out. This drop out might be attributable to cost or aversive data collection procedures, sensitive topics, change in schedule, participant relocation or refusal. Missingness and attrition might pose a detrimental consequence to both internal and external study validity, thus possibly influencing the interpretability or credibility of the findings of the study (Barry, 2005).

The present study was subject to missingness in terms of both item nonresponse and attrition across the three-year data collection period. While the total study sample comprised 2979 students at T1, the sample declined to 2827 students at T2 and comprised 2636 students at T3. Analyses revealed that the missing data was not missing at random (NMAR). According to Buhi et al. (2008), NMAR is “…the most problematic pattern of missingness” (p. 85), hence representing a possible study limitation. However, by comparing those responding at all three time points to those solely responding at one or two time points, patterns of missing data may also provide valuable information. The findings of the current study showed that completers scored
higher in all psychological needs at T1 across all physical activity contexts. Hence, adolescents with lower perceived need fulfillment at baseline were more likely to be subjects of missing data at subsequent stages of data collection. Similarly, completers compared to non-completers reported higher autonomy, competence, and relatedness in PE at T2 and T3 and in SOA at T3, in addition to higher OS relatedness at T3. These findings thus indicate patterns whereof completers were more likely to experience the physical activity contexts as need-accommodating, by reporting significantly greater perceived need fulfillment across varied context and time-points.

Due to data collection occurring during school hours, these findings may suggest that non-completers comprised a larger sample of students showing greater school absence. Previous findings have shown that compared to students without disability, students with disabilities are more likely to be chronically absent from school education (typically defined as missing more than 15 days of education, for any reason, during a school year) (Cortiella & Boundy, 2018; Kearney, 2008). Further, the school climate, referring to the degree of experienced connectedness and support at school, is acknowledged as a key contextual factor related to school attendance and drop out (Kearney, 2008). In the present sample, non-completers were more likely to report disability/long-term illness at T1 and be students of upper-secondary school. One can thus hypothesize whether less favorable school experiences are more present in students with disability and those commenced in upper secondary school, although more empirical underpinning is necessary. Essentially, findings of difference in certain characteristics and need fulfillment amongst completers and non-completers reflect the complexity in understanding both participation and the everyday lives of adolescents in general, and those with disabilities specifically. Nonetheless, comparing completers to non-completers across study variables and demographic data is, according to Barry (2005), one fundamental element that should be documented by researchers in order to minimize attrition as a source of bias interfering with accurate interpretation of findings.

Another limitation of the present study concerns the utilization of self-reported measures. In general, the use of questionnaires is associated with possibilities of biased responding, which for instance, might be due to specific ability, motivational or task factors of the particular survey and its respective respondents. Thus, the present findings
may be influenced by common method bias associated with self-report measures (Podsakoff, MacKenzie & Podsakoff, 2012). In addition, the subjective reporting of disability or long-term illness may also represent a study limitation. Specifically, students were asked to state whether or not they had disability/long-term illness and further report the type of disability or illness they experienced. The responses were diverse, and the type of disability/long-term illness varied from slight allergies to diabetes to specific musculoskeletal problems. The actual influence of these problems in the lives and physical activity experiences of the individual is however difficult to assess thoroughly. For instance, an individual reporting asthma may be greatly affected by the condition, whereas another student reporting the same condition may experience minimal influence in his or her everyday life. Previous research generally suggests that the level of impairment is associated with greater restriction in physical activity participation (Tonkin et al., 2014; McManus et al., 2008; Anaby et al., 2014; Law et al., 2004). Whether problems such as allergies greatly affect an individual during participation in physical activity may also be a matter of debate.

That said, it should be noted that the disability-specific survey question asked students to answer yes if they experienced impairment or long-term illness that made participation in certain physical activities difficult. Further, students were to answer the question at all three points of data collection. As such, although the subjectivity of disability/long-term illness may present a study limitation, it was also taken into consideration within the REPAC study design. Nonetheless, it may be plausible that the great variety of reported disability or long-term illness might influence the strength of the group differences reported in the current study. Essentially, the findings of the present study should be considered in light of the aforementioned study strengths and limitations.
7.0 Conclusion

The findings of the current study imply that differences in perceived competence, autonomy, and relatedness between adolescents reporting disability/long-term illness and adolescents not reporting so seemingly vary depending on physical activity contexts and across time. Specifically, results indicate that PE constitutes a particularly challenging context for adolescents with disabilities, where they seem to consistently experience reduced participation expressed through lower levels of need fulfillment. Adolescents with disabilities are seemingly also more prone to diminished participation, in terms of lower perceived need fulfillment, within the context of OS, although longitudinal findings are more inconclusive. In the context of SOA, however, the present study found group differences to be nonsignificant across time.

These findings may be suggestive of differing qualities in PE, OS, and SOA that, to a lesser or greater extent, are accommodating to the basic psychological needs of adolescents with disabilities. As addressed in this thesis, these qualities might be related to volition, normative discourses, adaptation competencies among coaches, teachers, and instructors and practical organization of activities within the respective contexts. Further, the study accentuates a potential need for improving basic psychological need satisfaction, and essentially participation, amongst individuals with disabilities in physical activity contexts such as PE and OS. Coaches, PE teachers, and instructors seem pertinent to the level of need fulfillment experienced by adolescents with disabilities in physical activity contexts. Consequently, increased knowledge and practical competencies amongst these individuals may be a propitious means to the facilitation of need-supportive environments. However, more emphasis placed on how to effectively facilitate physical activity environments accommodating basic psychological needs, regardless of abilities and level of functioning, might be warranted in future empirical work.

Ultimately, optimizing participation in physical activity amongst adolescents with disabilities is not only valuable in terms of social, mental, and somatic health. It is also an overarching ethical matter of protecting individuals with disabilities’ rights to meaningful participation in society at large, and in physical activity specifically.
8.0 References


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Appendices
Appendix 1: Independent sample t-test

Table 1: T-tests assessing perceived need fulfillment in PE, OS and SOA in relation to completers/non-completers, across three time points

<table>
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<th>Context</th>
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<th>T</th>
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<td>886</td>
<td>5.62 (1.33)</td>
<td>( t(1398) = -1.618 )</td>
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*Note.* BPN= Basic Psychological Need; \( n \)= number of respondents; \( M \)= Mean; SD= Standard deviation; Sig= \( p \) value; \( d \)= Cohens's \( d \) effect size.
Appendix 2: Formal approval from The Norwegian Centre for Research Data

Reidar Säfvenbom
Seksjon for kroppssøving og pedagogikk Norges idrettshøgskole
Postboks 4042, Ullevål stadion
0806 OSLO

Vår dato: 11.03.2014                         Vår ref: 37624 / 3 / LT                         Deres dato:                          Deres ref:

TILBAKEMELDING PÅ MELDING OM BEHANDLING AV PERSONOPPLYSNINGER

Vi viser til melding om behandling av personopplysninger, mottatt 12.02.2014. Meldingen gjelder prosjekten:

37624 The RElevance of Physical Activity Contexts in the every-day life of adolescents (REPAC)

Behandlingsansvarlig Norges idrettshøgskole, ved institusjonens øverste leder

Daglig ansvarlig Reidar Säfvenbom

Personvernombudet har vurdert prosjekten, og finner at behandlingen av personopplysninger vil være regulert av § 7-27 i personopplysningsforskriften. Personvernombudet tilråder at prosjektet gjennomføres.

Personvernombudets tilrådning forutsetter at prosjektet gjennomføres i tråd med opplysningene gitt i meldeskjemaet, korrespondanse med ombudet, ombudets kommentarer samt personopplysningsloven og helseregisterloven med forskrifter. Behandlingen av personopplysninger kan settes i gang.


Vennlig hilsen

Katrine Utaker Segadal

Lis Tenold

Kontaktperson: Lis Tenold tlf: 55 58 33 77

Vedlegg: Prosjektvurdering
Formålet er med prosjektet er å samle kunnskap om ungdommers utvikling gjennom ungdomstiden (ungdomsskole og videregående skole) og hvordan kroppsvingsfaget, organisert idrett og selvorganisert fysisk aktivitet påvirker denne utviklingen.

Utvalget informeres skriftlig og muntlig om prosjektet og samtykker til deltakelse. Informasjonsskrivene mottatt 06.03.2014 finner personvernombudet tilfredsstillende. For ungdomsskoleelevene innhentes det skriftlig samtykke fra foresatte, videregående elever samtykker til egen deltakelse.

Det behandles sensitive personopplysninger om etnisk bakgrunn eller politisk/filosofisk/religios oppfatning.

Personvernombudet legger til grunn at forsker etterfølger Norges idrettshøgskole sine interne rutiner for datasikkerhet. Dersom personopplysninger skal lagres på mobile enheter, bør opplysningene krypteres tilstrekkelig.


Prosjektet gjennomføres i samarbeid med Universitetet i Agder og Høgskolen i Østfold. Norges idrettshøgskole er behandlingsansvarlig institusjon. Personvernombudet forutsetter at ansvaret for behandlingen av personopplysninger er avklart mellom institusjonene. Vi anbefaler at det inngås en avtale som omfatter ansvarsfordeling, ansvarsstruktur, hvem som initierer prosjektet, bruk av data og eventuelt eierskap.

Det er mulig dersom det blir gitt finansiering at ungdomsskoleelevene kontaktet for oppfølgningsundersøkelse inn i videregående. Dersom slik en aktuelt må det sendes inn endringskjema i god tid før kontakt med elevene og datainnsamlingen tar til.