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Adapted Physical Education for Autistic Adolescents

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THESIS
ABSTRACT

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This thesis studies the physical development and education of 12-17-year-old adolescents with autism spectrum disorder and examines the adapted physical program at Väinölä School. The school is focused on special education for children and adolescents with a variety of mental and physical disorders, and provides individual education and other specific services for autistic adolescents. However, no adapted physical education program specifically for autistic adolescents is currently utilized in the school.

The main purpose of this thesis is to identify the main deficits in gross motor skills of the autistic individuals at Väinölä School. This thesis aims to determine how to choose proper physical adapted education exercises for autistic adolescents, and to determine if these exercises can improve their motor skills. Also, this thesis introduces an adapted physical education program for the autistic adolescents at Väinölä School.

The research data were gathered qualitatively from each participant. First, the participants were observed for 5 months on a weekly basis to surveys their physical activity and capabilities. After the observation period, the physical activity level and capabilities of each participant were evaluated using a specific physical activity tests. Participants were tested for 5 different gross motor and balance related skills. The physical activity program was made based on the evaluated results from the tests. The final physical activity program included various physical activity exercises for a 6-month period according to participants' individual physical activity level.

In this study, autistic adolescents were shown to have most severe problems with balance and coordination related skills. This research highlights the problems of gross motor skill development among autistic adolescents. It was found that at least 5 important gross motor and stability skills, such as: forward and backward walking, balance, coordination and crawling, can be improved by the use of modified APE program, made specifically for the different physical activity levels of the participants.

In conclusion, the autistic adolescents at Väinölä School have incificient motor skills. It was also noted, that differences in physical activity do not translate as they are into the level of motor skills. Also, an adapted physical education program can be devised in a way that it is suitable for participants with variable skill levels.

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PREFACE

I would like to thank all the staff members and students of Väinölä School who participated in research and especially Riikka Huotari, the working life supervisor. Without their help, inspiration and good vibes after each observing session it would have been impossible for me to complete this thesis. Also, I would like to express my deep gratitude to the KUAS staff and my supervisor Kari Partanen for providing great help throughout the research.

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CONTENTS

1 INTRODUCTION

Autism spectrum disorder affected roughly 2% among children 6-17-year-old in 2011–2012, and its prevalence has increased nearly by 100% from 2007, when only 1.17% of the children with the same age were affected (Blumberg et al. 2013). The prevalence of autism has increased dramatically from the 1980s, partially due to increased diagnostic capabilities (Blumberg et al. 2013; Newschaffer et al. 2007).

Autism is a neurodevelopmental disorder (Myers & Johnson 2007; Geschwind 2008) associated with impaired social skills, lacking communication skills, and repetitive and restrictive behaviour (Haney 2002; The Individuals with Disabilities Education Act [IDEA], 1999). Symptoms start to develop around 6 moths age steadily without remission (International Statistical Classification of Diseases and Related Health Problems [ICD-10], 2007), and are typically established at the age of 2–3 years (Roger & Sally 2009). Parents usually notice the first signs of autistic behaviour during the first two years of their child's life (Myers & Johnson 2007). The symptoms associated with autism spectrum disorder, such as continuous and repetitive engagement in odd activities, unusual responses to social and physical situations and difficulties dealing with environmental change can impair children's educational performance and make it challenging for them to relate to their peers.

Children with autism spectrum disorder have difficulties perceiving bodily boundaries (Shearer, Kohler, Bunchan & McCullough 1996) resulting in motor deficiencies (Berkeley, Zittel, Pitney & Nichols 2001). This results in the inability to participate in sports and other physical exercise thus denying the autistic children the opportunity to develop ordinary motor skills (Berkeley et al. 2001). In their study, Berkeley et al. (2001) confirmed delays in the motor development of autistic children and also concluded that motor skill reinforcement is critical even for the children at the high-functioning end of autism disorder.

Early intervention using physical and occupational therapy has been demonstrated to be effective in improving both gross and fine motor skills (Filipek et al. 2000). A well-designed adapted physical education (APE) program ensures the best possible opportunities to develop and practise of these crucial skills (FIlipek et al. 2000).

Improving the availability and quality of APE offered for children with special needs could greatly improve their abilities to interact with their peers and relieve their challenges regarding motor skills. Also, the variation within the individual skills and limitations within any given APE group limits the applicability of any one program. This poses a great challenge for APE educators of autistic adolescents, as the individual need for APE vary greatly.

This thesis studies autism spectrum disorder among 12-17-year-old adolescences and develops an adapted physical program for Väinölä School. The purpose of this thesis was to construct an adapted physical education program taking into account the individual skills and limitations of autistic adolescents. The aim of this thesis was to develop an APE program suitable for participants with various skill levels and developmental stages. The physical activity program constructed for Väinölä School which consentrated on providing special education for children with mental and physical disorders.

Väinölä School provides a variety of different forms of education and other special services, and educates kids with various developmental disorders from different age groups. Teachers instructing the classes are specialized in working with children and adolescents with special needs. Each physical activity class includes children with various motor skills and different disorders, and is thus constructed to be suitable for all participants. This thesis helps the teachers of Väinölä School to provide adapted physical activity classes especially for autistic adolescents, and to assess students' individual challenges and motor skills that need development most.

The research data were gathered by the qualitative research method. The physical activity program included various physical activity lessons for adolescents with autism spectrum disorder for a 6-month period according to their physical activity level. A series of observing sessions were held for the participants to acquire a comprehensive understanding on their individual motor skills. After the observing period, every participant passed a physical activity test. The data from the tests were collected and evaluated, and a physical education program was made based on the results. This program included adapted exercises to evaluate and develop especially locomotor and stability skills.

Väinölä School commissioned this thesis because of their interest in developing their students' physical activity level. This research and final data results provided new information for the staff members of the school. Moreover, they got new knowledge about the development of the locomotor and stability skills of their autistic students. The author's personal aims were to better understand the nature of autism spectrum disorder, and especially children and adolescents affected by it. Special attention was given for difficulties related to locomotor and stability skills. The thesis supports the author's professional development, as the author is planning to work with people affected by autism disorder. This thesis also greatly benefits Väinölä School, as it can apply the results and the developed APE program to its physical education curriculum. Kajaani University of Applied Sciences (KUAS) benefited from novel collaboration with Väinölä School provided both KUAS and Väinölä School with excellent competences to utilize each other's expertise and practical experience regarding physical education. Also, the research data form the collaboration can be used for educational purposes at the KUAS.

2 AUTISM DISORDER

Autism means a whole spectrum of disorders with neurological origins (Myers & Johnson 2007; Geschwind 2008). Autism disorder affect people in multiple ways with symptoms raging from mild to severe (Wolfberg 1999, 22). Most typical symptoms associated with autism disorder include hindered social and communicational skills, as well and repetitive and restrictive behaviour (Haney 2002; IDEA, 1999). Thus, people with autism disorder have impaired skills related to reciprocal social interactions, and suffer from inflexible behaviour and limited imagination (Wolfberg 1999, 22).

Autism is considered to be a behavioural syndrome and developmental disability rather than a disease (Gerdtz & Bregman 1990, 14). Autism can be seen as a behavioural syndrome as people with autism often engage in clusters of repetitive behaviour which separates them from non-autistic people (Haney 2002; IDEA, 1999; Gerdtz & Bregman 1990, 14). The behavioural models associated with autism can be separated into four broad categories (adapted from Cohen, Paul & Volkmar 1987, 30):

1) Difficulties with social relationships

2) Severe deficits in language

3) Severe deficits in communication

4) Other associated features

The prevalence of autism disorder was 2% among children from 6–17 years old in 2011–2012, while in 2007 only 1.17% of the children with the same age were affected by the disorder (Blumberg et al. 2013). The prevalence of autism disorder has increased dramatically from 1980s, partially due to increased diagnostic capabilities, making it difficult to estimate how much the actual prevalence of the disorder has increased (Blumberg et al. 2013; Newschaffer et al. 2007; Sewell 1998, 6). There are roughly two to four times more males than females suffering from autism disorder (Wolfberg 1999, 16).

Mental retardation is strongly associated with autism disorder as evaluated by standardized intelligence tests (Wolfberg 1999, 16). Autism is frequently accompanied by mental retardation based on standardized intelligence tests, with approximately 60% having scores of be-

low 50, 20% having scores between 50 and 70), and 20% with scores greater than 70 (Aarons & Gittens 1992, 22; Wolfberg 1999, 16). Despite their higher level of intellectual capabilities, the 20% with IQ scores over 70 still almost certainly encounters difficulties and require additional support from parents, teachers and peers when compared with people not affected by autism (Aarons & Gittens 1992, 22).

Although most people with autism disorder suffer from intellectually retardation, small numbers of autistic individuals are not intellectually impaired in the usual sense (Aarons & Gittens 1992, 22). Thus autism should not be described simply as being mentally handicap, as this is not true for all people with autism disorder (Aarons & Gittens 1992, 22).

There are many similarities between autism and mental retardation; however they are not the same condition (Gerdtz & Bregman 1990, 27). Similar to autism, mental retardation is both a behavioural syndrome and a developmental disability, and over 70% of autistic people are also mentally retarded (Gerdtz & Bregman 1990, 27).

Also, autism may be associated with other conditions, such as obsessive-compulsive disorder or Tourette's syndrome (Wolfberg 1999, 16). Also seizure-related conditions could be associated to autism disorder (Wolfberg 1999, 16).

Since children even normally have lower levers of intelligence when compared with adults, a small percentage of autistic children have relatively high, sometimes even normal, intelligence for their age group. The most severally autistic children are generally the most severally mentally handicapped, whereas autistic children with close to normal intelligence suffer mainly from impaired verbal skills (Aarons & Gittens 1992, 22).

2.1 History of Autism

Kanner described the condition called autism for the first time in 1943 (reviewed by Aarons & Gittens 1992, 8). The condition was described by enlisting a set of features common in children with the disorder. Kanner did not invent the term "autistic", but was the first one to use the term in its current meaning; previously the term had been used to describe withdrawal into imaginary world by schizophrenia patients (Aarons & Gittens 1992, 8). Kanner had also concluded the disorder would have affected mostly children from higher socio-

economical classes and children of well-educated parents, which is later shown to be false conclusion, most likely due to observational bias (Aarons & Gittens 1992, 8).

When describing the autism disorder, Kanner highlighted nine key points, which are still relevant in diagnosing the disorder (reviewed by Aarons & Gittens T 1992, 9):

1) An inability to develop relationships
2) A delayed acquisition of language
3) Non-communicative use of spoken language
4) Delayed echolalia (repetition of words and phrases, which is very common for autistic children)
5) Pronominal reversal
6) Repetitive play
7) Maintenance of sameness
8) Good rote memory
9) Normal physical appearance

Later Kanner suggested that these nine points could be reduced to only two essential ones (reviewed by Aarons & Gittents 1992, 9):

1) Maintenance of sameness in repetitive routines
2) Extreme aloneness that onsets within the first two years of life

This was considered confusing, as only the children with the most classic forms of autism fit these two criteria, when in fact there were many more children with different difficulties (reviewed by Aarons & Gittens 1992, 9).

Already in 1970s, based on thousands of case histories from autistic children, researches were aware that there were two major groups of children with autism (Furneaux & Roberts 1977, 23):

1) Those who show normal behaviour, except having an unusually good or normal ability in limited area (but not speech)

2) Those with normal development up to two years, and then development of autistic behaviour

Regarding the second group (group 2) however, there has always been much debate about whether autistic children ever demonstrate normal communication or other abilities even before the age of two, as children's normal abilities wide that it's often times difficult to assess if any particular behaviour can be considered normal (Furneaux & Roberts 1977, 23). Thus many autistic traits before the age of two might just be mixed with normal childlike behaviour.

2.2 Types

Currently two different classifications are used to diagnose autism disorder. The International Classification of Diseases (ICD-10) by World Health Organization (1987) and the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) by American Psychiatric Association (1994) are both commonly used. The DSM-IV criteria for autism disorder can be found in the Appendices. While both classifications have same essential criteria for autism disorder, they often use different terminology (Wolfberg 1999, 16). The DSM-IV separates autism disorder into many subtypes under pervasive developmental disorders, including autistic disorder, Rett's disorder, childhood disintegrative disorder, Asperger's Disorder and otherwise not-specified pervasive developmental disorder (Wolfberg 1999, 16).

All of these conditions appear within the first years of life, and are associated with severely impaired development of normal social interactions, limited verbal and nonverbal communication, limited imaginative abilities and restricted and repetitive behaviour (Wolfberg 1999, 16). Also stereotypical behavioural patterns, interests and activities are typically present in different form of autism (Wolfberg 1999, 16). All of the aforementioned traits must be present for the diagnosis of any autistic disorder (e.g. classic Kanner's autism) (Wolfberg 1999, 16).

As the brain abnormalities underlying autism cause first symptoms early in life, autism can be distinguished from other psychiatric disorders that might induce similar symptoms, such as schizophrenia, where the symptoms typically emerge later in life (Wolfberg 1999, 16).

However, distinguishing autism from other pervasive developmental disorders can be more difficult, but can be done in numerous ways (Wolfberg 1999, 17). Rett's disorder has only been diagnosed in females, and it's characterized by diminished head growth, as well as loss of purposeful hand skills and poor coordination (Wolfberg 1999, 17). Children with childhood disintegrative disorder develop first normal communication skills and social relationships as opposed to autistic children, but regress afterwards (Wolfberg 1999, 17). Individuals with Asperger's syndrome have fairly normal language development and intelligence, however they suffer from problems with social interaction and stereotypical behaviour (Wolfberg 1999, 17).

A psychiatrist or specialized and licensed psychologist formally diagnoses autism disorder. The diagnosis is based on both direct observations of the patient and interviews with the parents and other family members (Gerdtz & Bregman 1990, 19). Given the nature of the autism disorder, a detailed life and family histories ought to be an important part of the diagnosing process (Gerdtz & Bregman 1990, 19). DSM provides a systematic method for diagnosis of autism disorder, and most professionals rely on this while diagnosing autism disorders (Gerdtz & Bregman 1990, 19).

National Society for Autistic Children (NSAC) has provided a nine-point list to help diagnosticians with the diagnosis of autism disorder (Furneaux & Roberts 1977, 24). The NSAC list contains more detailed information when compared with the original list revised by Kanner in 1943, making the diagnosis a more streamlined process (Furneaux & Roberts 1977, 23). The list provided the NSAC is as follows (Furneaux & Roberts 1977, 23):

1) Gross and sustained impairment of emotional relationships with people

2) Self-examination

3) Pre-occupation with particular objects, or certain characteristics of them, without regard to their accepted functions, persisting long after the baby stage

4) Behaviour leading to suspicious of abnormalities of the special senses in the absence of any obvious physical cause

5) Sustained resistance to change in the environment, and a striving to maintain order or sameness

6) Abnormalities of moods

7) Speech disturbances

8) Disturbances of movements and general activity

9) A background of serious retardation in which islets of normal, near normal, or exceptional intellectual function or skill may appear

There are however many confounding factors with the NSACs list, such as the fact that they do not specify how many criteria need to be covered for the diagnosis (Furneaux & Roberts 1977, 23). The list also does not consider the age at which the features become prominent, even thought this has been proposed to be a major diagnostic factor (Furneaux & Roberts 1977, 23). Also one important limitation within the list is the fact, that it only contains positive abnormalities, whereas also the negative symptoms (what the autistic children no not do) are important for accurate diagnosis (Furneaux & Roberts 1977, 25).

There are many more standardized scales and instruments in addition to the aforementioned ones. Most notably, these include Childhood Autism Rating Scale (CARS) and Autism Screening Instrument for Educational Planning (ASIEP). Both CARS and ASIEP are used when differentiating autism from other handicapping conditions and while setting goals and objectives for autistic people (Teal & Wiebe 1986).

Referring to the aforementioned lists by NSAC and Kanner, to be diagnosed with autism a child must have difficulties interacting with others, impaired communication skills and they must demonstrate restricted interests. In principle the diagnosis is easy, but since no biological or chromosomal test for autism exists, even though most agree that the disease has a neurological origins (Myers & Johnson 2007; Geschwind 2008), there is always a bias in the diagnosis based on the individual diagnostician (Koegel & LaZebnik 2004, 2). Practically the diagnosis based on the observation of the three symptoms, and the expression of them can vary based on the individual (Koegel & LaZebnik 2004, 2). Hence, the diagnosis of the autism disorder is far from a simple process, and sometimes even skilled and experienced professionals do not agree on the definite diagnosis (Sugiyama & Abe 1989). Often times there

is a larger team of professionals is consulted before a conclusive diagnosis can be achieved (Gerdtz & Bregman 1990, 20).

The prevalence of autism has increased considerably during the recent years, at least partially due to the increased diagnostic capabilities (Blumberg et al. 2013; Newschaffer et al. 2007; Sewell 1998, 6). Recent advancements in knowledge base regarding the autism have made psychiatrists, neurologists, medical doctors and other professionals much more aware of the diagnostic process, and the incidence of incorrect diagnoses has notably decreased (Sewell 1998, 6). The increased diagnostic accuracy has also led earlier onset on the treatment, as well as helped the people formerly diagnosed just as mentally retarded or handicapped to receive proper diagnoses (Sewell 1998, 6).

2.3 Reasons for Autism

The exact ethology of autism is unknown, but already since Kanner's time, many different theories have been suggested (Aarons & Gittens 1992, 17). For example, it has been suggested by Tinbergen & Tinbergen in 1972 that autism is caused by somehow inadequate bonding between the mother and the child (reviewed by Aarons & Gittens 1992, 17). This theory placed the blame for the autism partially on parents, and it was suggested that with intensive psychotherapy the child could "break through the autistic barrier" and that this way autism could be cured (reviewed by Aarons & Gittens 1992, 26). However, no data exist supporting the theory that parents would cause autism, and since the prevalence of autism is similar across all cultures, geographical areas and socio-economical groups, links to social or environmental factors are unlikely (Aarons & Gittens 1992, 17).

Autism is more common in boys than in girls; there are roughly 2–4 times more autistic boys than girls (Wolfberg 1999, 16; Aarons & Gittens 1992, 19). The higher prevalence of autism in males, taken together with the association to severe mental retardation suggests that the causes of autism are not psychogenic (Aarons & Gittens 1992, 19). It has been shown, that relatives of autistic people not only stand a higher change of being autistic themselves, but also have a higher probability minor cognitive disabilities, such as speech disorders and learning difficulties (Aarons & Gittens 1992, 19). This would seem to suggest at that there is at least some genetic component to the condition.

The current consensus among researchers is that autism is the result of an injury or dysfunction of the central nervous system (Gerdtz & Bregman 1990, 27; Myers & Johnson 2007; Geschwind, 2008). This injury could result from a wide variety of different factors including the following (Gerdtz & Bregman 1990, 27):

- Prenatal events (e.g. toxaemia)
- Perinatal events (e.g. trauma, anorexia)
- Congenital factors (e.g. microcephaly)
- Chromosomal factors (e.g. XYY syndrome)
- Metabolic factors (e.g. Addison's disease)
- Other factors (e.g. meningitis, encephalitis)

Despite there being vast body of evidence for autism being caused by central nervous system injury, the exact mechanisms on how to injury leads to autistic behaviour are still unknown (Gerdtz & Bregman 1990, 27).

Autism is also associated with epilepsy, although sometimes the onset of epilepsy takes place at adolescence whereas autism is diagnosed at an early age (Aarons & Gittens 1992, 20). Also, the severity of the autism seems to correlate with epilepsy, as more severely handicapped autistic children suffer on average more often from epilepsy (Aarons & Gittens 1992, 20). This association between autism and epilepsy further supports the theory of the organic basis for autism (Aarons & Gittens 1992, 20).

The specific areas of the brain affected by autism have been studied extensively, but no conclusive evidence for any single damaged area as the cause of autism has been found (Aarons & Gittens 1992, 20). Thus, it is much more likely that autism is caused by multiple coexisting neurological deficits (Aarons & Gittens 1992, 20).

Also endocrine reasons for autism have been studied, and around one third of autistic children show high levels of serotonin in their bloodstream (Aarons & Gittens 1992, 20). However, pharmacological reduction of serum serotonin levels by the use of fenfluramine has not proven to be effective in treatment of autism (Aarons & Gittens 1992, 20).

Taking all the evidence for different possible aetiologies of autism into account, the current consensus is that for autism to develop, there needs to be genetic predisposition to the brain damage, with many other heterogeneous factors coexisting within every autistic patient (Aarons & Gittens 1992, 20).

2.4 Treatment

No curative treatment for autism exists, however almost all children with autism disorder improve considerably with appropriate interventions (Koegel & LaZebnik 2004, 11). There has been, and there still is, continuous progress made in the treatment of autism (Koegel & LaZebnik 2004, 11). Even though no "cure" for autism exists, it has been shown that with adequate education for their need, some autistic individuals are able to life relatively independent lives (Furneaux & Roberts 1977, 192).

The early diagnosis is the cornerstone of a successful treatment. In general, the treatment does not aim to cure autism itself, but rather help the autistic children to function better Myers & Johnson 2007). There is vast variety within the symptoms between different autistic children, and thus treatment needs to be tailored to everyone's individual needs (Myers & Johnson 2007). In general, the best results are achieved by using a highly structured and specialized treatment programs, which aim to improve communicational, social and behavioural skills (Myers & Johnson 2007). Also, in most cases, a combination of multiple treatment modalities is beneficial (Myers & Johnson 2007). Also, it is not realistic to expect that complex condition such as autism could be cures or treated using a single method (Aarons & Gittens 1992, 85).

Following treatments for autism are recommended by U.S.A National Institutes of Health (NIH) (National Institute of Mental Health [NIMH] 2011):

1) Behavioural Management therapy
2) Cognitive behaviour therapy
3) Early intervention
4) Educational and school-based therapies
5) Joint attention therapy

6) Medication treatment
7) Nutritional therapy
8) Occupational therapy
9) Parent-medicated therapy
10) Physical therapy
11) Social skills training
12) Speech-language therapy

Behavioural Management therapy

Several different methods for modifying the autistic behaviour have been used. Most methods are based on rewarding the desired behaviour, leading into this behaviour being more likely repeated than ignored behaviour. This method is in general called applied behaviour analysis (ABA). Behaviour modification focuses on skills where the individual needs most development. Skill-oriented and structured activities are oftentimes included. ABA requires intense training and requires extensive therapist and parent involvement.

Sensory integration therapy is a specific form of behaviour management therapy that aims to help autistic people to respond normally to sensory stimulation. Treatment includes exposing the autistic children to different forms of sensory stimulation by giving them objects different textures or making them listen to different sounds.

Play therapy is used to improve emotional development of autistic children, as social interactions of autistic people are often times limited by their impaired emotional development. In play therapy, the child controls an adult-child interaction.

In addition to play therapy, social stories are often used to improve social skills. The purpose of the stories is to help autistic children to understand the viewpoints and feelings of other people, and to make them alternate responses in different situations. They also help autistic children to understand their own feelings in different scenarios.

Communication Therapy

Autistic children who are having problems with either verbal or non-verbal communication are often times treated using so called communication therapy, whereas speech therapy is used to help autistic children to gain the ability to speak. For these purposes, picture exchange communication systems are used. In this form of therapy the individuals are able to communicate simply using only pictures, which can represent activities, items, ideas, requests, need, etc.

Dietary Modifications

There is no proof of autism being caused by the diet, and the use of dietary modification as a therapy is controversial. Food intolerances or allergies might contribute to some behavioural problems with certain autistic individuals, in which case changes in diet could help individuals with digestion and eliminate food intolerances.

Elevated levels of gluten and casein have been reported in autistic individuals, suggesting that incomplete digestion or excessive absorptions of these substances might be associated with autism disorder. It has also been reported that vitamin supplements (A, B, C and D) might improve behaviour and reduce depression in autistic people.

Autism Prognosis

The prognosis varies between different autistic people. Autistic people have normal life expectancies, and with good treatment autistic individuals are able to function productively and have decent level of independence. However, some autistic people require lifelong assistance (Stanley & Swierzewskii 2000).

Occupational therapy

In occupational therapy, basic skills (such as buttoning a shirt) are taught for the autistic children (Stanley & Swierzewskii 2000).

Physical therapy

In physical therapy exercise and other physical activities are used to help autistic individuals to attain better level of control over their own bodies (Stanley & Swierzewskii 2000).

Medication

No specific medication for autism disorder exists, but a many psychotropic drugs have been demonstrated to have clinical benefits. However, the research is relatively limited, and only few carefully conducted trials demonstrating the efficacy and potential side effects have been conducted. Thus, it is difficult to predict the subgroups of patients that would benefit from medical therapy (Gerdtz & Bregman 1990, 123).

Autistic individual experience many forms of behavioural and emotional disturbances. This might predispose them for other psychiatric disorders, which might in turn require medical therapy. In treatment of these individual, medical therapy is an integral part of the overall treatment (Gerdtz & Bregman 1990, 123). Neuroleptics, lithium, opioid antagonists, beta-blockers and stimulants are often used based on the symptoms (Gerdtz & Bregman 1990, 117).

In addition to psychotropic drug, also psychotherapy has been tested in treatment of autism (Aarons & Gittens 1992, 88). This has resulted in some cases from not acknowledging autism, but assuming that children's' problems were of emotional origins (Aarons & Gittens 1992, 88).

3 ADOLESCENTS WITH AUTISM DISORDER

Adolescence is the most difficult, complicated and stressful period of physical and psychological growth and development for both teenagers and families (Gerdtz & Bregman 1990, 88; Furneaux & Roberts 1977, 121). Autistic adolescents are dubious, frustrated and facing difficulties based on their educational and communal development, which is making the influence for their future adult life and social development (Furneaux & Roberts 1977, 121; Gerdtz & Bregman 1990, 88).

Based on the physical and psychological development, challenges can be categorized into 3 separate sections (Gerdtz & Bregman 1990, 89):

1) Physical growth and development

2) Need for independence

3) Being part of the group

Issues faced by the autistic adolescents in physical growth and development cannot be separated to medical problems and communal complications (Gerdtz & Bregman 1990, 95). As J.Gerdtz and J. Bregman stated in their book "Autism: a practical guide for those who help others": "If the teenager with autism is severely disabled, his or her physical development will soon outpace cognitive and emotional development" (1990, 95). The medical problems and social challenges of the autistic adolescents are deeply intertwined.

Autistic adolescents mostly ignore the use of speech for communicating with people and it is rare that they commonly use reciprocal interactions, gestures or body movements (Rosenberg, Wilson, Maheady & Sindelar 1997, 86).

3.1 Emotional and Psychological Development of Autistic Adolescents

Complicated behaviour can cause difficulties in eating and sleeping during the childhood period, and as autistic kids are growing old they get accustomed to those habits, but many other difficulties tend to continue (Furneaux & Roberts 1977, 132). For instance hyper-

activity, aggression, destructiveness, temper tantrums, negativism, ritualistic and obsessional behaviour characterize autistic behaviour even at older age (Furneaux & Roberts 1977, 132). When autistic children grow older, difficulties in upbringing can appear as hyper-activity, explosive outburst and erratic behaviour, thus the need of containment of special teaching and social programs is increasing (Furneaux & Roberts 1977, 132-133).

However, some of the behavioural abnormalities which are inherent in autism disorder, such as obsessional and ritualistic behaviour, or self-mutilation (e.g. head banging, biting hands and arms, throwing themselves on the floor) can be transferred into positive flow with additional control and elimination of other behavioural distortions (Furneaux & Roberts 1977, 133). Under those circumstances, if the additional and constant strict control will be provided, adolescents with autism disorder can develop their own sense of individuality and self-responsibility, as well as become more emotionally stable and mature (Furneaux & Roberts 1977, 133).

As previously stated, the adolescents with autism disorder can improve their outburst and impermanent behaviour by having the additional control from the community over a long period of time (Furneaux & Roberts 1977, 134). Nonetheless, supplementary training is needed in order to develop proper responses in social situations (e.g. proper behaviour at public places, in transport, other people's homes, the proper selection of clothing to wear according to the weather and occasion) and to organise own leisure time activities (Furneaux & Roberts 1977, 134).

In addition, at least 50% of adolescents with autism disorder have impaired capabilities for emphatic speech, and impairments of more sever in girls than in boys (reviewed by Rosenberg et al. 1997, 85). By the same token, autistic children can show peculiar features if they are establishing good speaking abilities, with echolalia being the most frequently observed abnormality (Rosenberg et al. 1997, 86). Teenagers with autism are rarely using the speech as their main communicational tool, and some of the normal retaliatory connections working as they are supposed to, but issues with understanding the spoken language can appear (Rosenberg et al. 1997, 86).

3.2 Physical Growth and Motor Development in Adolescence

Nowadays, the period of adolescence is starting at the age of 10 and lasting as far as the person reaches the age of 20 or above, the prolongation of which was caused by biological and cultural effects (Gallahue & Ozmun 1995, 367). Change from childhood to adolescence is characterized by meaningful physical and cultural events, which causes the progress of motor development, especially to males in various motor skills (Gallahue & Ozmun 1995, 367; Gabbard 2012, 330). By way of example, the period of adolescence can occur some biological changes, which can be recognised by the appearance of the growth spurt, the onset of puberty, and sexual maturation (Gallahue & Ozmun 1995, 367).

The increases in person's height and weight, its' starting age, duration and intensity of the growth development are individual features of the adolescents, with vast case-by-base variation (Gallahue & Ozmun 1995, 367). Moreover, the gender difference is also playing a very important role in physical development. Gallahue and Ozmun made in their book the following statement: "The adolescent growth spurt lasts four years, beginning in females about two years earlier than in males" (1995, 369). For instance, for boys the average age of the beginning of the growth burst is 11 years and it lasts up to the age of 13, and uniformly decreasing by reaching the 15 years old period (reviewed by Gallahue & Ozmun 1995, 368; Gabbard 2012, 93). For girls, the average age of the burst of height growth is from 9 to 13 (reviewed by Gallahue & Ozmun 1995, 368).

Regarding the growth development, males are growing at least for 2 years longer than females. For instance, males are reaching their mature adult heights when they are at the age of 18, and females are noted to achieve their maximum heights at the age of 16 (reviewed by Gallahue & Ozmun 1995, 369). As a consequence of the varying growth development in adolescence, the development of fundamental movement skills also varies, which is common for the general motor development of children (Gallahue & Ozmun 1995, 225). Fundamental movement skills involve 4 patterns such as body management, locomotor and object control skills and form the basis for more advanced and specific movement activities (Education Department of Western Australia [EDWA], 2013, 15; Gabbard 2012, 283). In order to control the appropriate development of the fundamental movement skills, the environment and factors such as circumstances within the environment, enthusiasm and objectives of the tasks must be taken into account (Gallahue & Ozmun 1995, 280). To summarize

the preceding information, Gallahue and Ozmun stated in their book: "Motor development is progressive change in motor behaviour throughout the life cycle, brought about by interaction among the requirements of the task, the biology of the individual, and the conditions of the environment" (1989, 3).

Subsequently, the effect of opportunities for practicing, qualified instructions and community encouragement provided for teenagers, can play a very important and significant role in the development of the specialized movement skills (Gallahue & Ozmun 1995, 386). Adolescents are making an effort towards improving and matching personal mature movement patterns during the transition phase (Gallahue & Ozmun 1995, 389). Therefore the awareness of the physical abilities and limitations, which is eventually supporting the interest only in limited sport activities, is appearing during the application stage of adolescence (Gallahue & Ozmun 1995, 389). As a result, the final stage in supporting autistic adolescents in sports is to decrease the amount of overall sport activities, and focusing on the specialized activities proper for them (Gallahue & Ozmun 1995, 390). As a final point, physical education and sports are the factors, which have enormous impact on motor skill development and modification throughout the childhood and adolescence periods (Gabbard 2012, 341).

3.3 Physical Growth and Motor Development of Adolescents with Autism

Nowadays, it is known that people with Rett's disorder and Childhood Disintegrative (CDD) disorder are suffering from a shortage of physical and motor abilities, and also that people with Asperger syndrome are facing difficulties by being clumsy (reviewed by Winnick 2011, 201). However the research on autistic people and their physical and motor skills remains unconvincing (reviewed by Winnick 2011, 201). In contrast, the early research made by Rimbland in 1964 concluded that children with autism disorder are having the motor development and movement skill patterns developing in a similar way to normal children (reviewed by Winnick 2011, 201). Lately, Sigman and Capps in 1997 specified the fact that autistic kids differ in the physical characteristics from kids with Asperger Syndrome by the fact that their physical development and motor coordination are greatly developed, moreover the maintenance of advanced physical skills can be reached and evaluated in adolescence (reviewed by Winnick 2011, 201).

To understand motor development of autistic individuals, in 2002 Reid and Collier summarized their findings by stating that autism disorder is mostly associated with delay of the movement skills and clumsiness (reviewed by Winnick 2011, 201). Based on the controversial examples provided by Reid and Collier in their study, autistic people can be in decent physical condition and agile, but the research should be continued in order to get conclusive results (reviewed by Winnick 2011, 201). Moreover, it was also shown in the results of the study that autistic people are having a lack of motivation and intelligence to complete several motor tests to evaluate their physical activity level (reviewed by Winnick 2011, 201). Also, Levinson and Reid in 1993 suggested that by reducing stress, self-stimulatory and destructive behaviour, people with autism disorder could improve their physical activity (reviewed by Winnick 2011, 201).

All gross motor skills are developing opportunistically, for instance systematic development of locomotor skills can be divided at least into 13 milestones such as rolling, crawling (e.g. stomach touches ground), creeping (e.g. one hand on object), cruising (e.g. one hand on object), walking, jumping, running, hopping, climbing, sliding, galloping, dodging, and skipping (Jansma & French 1994, 55). The statement by Jansma and French highlights important key points in development of motor milestones: "For a stage of development to be fully set for the emergence of developmental voluntary motor milestones, a youngster needs to inhibit all primitive reflexes, differentiate mass random bodily movements, process incoming stimuli, and possess at least minimum fitness (strength, heart-lung endurance and flexibility) to respond motorically to environmental demands voluntarily" (1994, 56).

Specific motor skills, such as manual control (i.e. writing), manual dexterity (i.e. coordination), ball skill, walk, balance, body coordination, strength and agility, paxis, imitation, postural stability and speed are commonly impaired in adolescents with autism disorder (Song 2013).

Autistic adolescents, who are limited in their gross motor activities on the regular basis are more unsocial with peers, and face problems with interacting and taking part in socially age-appropriate activities (Stanley Jones & Associates [SJA] 2012). Moreover, those skills should not be limited in order to avoid additional difficulties with gross motor skills development (SJA 2012). Adolescents with autism are having a lack of self-understanding and their relation to the environment (Reynolds & Dombeck 2006). For instance, they cannot understand

the definite placement of their bodies and its' location in relation to their actual surroundings (Reynolds & Dombeck 2006).

Coordination and motor skills are also affected because of abnormal or late vestibular responses, which causes issues with ability of body to coordinate (Song 2013). This is because subjective awareness of the body position and movement in space are allowed by the vestibular system, which plays an important role in the combination of the sensory processes (Song 2013).

Adolescents with autism disorder are stated to have poor upper-limb coordination while completing visuomotor or manual dexterity tasks, as well as poor lower-limb coordination (Song 2013). As Sewell established in her book "Breakthroughs: how to reach students with autism", "Many have good-to-superior fine and gross motor skills, but some walk with a peculiar gait, or 'toe-walk'. Some walk with arms hanging down by their side instead of reciprocal swinging when the opposite foot is put forward. Some have what seems to be a "willed" limpness in their fingers and hands" (1998, 241).

4 ADAPTED PHYSICAL EDUCATION

Adapted physical education (APE) is a special educational method for developing, implementing and observing already existing physical education programs, which are modified to learners with disabilities. The purpose of the APE is to provide these individuals with needed skills to experience and enjoy physical activities and sports safely (Jansma & French 1994, 4). The main focus of the APE is the development of knowledge and skills in psychomotor areas such as physical, motor, fitness and play elements, which can be applied into supplementary activities at school or in some post school psychomotor practices (Jansma & French 1994, 2).

Adapted physical education and related sports programs which are modified for the individuals with disabilities have been proven to help individuals who involved to accomplish certain goals and make improvement, which would have been otherwise thought to be impossible (Winnick 2011, 3).

4.1 Definition and Nature of APE

The term APE was introduced in 1952 by the American Association for Health, Physical Education, and Recreation (AAHPERD), while being published with the guidelines as a recommended subject at schools for students with disabilities in order to safely and effectively participate in vigorous and standard physical education programs (Sherrill 2004). Based on the AAHPERD, APE is customized and multilateral program of physical activities, games, sports, and rhythms, based on the interests, abilities, and limitations of participants with disabilities who may not safely and effectively be interested and involved into vigorous activities of the standard physical education program (West Chester University Of Pennsylvania [WCUP] 2011).

Justified practice of APE is based on the fact that each student has the ability and motivation to move, to be active, and be involved into physical activities with the peers (Connecticut State Department of Education [CSDE] n.d.). Moreover, all students with disabilities should be involved into qualified physical education program with modified lessons and the equipment, that supervise their individual needs and offers them the opportunity to benefit

and access their potential physical activity level (CSDE n.d.; WCUP 2011). Thus, well-educated and qualified specialists provide APE to the participants who have necessity for it and cannot participate in standard physical education program (CSDE n.d.).

Under those circumstances, adapted physical activity can be described by the delivering the services such as pedagogy, instructing, rehabilitation or therapy conducted by professionals in order to evaluate and develop physical activity level of individuals of all age groups with limitations (Sherrill 2004, 3).

4.2 APE for Autistic Adolescents: Ethics and Reliability

Based on the Education Act implemented in 1981 with the emphasis on providing for individuals with disabilities special assistance by educating autistic children based on their level of functioning, not based on the diagnosis (Aarons & Gittens 1992, 72). The term "autistic" includes a broad range of disabilities and behaviour, involving many or few features of autism, and the specific diagnosis does not necessarily reflect the individual's level of physical capabilities (Aarons & Gittens 1992, 72).

Notably, autistic individuals who are less affected and not demonstrating behaviour abnormalities are able to participate in mainstream education (Aarons & Gittens 1992, 74). However, the overall number of autistic individuals who are able to access mainstream education is very limited, because the majority of individuals suffer from mental retardation (Aarons & Gittens 1992, 75).

Regardless of the fact that the special education raises ethical issues, the ethics of special education is not receiving close enough attention (Howe & Miramontes 1992, 1). Moreover, the field of ethical assessment is not adequately addressed during teacher education (Howe & Miramontes 1992, 1).

Based on the Council for Exceptional Children (CEC) Code of Ethics, Howe and Miramontes declared the following principles in their book "The Ethics of Special Education" (1992, 119):

1) Special education professionals are committed to developing the highest educational and quality of life potential of exceptional individuals

2) Special education professionals promote and maintain a high level of competence and integrity in practicing their profession

3) Special education professionals engage in professional activities, which benefit exceptional individuals, their families, other colleagues, students, or research subjects

4) Special education professionals exercise objective professional judgment in the practice of their profession

5) Special education professionals strive to advance their knowledge and skills regarding the education of exceptional individuals

6) Special education professionals work within the standards and policies of their profession

7) Special education professionals seek to uphold and improve where necessary the laws, regulations, and policies governing the delivery of special education and related services and the practice of their profession

8) Special education professionals do not condone or participate in unethical or illegal acts, nor violate professional standards adopted by the Delegate Assembly of CEC

4.3 Teaching APE for Autistic Adolescents

Individuals with emotional disorders require physical education programs, which focusing on development of physical and motor fitness, and offered in directed, structured and safe environment (Jansma & French 1994, 177). Moreover, students who are emotionally disordered are having the deficits in fundamental motor skills (Jansma & French 1994, 179). Thus the activities, which are enhancing spatial orientation, body image, locomotion, coordination, balance and rhythm must be provided constantly (Jansma & French 1994, 179).

Adolescents should regularly do the exercises for improving the coordination, balance and motor skills with use of the safe equipment and objects, in order to develop the confidence in individual work and improve their essential movement patterns (Jansma & French 1994, 179). For the effectiveness of physical education, it must be planned in advance in organized and controlled environment (Jansma & French 1994, 179). Since it was proven that students

with ASD could demonstrate abnormal behavioural responses when new tasks are presented in a random or unpredictable manner (Winnick 2011, 206).

During the participation in the individual, dual or group activities can provide benefits in psychomotor development as well as modifications in unadapted behaviour (Jansma & French 1994, 179). Especially the progressive and consistent introduction of the new activities is necessary in working with students who are emotionally disordered (Jansma & French 1994, 184).

As Jansma and French stated in their book called "Special Physical Education. Physical activity, Sports, and Recreation" the following considerations must be taken into account to provide the essential physical education (1994, 185-186):

- Play therapy
- Movement education
- Coping with fear
- Grouping pupils
- Choosing teams
- Modifying rules
- Precise signals
- Controlled aggression
- Individualizing instruction

While providing APE for autistic adolescent, the difficulty of tasks can be selected based on the individual gross motor skills of the participants, thus enabling both skilled and unskilled participants to benefit from the education (Jansma & French 1994, 184). Also, as the skill level of the participants develops as a result from proper APE, the education remains challenging as the difficulty level can be increased (Jansma & French 1994, 184). Taking the participants age, needs and interests into account can positively affect the outcome of APE (Winnick 2011, 205).

4.4 Different Approaches to Providing APE for Autistic Adolescents

Nowadays exist a wide range of different approaches for conducting physical education for adolescents with ASD (Winnick 2011, 201). The continuation and extension of the researches in this field is relevant in order to provide the most relevant approaches to help autistic individuals (Winnick 2011, 201). Based on the research made by Furneaux and Roberts in 1977, the following list of different approaches can be used in teaching individuals with ASD (1997, 144 -151):

- The psychodynamic approach, which views autism as a condition with emotional origin
- Behaviour modification, which is based on rewarding or punishment wanted and unwanted behaviour
- Environmental approaches, which used structured environments to provide autistic individuals with a stable learning environment

5 RESEARCH TASKS

This thesis addresses the topic of physical activity development among adolescents with autism spectrum disorder and adapted physical education provided for them. Also, this thesis studies and describes the most common problems in physical development among 12-17-year-old participants at Väinölä School. The aims of the study were to evaluate the physical activity level of the autistic adolescents who took part in gym classes at Väinölä School, and to determine their most severe deficiencies in their motor skills. In addition, the study aimed to determine if the gross motor skills of the autistic adolescents could be improved by using adapted physical education, and to develop an adapted physical program for the autistic adolescents.

The research tasks were:

1) What are the physical capabilities and limitations of autistic adolescents at Väinölä School, and which tests could be used as relevant measures of their physical progress?

2) How to choose proper physical activity tasks suitable for the students with different activity levels?

3) Can adapted physical education be used to improve the gross motor skills of the autistic adolescents?

6 RESEARCH METHOD

This chapter provides an overview of the research process and methods used. Moreover it describes the commissioner of the study and demonstrating the information on the participants and instruments of the study.

6.1 Commissioner of the Thesis

The commission organization for the thesis is Väinölä School, which is located in Kajaani, Finland. The school is focused on providing special education for children and adolescents with different mental and physical disorders, for whom they provide different education and other services. The school enrols students with different disorders and ages. Teachers instructing the classes at Väinölä School are educated professionals in the field of providing special education. During physical activity classes close attention is paid to planning the instructions before classes, since all the physical exercises must be suitable for all participants with different physical activity levels and disorders. Väinölä School has commissioned this thesis because they are interested in developing their students' physical activity level, and acquiring new adapted physical education program.

6.2 Qualitative Research Method

Qualitative research is done by participant observation or case studies, from which a narrative and descriptive account of the studied subject is acquired (reviewed by Guest, Namey & Mitchell 2013, 2). The typical approach for qualitative research is first to collect comprehensive amounts of information by analysing and observing the studied social circumstances and people involved in these circumstances (Gribich 1999, 80; Berg 2001, 6).

As qualitative research involves gathering large amounts of information from different individuals, specific ethical issues arise. Decisions such as, how much any given phenomena will be investigated are integral for qualitative research process, especially when research subjects are notably susceptible, e.g. children (Gribich 1999, 80). Because if this, a critical literature

review and theoretical standpoints are required before choosing the methods for data collection and analysis (Gribich 1999, 80).

Qualitative research is defined by open-ended and inductive questioning, as well as by open-ended observation (Guest et al. 2013, 6). Participant observation is a commonly used technique in qualitative research. It involves researcher to observe subjects' behaviour, actions and interactions in a proper environment, and leads into collection of very individual data (Guest et al. 2013, 6).

Participant observation method can be used to study many kinds of groups – complete institutions (e.g., hospitals, schools), partial institutions (e.g., a classroom or a department), or single individuals (Gribich 1999, 124). One advantage of participant observation technique is that it grants the researcher with access to the actual environment where the studied processes are taking place (Gribich 1999, 124).

In addition to the participant observation technique, phenomenology approach to the qualitative research can also be applied. It is more focused on human experiences, understanding, and opinions, rather than just plain observation of subjects' actions (Guest et al. 2013, 8). Participant observation technique and phenomenology approach are by no mean mutually exclusive, but instead support one another, and can often times be used to give the researcher better understanding of the studied subject (Gribich 1999, 122-123).

6.3 Choosing the Proper Research Methods

The first aim of the thesis was to evaluate the gross-motor skills of the autistic adolescents. For this purpose, the observation method was chosen, as thorough observation of the participants over a long period of time seemed like the most reliable way to acquire detailed and yet comprehensive understanding of the participants' motor skills. Simple motor skill testing and numerical analysis of the results to determine their gross-motor development would not have been applicable, since there were only 3 participants. Thus, in this instance, the qualitative observation approach was the most proper one. In addition, the data from the observation sessions was not only used to analyse participants' motor skill level, but also to choose the proper exercises for the APE program and for the testing of the participants' motor skill

level. The data from the pre- and post-testings' were analysed by simply comparing the results to determine, if the APE had potentially affected the participants' gross-motor skills.

6.4 Participants

The main foci of the thesis were to identify the most severe deficits in the motor skills of the autistic adolescents and to determine wheatear they could be improved by using APE. Three male participants from Väinölä School were been observed, evaluated and tested. The age of the participants varies from 12 years old to 17 years old (12, 16 and 17).

The criteria for the selection of the participants were based on the diagnosis (DSM-IV) and amount of the participants in Väinölä School, who were taking part in the physical activity classes.

6.5 Instruments

Special measuring scale was used to evaluate participants' skills and physical activity level during physical activity testing. All participants were first observed, after which their physical activity level was tested before and after one-month training period. Before the pre and post-testing, all participants were been observed on a weekly basis for 5 months. After the 5-month observation period, the most difficult and weak points regarding the participants' gross-motor skills were identified. The testing protocol and exercises were designed to specifically measure the gross motor skills where participants showed the weakest points during the observation period.

6.5.1 The Testing Protocol

The testing form with tasks and instructions included 5 different gross motor skills: walking, backward walking, balance, coordination, and crawling. The challenge level of the tasks was increased during the whole process. The testing protocol remained the same during both testing's.

The testing tasks were chosen based on the results from the observation sessions. Only tasks related to skills with which the participants had demonstrated to have problems with were chosen. Traditional tests of motor skills are difficult to execute while assessing autistic individuals, since some of the tasks might be too challenging or complicated for them to perform or understand. Thus, the testing tasks for the program were chosen by the author based on the observation sessions in a way, that the tasks would pose enough challenge for the participants, but would not bee overly complex.

In the first task of the testing session, participants were asked to complete the walking forward task. The trial included forward walking at the own self-determined pace by the participants, followed by same exercise while simultaneously performing a cognitive task of naming objects, which were shown with pictures. The distance required to walk was 10 meters. The second task was otherwise identical to the first, but with the participants walking backwards while performing a cognitive task.

The third task included a balance exercise, where the participants were asked to stand motionless with one leg with their eyes closed while maintaining balance (participants were allowed to choose the leading leg) for 10 seconds. The fourth task included both balance and coordination components. Participants were asked to step in and out of box placed in the ground. A time limit of 30 seconds was applied. A successful completion of the task was measured by the amount of repetitions as well as by overall performance, evaluated e.g. by rhythm and proper technique. Participants could try twice to complete the task; first they would do a warming up where they were allowed to practice the movement and after that, the actual testing.

During the final exercise crawling skills were tested. Participants were asked to complete two crawling trials through the five meters long tunnel. The first trial was completed at participants' own self-selected pace as a warming-up, after which it was measured, how many times the participants could crawl through the tunnel in 30 seconds.

During the whole testing period, assistance was allowed if the participants were not capable to complete or understand the tasks without additional help.

6.5.2 The Testing Scale

The special measuring scale included four different options to choose from, in order to non-judgmentally evaluate each task performed by the participant. The answer possibilities were the following: 0-unable; 1-needs major help; 2-needs minor help; 3-independent. At the end of the pre and post-testing testing each participant had his own amount of points and feed-back comments as well.

Grade	Explanation
0	Participant was not able to complete the task
1	Participant was able to complete the task with major assistance
2	Participant was able to complete the task with minor assistance
3	Participant was able to complete the task independently without help

Table 1. Grading criteria

Autistic adolescents have various challenges regarding their motor skills, making the exact numerical evaluation of their skills difficult. Merely recording the number of repetitions, or other relevant measures, would not give representative and realistic image of participants' actual capabilities. The used scale form 0 to 3 gives a much more relevant understanding of the participants' actual capability to function when it comes to tasks involving gross-motor skills.

Also, the feedback from the staff members, regarding the overall performance was recorded. The maximum number of points, which participants could get after completing the testing was 15. Moreover, in all tasks the amount of the repetitions was recorded where it was counted.

The testing tasks and instructions as well as the measuring scale were translated into Finnish in order to make the pre and post-testing process easier for the staff members and the participants. The translation was done by the author and approved by the Väinölä School and the KUAS. Thus, the translation of the pre and post-testing tasks and measuring scale has should not decreased the reliability of the study.

6.6 Data Collection and Procedures

The observing period started in the middle of November 2014 and lasted until the end of March 2015, and the participants were observed on the weekly basis. All gym sessions provided by Väinölä School were been recoded, and the feedback for each participant was given based on their physical activity, behaviour and participation level. Data collection and analysis progressed concurrently, starting with actual observation sessions. After gathering enough data and theoretical background throughout the observing period, pre-testing date was set to the end of March 2015.

The staff members of the Väinölä School conducted both the pre and post-testing. The pre-testing was conducted at the end of March 2015 and the post-testing at the end of April 2015. All testing materials with tasks and special measuring scale were provided in both English and Finnish 1 week before the tests. Between the pre and post-testing, based on the results of the pre-testing, the initial version of the APE program was announced to the staff members of Väinölä School. The program was tested once in the beginning of April 2015. After the successful trial of the initial version, the final date for the post-testing period was set at the end of April 2015. The testing protocol and scale remained the same for both testing periods. After the pre and post-testing sessions, and successful trial of the initial version of the program, the final adapted physical activity program was made. The program is based on the data gathered throughout the whole period from the middle of November 2014 till the end of April 2015, and was provided for the Väinölä School at the end of April 2015.

The contact with Väinölä School was kept using email. The testing tasks, measuring scale, as well as the initial and final versions of the program were provided by the email. The emails included the enclosed documents, timetables and the instructions for the upcoming events.

The anonymity of the participants was guaranteed, and all data from the observing sessions and testing was collected without using names, but the participants were referred to as Participants 1 to 3.

6.7 Data Analysis

In this thesis, quasi-statistical and qualitative content analyses are used to analyse the data collected using participant observation and testing. In quasi-statistical analysis the enumerative approach is dominating, and it is defined by the production of "objective" explanations of the content of oral, visual or written texts (Gribich 1999, 223). In this thesis, the participants' physical activity was evaluated using a numerical scale in order to acquire more objective estimate on their actual performance. Qualitative content analysis is also enumerative as the quasi-statistical analysis and it is including the following consecutive stages: development of the codes, application of the developed codes, and emphasis on aspects such as "why" and "how" of the background interpretation (Gribich 1999, 225).

Quasi-statistical analysis was used to analyse the data gathered from the observing sessions. All written material gathered throughout the observing sessions was analysed. The specific weak points for every participant were identified based on the notes made during the observation sessions.

Testing protocol was designed to evaluate especially the gross motor skills with which the participants would require the most development, as evaluated during the observation sessions. Then qualitative content analysis was used to analyse the actual testing results, as well as participants' progress between the pre- and post-testing periods.

All numerical data were analysed using Microsoft Office Excel software. Firstly the author analysed the numerical data manually, and then the numerical data were interpreted into the charts using Excel software.

7 RESULTS

This chapter describes the results of the study. The results obtained from the observing sessions are presented first, followed by results from testing and the additional findings of the study are presented as well.

7.1 Observing Period

Throughout the 5-month observing period, all 3 participants were been observed while performing and completing the gym exercises provided by Väinölä School. The participants were taking part into same lessons with other children, and the size of the whole group was 11.

During the whole observation process, the structure of the lessons was the same. Every gym lesson was started by warming-up and ended with cooling-down sessions. The actual main part of the gym sessions changed for every lesson. The main purpose of the gym lessons was to develop different gross motor skills while keeping the participants motivated, interested and involved in the process. Keeping the warm-up and cool-down periods unchanged was beneficial, as it helped the participants to better memorize the exercises to do.

The objective of the observation sessions was to determine the most severely impaired motor skills of the participants. Special attention was given on how the participants would cope with balance and coordination related exercises. Also throughout the observation period, increasing focus was given for the motor skills that seemed to be the most challenging.

Between each observing sessions, there were notable differences regarding the content of the lessons, as well as individual performance of the participants. Five different observing sessions are presented here as representative examples, and are precisely described. The observation sessions greatly affected the research and the outcome of the thesis – the adapted physical education program.

Observing session 1

During this observing session, all the participants were been observed for the first time and the weakest points were been recorder immediately. This proved to be helpful later during the observing period, and helped to guide the observation towards relevant skills. During this session, the Participants 1 and 2 demonstrated the significant capabilities in gross motor skills during the warming up session; they possessed good abilities with completing the tasks, which required walking, running and skipping. Participant 3 was able to try to complete the same tasks, but required help from the staff members of the school. As for the backwards walking, all of the Participants were not being able to complete it and were unconfident in their movements. Balance skills were been presented on the high level of the Participants 1 and 2, whereas the Participant 3 was anxious while he was doing the exercise on practicing the balance on the gym ball. During the cognitive exercises to test understanding, remembering, seeing and attending, association, reaction and logic all the Participants showed a wide range of skills. For Participant 2, the tasks requiring reaction, understating, seeing and attending were very easy to accomplish, and he was able to understand, memorise and repeat all the required tasks afterwards. Participants 1 and 3 showed roughly the same level of capabilities in the same section, however the lack of enthusiasm was clearly seen, and understanding of the tasks, seeing and attending was been hard to accomplish. Participants 1 and 3 were not being able to choose different options, and reaction was slow through the tasks.

Observing session 2

During this observing sessions it was clearly seen that the participants already memorized roughly the all the exercises, which they were asked to do every time as a warming-up session. The obstacle course was the main theme of this gym session. Participants were asked to do different exercises in order to practice their gross motor skills, such as jumping, rolling on the mattresses, crawling through a tunnel, climbing up with the use of a rope, jumping with the jumping rope, balance with the balance board, and walking on the bench. All of the exercises were first been shown to the participants by the staff members in order to help them memorize the order and proper technique for the exercises. Participant 1 was not being able to complete successfully the jumping with the jumping rope. He was also facing difficulties with the crawling through tunnel exercise. All in all, it was really hard for the Participant 1 to memorize the actual direction and order of all of the movements. He was also disoriented throughout the whole lesson. Participants 2 demonstrated very good abilities

with the jumping rope task, balance exercise, and side jumps. He was not facing such difficulties with memorizing the order of the tasks as the Participant 1. Participant 3 was trying to complete all exercises with help of the staff members, who were guiding him throughout the obstacle track. However, he was not able to complete some exercises despite the help of the staff. Based on the participants' results at the obstacle track it would seem that participants with autism disorder are having difficulties with memorizing the various exercises, especially when they must be completed in a specific order.

Observing session 3

Participant 3 showed very good skills by successfully completing all the various options of the exercises, which required balancing on the gym ball, completing movements for the upper body, and cognitive tasks. During the observing session, all 3 Participants showed very good stretching skills and movements related to stretching, e.g. side stretching, upper and lower body stretching, and back arching. In addition to good stretching abilities, all the Participants showed very good capabilities to work as a part of a larger group.

Observing session 4

During this observing session, Participants 1 and 3 were able to complete the balance exercises, where they would sit on the gym ball while performing simple gross motor tasks, such as clapping hands. Both participants were been able to create different variations of the gross motor tasks for the rest of the group to complete. However, the Participant 3 was still not being able to complete all tasks without the help provided by the staff members.

Observing session 5

During this observing session, the gym class was conducted in different environment than normally, and all participants were able to cope with the changes. The structure of the lesson was the same during the warming up and cooling down sessions, and the participants were not showing sings of feeling frustrated or disoriented.

7.2 Choosing Proper Physical Activity Tasks for Autistic Adolescents

The main purpose of the APE for autistic adolescents is to improve those motor skills with the most severe deficits. Based on the data that were collected during the observation sessions the weakest points of the participants regarding their gross motor skills were been identified. During the observation period, the participants seemed to have most difficulties with balance and coordination related motor activities, and thus mainly physical activity tasks related to those skills were chosen. Also, during the observation session the participants had problems with all tasks without repetitive components to them, or with tasks without clear instructions. Thus, all the chosen physical activity tasks had to contain repetitive elements, and had to be easy to instruct. All the selected activity tasks also had to offer challenge for people with both very low motor skills and fairly well developed motor skills, since the target group for the final APE program would have participants with varying level of motor skills.

7.3 Pre-Testing

In order to evaluate participants' gross motor skills, pre and post-testing protocols were designed. Specific testing protocols were described previously in chapter 6.4. All tasks provided for the participants were based on their abilities and were been placed in logical order through the testing program. Before the actual testing, the content of the tasks were been discussed with the staff member of Väinölä School and agreed upon. The testing template provided for the school can be found in the Appendices.

During the pre-testing, Participant 1 gained a total of 10 points out of 15. For the first two exercises, forward and backward walking while performing a cognitive task, he gained 4 points all together (2 points for forward and 2 points for backward walking). During each trial he named 3 images from the cards. During the third exercise, Participant 1 was not being able to keep the balance without assistance while performing the one leg stance, and thus he gained 2 points. However, Participant 1 showed a very good result in the stepping and coordination task, where during the 30 seconds time he was able to complete 11 steps inside and outside of the box. For this task he received the maximum amount of 3 points. Also, for the crawling exercise participant got 1 point, during the 30 seconds time he was able to complete only 2 trials with assistance.

Participant 2 gained a total of 12 points out of 15 during the pre-testing period. First two tasks were performed perfectly, resulting in 6 points from the tasks. For the balance exercise with 1 leg stance and for the coordination and stepping exercise he received 2 points both. During the stepping exercise, Participant 2 was able to perform the stepping in and outside the box for 8 times. As for the crawling exercise through the tunnel, Participant 2 was able to complete 2 trials through the tunnel during the 30 seconds period of time, and he received 2 points.

Participant 3 received a total of 6 points out of 15. For the first and second exercises he gained 4 points altogether (2 points from forward and 2 points from backward walking) and named he was able to name 2 pictures for both trials. For the balance exercise he received 0 points since he was not being able to perform the task, not even with the assistance of the staff members. During the exercise number four, Participant 3 received 1 point, as he was able to perform 2 times the stepping in and out of the box with assistance. For the last exercise he received 1 point, as during the 30 second period, he was able to crawl only once through the tunnel.

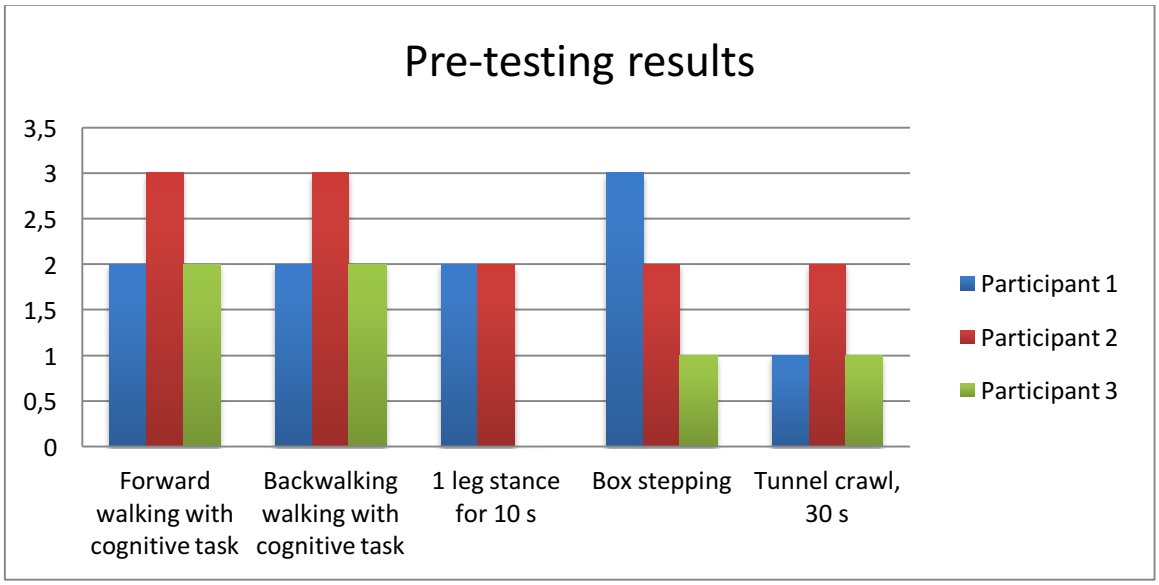

Figure 1. The summary of pre-testing results

7.4 Adapted Physical Education Program for the Participants

After completing the observing sessions and pre-testing, the collected data were analysed. Based on this, an APE program was constructed. The lesson plan template provided by the

KUAS was used in order to write the lesson plan for the Väinölä School. An example of the lesson plan template can be found in the Appendices.

The main objectives of the lesson plan were to introduce and familiarize the participants and Väinölä School staff with the APE program. In the beginning, main goal was to instruct proper technique and understanding for the participants.

The lessons were divided into 3 main parts: warm-up session, main part, and cool-down. During the warm-up session, the participants were doing the same exercises with music as they used to do throughout their ordinary weekly gym sessions in Väinölä School. The warm-up and cool-down sections were performed in a similar fashion as during normal gym classes at Väinölä School.

After the warm-up, the participants were asked to do 3 different parts of the actual training session. The first part included introduction to the topic of balance, and participants were having 3 trials (lasting 5, 10, and 15 seconds) in order to complete the balance task by standing motionless with their eyes closed.

The second part was so called familiarization part. It was divided into 2 different sections, where during the first part, the participants would perform forward walking on a straight line. The length of the line was 10 meters and there was an increasing amount of balance obstacles was placed on the line. The starting amount of the balance obstacles was 5 and the final amount was 10. There were multiple opportunities for the participants to practice each skill. The amount of obstacles remained the same if the participant was not being able to complete the first trial successfully with the 5 balance obstacles on the line.

The second part of the familiarization section was partially similar to the first one, except for some modifications. Participants were being asked to perform the exercise while being shown pictures, and they were asked to name as many of the pictures as they could, while simultaneously continuing the exercise.

The third and the final section of the main part of the lesson was the most challenging one. The third part was having only 1 task, which was called "balance on a balance board"; where there were 2 different options were provided for the participants in order to help them to be familiar with the equipment. They could balance on the board either by themselves or with the help of the staff members (staff members would hold their hand from the front).

After receiving the feedback from the staff members of Väinölä School about the initial version of the adapted physical education program, it was agreed that the content and the layout of the actual program would stay the same. An example of the lesson plan provided for the Väinölä School as a part of the initial program can be found in the Appendices.

7.5 Post-Testing

After the participants and the staff at the Väinölä School were familiarized with the APE program, the date for the post-testing was decided. The purpose of the post-testing was to evaluate, if the APE program affected the gross-motor skills of the participants. The content of the tasks and the measuring scale were kept the same as during the pre-testing. The content of the testing was described previously in chapter 6.4. An example of the testing form and an evaluation scale can be found in Appendices.

During the post-testing, Participant 1 gained a total of 11 points out of 15. For the first two exercises: forward and backward walking while performing a cognitive task, he gained 4 points all together (2 points from forward and 2 points from backward walking). Participant was able to name 3 images from the cards shown to him during the forward walking and 4 images during the backward walking trials. As for the third exercise, Participant 1 was not being able to keep the balance during one leg stance, but was able to manage with minor assistance by the staff members and thus received 2 points. During the exercise number 4, Participant 1 showed very good coordination abilities, as during the 30 seconds time he was able to complete 8 steps inside and outside of the box. For this task he gained 3 points. For the last exercises, Participant got 2 points, as during the 30 seconds he was able to complete only 4 trials with extra assistance of the staff members.

Participant 2 gained a total of 14 points out of 15 during the post-testing period. During the first two tasks he was able to perform very confidently without any problems, receiving 6 points altogether. During the forward walking he was able to name 3 pictures and during the backward walking up to 7 pictures. For the balance exercise with 1 leg stance, the Participant 2 received 3 points, and for the coordination and stepping exercise he received 2 points, by completing 9 stepping in and out movements with minor assistance. During crawling through the tunnel, the Participant 2 was able to complete 5 trials through the tunnel during the 30 seconds period of time, and he received 3 points.

Participant 3 received a total of 7 points out of 15. For the first and second exercises he gained 4 points altogether (2 points from forward and 2 points from backward walking) and he was able to name 1 picture during the forward walking and 3 pictures during the backward walking. For the balance exercise he received 1 point, as he needed major assistance from the staff members. As for the exercise number 4, the Participant 3 received 2 points, as he was able to perform 4 repetitions during box stepping. For the last exercise he received 2 points, as he was able to crawl twice through the tunnel with the assistance of staff members.

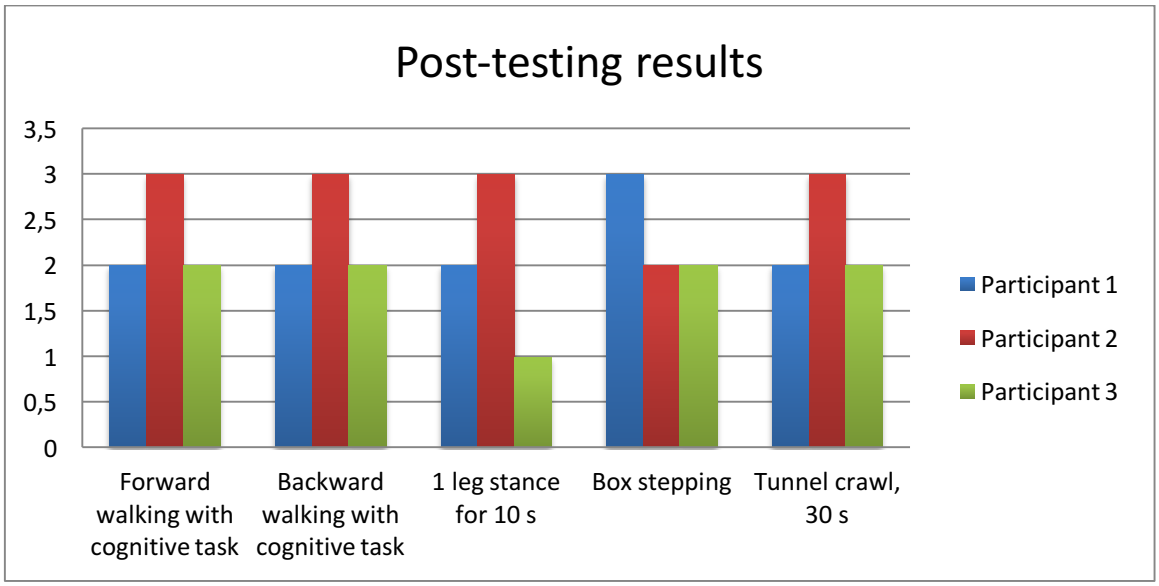

Figure 2. The summary of the post-testing results

The participants were generally able to perform the tasks better during the post-testing when comparing to the pre-testing. The differences between the pre- and post-testing results are summarized in the figures 3–5.

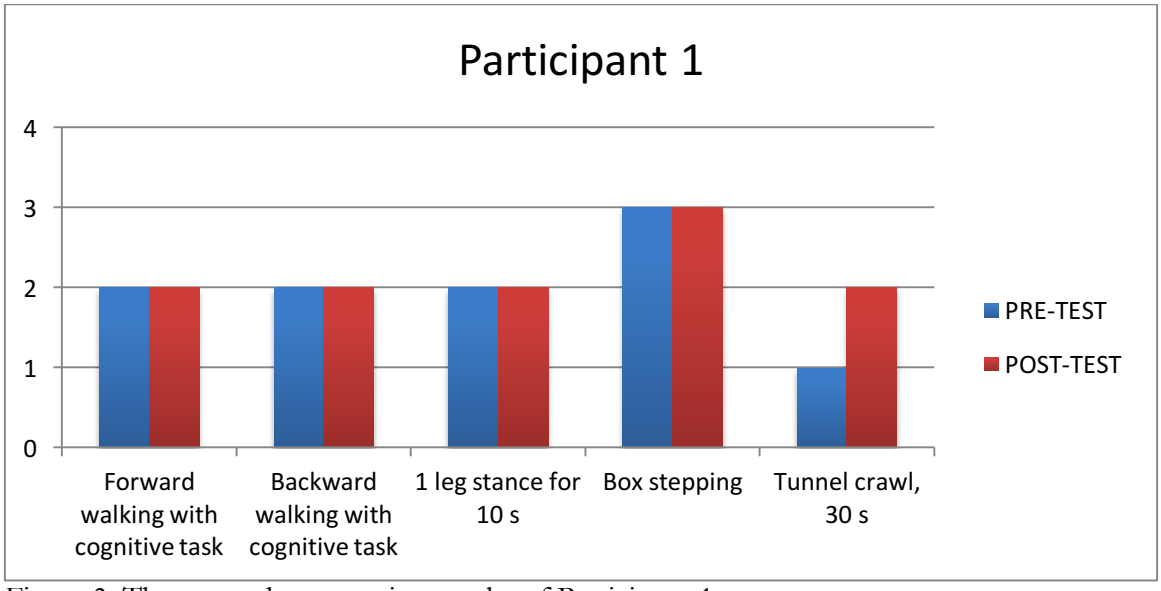

Figure 3. The pre and post-testing results of Participant 1

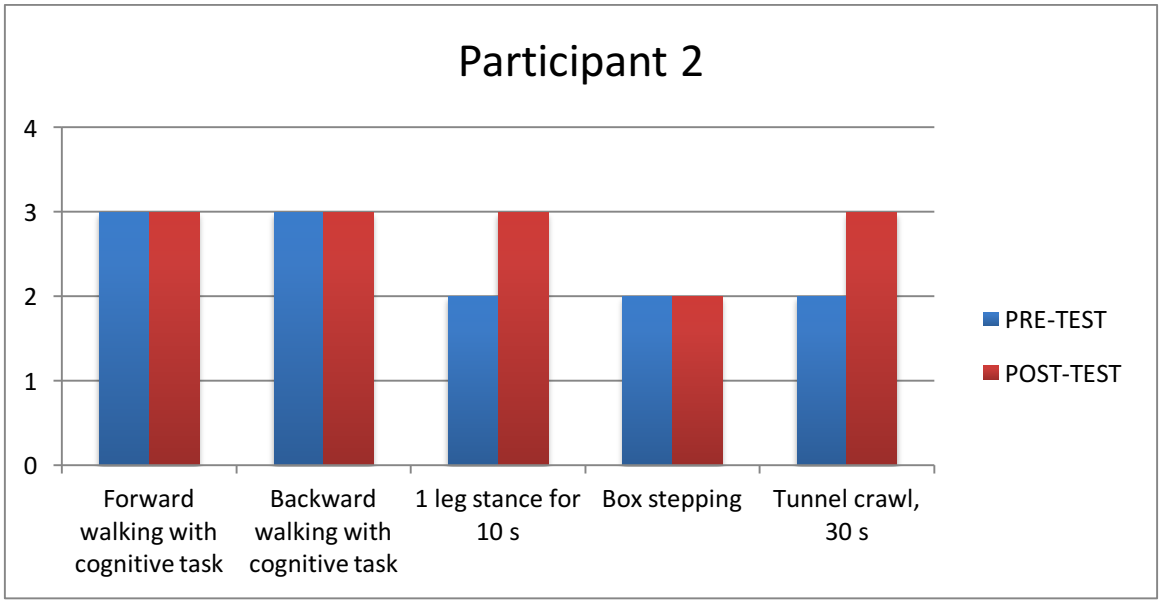

Figure 4. The pre and post-testing results of Participant 2

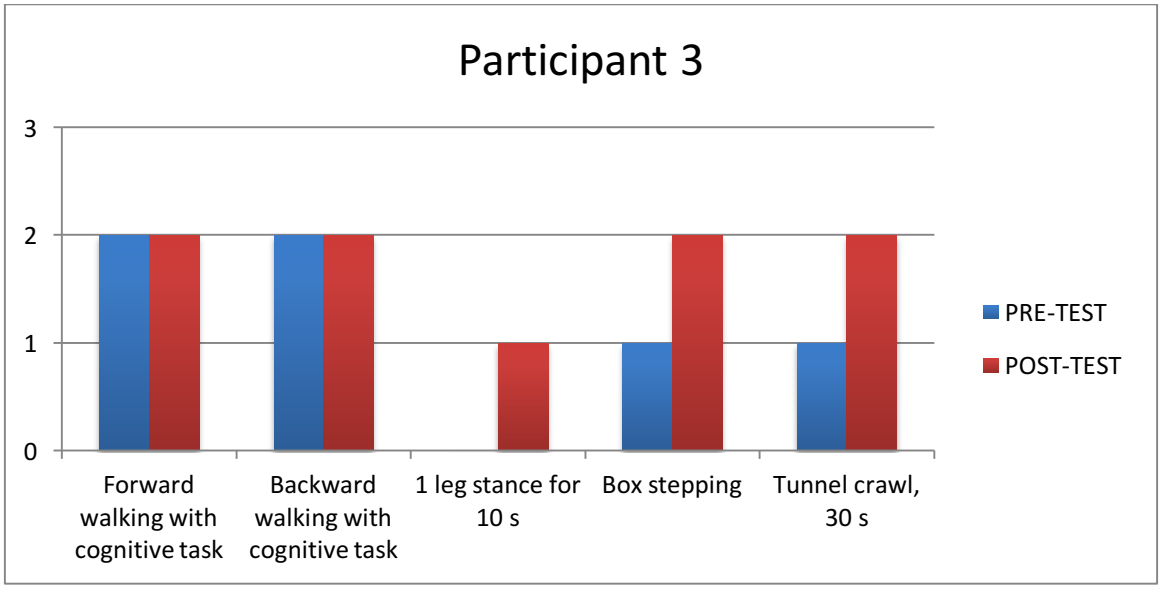

Figure 5. The pre and post-testing results of Participant 3

7.6 Adapted Physical Education Program

After all the required data for the APE program was collected, the final 6-month training program for Väinölä School was made. The content and structure of the program were made based on the observing sessions notes, pre and post-testing results.

The lesson plan template of the KUAS was used to make the APE program. An example of the lesson plan can be found in the Appendices. As mentioned previously, the APE program last for 6 months, from September 2015 to February 2016, and includes a weekly APE lesson.

The program includes backward walking exercises, balance exercises, stepping and coordination exercises, crawling exercises, and finally obstacle courses. The program was divided into 3 different sections: introduction and familiarization, and evaluation of the skills. During the introduction and familiarization parts, participants will practice their skills by having vast variations of exercises to develop the similar locomotor skills for the 1-month period. At the end of each month, participants will have obstacle course as the main theme of the lesson. For the evaluation of the skills, participants will practice all locomotor skills, such as: forward and backward walking, balance, balance and coordination, and crawling for a 2-month period on a weekly basis. Obstacle course will be conducted twice during the evaluation phase.

APE program was provided for both Väinölä School and KUAS as an electronic document. The link to the document can be found in Appendices.

8 DISCUSSION

This chapter demonstrates the outcomes of the research. The discussion starts with study assessment. After that ethicality and reliability of the study were evaluated. Finally, the author's personal development during the thesis process is discussed.

8.1 Research Evaluation

The purpose of this thesis was to identify the main challenges of physical development and physical education among adolescents with autism spectrum disorder based on individual evaluation of the autistic students in Väinölä School. Also, the thesis aimed to measure if the motor skills of the autistic participants could be improved by using physical adapted education program.

The author's personal objectives were to understand better the nature of autism spectrum disorder, to learn how to choose physical activity tasks based on the physical activity level of the students with autism spectrum disorder, and to learn how to construct a proper APE program.

The research data were gathered using qualitative research methods. The observation and testing sessions helped the author to answer the research tasks: "What are the physical capabilities and limitations of the autistic adolescents at Väinölä School, and which tests could be used as relevant measures of their physical progress?", "How to choose proper physical activity tasks suitable for the students with different activity levels?" and "Can adapted physical education be used to improve the gross motor skills of the autistic adolescents?"

The research focused on students of Väinölä School. The participants were exercising during the whole research period with other children, who are taking part during the physical activity classes provided by Väinölä School once a week.

The first research task was "What are the physical capabilities and limitations of the autistic adolescents at Väinölä School, and which tests could be used as relevant measures of their physical progress?" Visiting the physical activity classes to observe the participants provided by Väinölä School approached this task. The total number of participants was 3. During the

whole observation period lasting for 5 months, the author was able to understand better the specific problems that autistic adolescents have regarding their motor development and motor skills. The observation period enabled a thorough and analytic evaluation of the capabilities and limitations of the autistic adolescents, and also made it possible to choose the proper physical activity tests to measure their development.

The second research task was "How to choose proper physical activity tasks suitable for the students with different activity levels?" The observation period enabled to identify the specific gross motor skills that the participants had most severe problems with. After this, the exercises to develop these weak points were chosen. In the beginning of the APE program, the pre- and post-testing enabled the author to verify that the selected exercises would be both suitable and beneficial for autistic adolescents with different skill levels.

In this study it was found, that the observed autistic adolescents had considerable problems with their gross motor skills, especially with balance and coordination. These finding are in line with already published literature. Song (2013) concluded in her article "Enhancing Motor Skills of Children with Autism Spectrum Disorder. The Potential of an Interactive Metronome Approach" that some specific motor skills like manual control, manual dexterity, walking, balance, body coordination, strength and agility, postural stability and speed can be considered as commonly impairment in autistic kids. These are the very types of problems that also the autistic adolescents at Väinölä School were suffering from.

The third research task was "Can adapted physical education be used to improve the gross motor skills of the autistic adolescents?" Once the weak points of the participants had been identified during observation period, the initial training program was made. The results from pre- and post-testing verified the suitability of the selected exercises for the autistic adolescents. Based on these results, the final APE program for the commissioner was constructed.

The participants were able to perform notably better during the second testing when compared to the first one. Thus, the APE program provided in this thesis would seem to be a potentially beneficial for autistic adolescents. However, it cannot be concluded that during the first months of the program the participants would have necessarily improved their motor skills. The reason behind the improved scores could result simply form participants becoming more familiar with the exercises and tasks. More research is required to make definitive conclusions.

The commissioner wanted to receive an APE program for the autistic adolescents based on their abilities. Moreover, it was very important that the program would be suitable for all other participants of the Väinölä School, and not only for the autistic adolescents. Since the mission of any school, which is providing the APE, is to improve the physical abilities of their participants, Väinölä School staff members were eager to get and thereafter use the APE program provided by the author. The study provided an APE program suitable for both autistic and other participants of the school, and will be used for a 6-month period. This means that before the start of new academic year the content of the physical activity classes might change for the participants who are taking part on classes provided by Väinölä School.

8.2 Ethicality and Reliability

There were 3 participants who were been observed and tested during this research. As the topic of this thesis is highly complicated and sensitive, it may affect the performance and participation of the study, as the participants are not mentally stable and their behaviour can change rapidly.

The author developed the testing tasks and special measuring scale. The commissioner approved both. The testing forms were been translated in Finnish to make the testing process more understandable and clear for the staff members of the Väinölä School. The translation was made by the author and lately checked by the Väinölä School staff members and native speakers who were familiar with the process, so it can be concluded that the translation of the testing tasks and evaluation scale has not decreased the reliability of the research.

The previous and published researches, which were used by the author as the base of the thesis i order to have reliable data from testing. Moreover, the author was present during both testing periods and only 1 staff member from the Väinölä School was giving the feedback towards the participants so that there would not be any variation in the data caused by different observers.

The ethics of the research process were also considered. The staff members of Väinölä School also considered ethicality of the thesis. All data, which was gathered during the observing process, was gathered anonymously, and participants were referred to as Participant

1 to 3. Solely the researcher has held all data. The author is also tied to professional secrecy regarding all the information received during the process.

One limitation of the study is the specificity of the target age group. Previous research has concentrated often time on participants from ages 6 to 10, while in this research the age of the participants was from 12-17. This complicates the comparison of the data to some previously published data. Also the number of the participant in this study limits the generalization of the results; the results and conclusions of this research cannot be generalized, as only 3 participants were been involved into the process.

8.3 Personal Development

The author chose this particular subject for thesis, because she is interested in autism and especially in the age period of adolescence years. Author was interested to discover the limitations of the physical activity development in adolescents in Väinölä School who are suffering from autism spectrum disorder. In the future, the author is interested in working at educational environment and in a setting, which is connected to autism and adolescence.

The process of writing the thesis seemed challenging and complicated with the amount of themes to be covered. The width of the topic allowed and forced the author to attain vast amount of knowledge in the fields of autism and adapted physical education. Before beginning the process of the research, the author was not having any experience in doing it. The actual starting phase required a thorough literature review and process orientation. Finding appropriate references proved to be a long, educating and time-consuming process. The proper understanding of qualitative research and associated methods was the most challenging part, since different methods were used to analyse the data in the most precise and reliable ways.

The testing tasks and evaluating scale were the core elements of the research, thus preparing them was not only of crucial importance, but also proved to be very demanding and challenging. However, the results showed that it was made in a correct and suitable way for both staff members and the students of Väinölä School.

The outcome of the study and gained new knowledge improved the author's competences in coaching and helped the author to become more professional in the field of sports. The

knowledge gained during the process of the research regarding phycology, physiology and motor development can be applied in other situations, and they remain useful for the author regardless of the line of work the author chooses.

Last but not leas, the author hopes that the results of the thesis will help the Väinölä School to improve the physical activity level among their autistic students.

8.4 Further Studies

From the researchers point of view, the actual topic of the thesis is relevant and needs to be studied further. The topic is essential for the future professionals in the field of special education. The importance of adapted physical education in treating children and adolescents with autism spectrum disorder should be highlighted.

More research is required to identify the optimal ways to offer APE for autistic individuals to best support their physical development.

9 CONCLUSIONS

This research highlights the problems of gross motor skill development among autistic adolescents. The research was focused on the autistic adolescents of Väinölä School with ages from 12 to 17. It was found that at least 5 important gross motor and stability skills, such as: forward and backward walking, balance, coordination and crawling can be improved by the use of modified APE program, made specifically for the different physical activity levels of the participants.

This research was also points out the lack of proper adapted physical education programs for autistic individuals, especially adolescents. The professionals should strive to create different variations and approaches for the APE, which would be suitable for mixed groups, such as the one in Väinölä School. The results of the research are logically connected with the previous research in the field, and the actual research provides trustworthy results regarding the current situation in the field of APE for autistic adolescents.

Based on the research presented in this thesis, the following conclusions can be made:

1) The physical activity level of autistic adolescents at Väinölä School varies greatly, and the participants would benefit from adapted physical education, since they have clear limitations in their motor skills.

2) Participants and difference between them, especially in their physical activity levels and age, does not translate into differences in gross motor skills; the participants' differences in their gross motor skills were not dependent on participant's age or physical activity level. In choosing proper physical activity tasks for each individual, their personal gross motor skills must be evaluated to determine the most appropriate exercises for their physical activity level.

3) A well-constructed APE program can potentially improve the gross-motor skills of the autistic adolescents. However, more research on the topic is still required for definite conclusions to be made.

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LIST OF APPENDICES

CONSENT FORM

DEAR ADMINISTRATION
I would like to ask you to participate in the study, which investigates the use of adapted physical education to improve the gross motor skills of autistic adolescents at Väinölä School.

TOPIC
My thesis is about adapted physical education for autistic adolescents.

PURPOSE OF THE STUDY
The main purpose of this thesis is to identify the main challenges of physical development and physical education among autistic adolescents based on both the literature and individual evaluation of the autistic adolescents at the age of 12-17-year-old.

AIMS OF THE STUDY
The main aim of the study was to introduce an adapted physical education program specifically for autistic adolescents at Väinölän koulu. The program contains different types of physical activity lessons to improve the skills that require most development, such as gross motor and stability exercises. The program also aims to help autistic adolescents to understand the meaning of the exercises.

DATA COLLECTION
Data is collected using specifically designed measuring scale and physical testing. Target group consists of adolescents in the age group from 12 to 17 years old.

DATA PROJECTION
All materials and information related to this thesis is strictly confidential. The researcher is tied on professional secrecy. The data will be analyzed by using a scale made specifically for this purpose.

I ask you to give a written consent to me. You have the right to ask more information about my research. I would be pleased to answer your questions.

Kind regards,

Klavdia Bukina
Kajani University of Applied Sciences
Degree programme in Sports and Leisure management
Group – SPO12S

DSM-IV Diagnosis Criteria for Pervasive developmental disorders

DSM-IV Diagnosis Criteria for Autistic Disorder:

A. A total of 6 (or more) items from (1), (2), and (3), with at least two from (1), and one each from (2) and (3):

(1) qualitative impairment in social interactions, as manifested by at least two of the following:

(a) marked impairment in the use of multiple nonverbal behaviors such as eye-to-eye gaze, facial expression, body postures, and gestures to regular social interaction

(b) failure to develop peer relationships appropriate to developmental level

(c) a lack of spontaneous seeking to share enjoyment, interests, or achievements with other people (e.g., by a lack of showing, bringing, or pointing out objects of interest)

(d) lack of social or emotional reciprocity

(2) qualitative impairments in communication as manifested by at least one of the following:

(a) delay in, or total lack of, the development of spoken language (not accompanied by an attempt to compensate through alternative modes of communication such as gesture or mime)

(b) in individuals with adequate speech, marked impairment in the ability to initiate or sustain a conversation with others

(c) stereotyped and repetitive use of language or idiosyncratic language

(d) lack of varied, spontaneous make-believe play or social imitative play appropriate to developmental level

(3) restricted repetitive and stereotyped patterns of behavior, interests, and activities, as manifested by at least one of the following:

(a) encompassing preoccupation with one or more stereotyped and restricted patterns of interest that is abnormal either in intensity or focus

(b) apparently inflexible adherence to specific, nonfunctional routines or rituals

(c) stereotyped and repetitive motor mannerisms (e.g., hand or finger flapping or twisting, or complex whole-body movements)

(d) persistent preoccupation with parts of objects

B. Delays or abnormal functioning in at least one of the following areas, with onset prior to age 3 years: (1) social interaction, (2) language as used in social communication, or (3) symbolic or imaginative play.

C. The disturbance is not better accounted for by Rett's Disorder or Childhood Disintegrative Disorder.

DSM-IV Diagnostic Criteria for Rett's Disorder:

A. All of the following

(1) apparently normal prenatal and perinatal development

(2) apparently normal psychomotor development through the fist five months after birth

(3) normal head circumference at birth

B. Onset of all of the following after the period of normal development:

(1) deceleration of head growth between ages of 5 and 48 months

(2) loss of previously acquired purposeful hand skills between ages 5 and 30 months with the subsequent development of stereotyped hand movements (e.g., hand-wringing or hand washing)

(3) loss of social engagement early in the course (although often social interaction develops later)

(4) appearance of poorly coordinated gait or trunk movements

(5) severely impaired expressive and receptive language development with severe psychomotor retardation

DSM-IV Diagnostic Criteria for Childhood Disintegrative Disorder:

A. Apparently normal development for at least the first 2 years after birth as manifested by the presence of age-appropriate verbal and nonverbal communication, social relationships, play, and adaptive behavior.

B. Clinically significant loss of previously acquired skills (before age 10 years) in at least two of the following areas:

(1) expressive or receptive language

(2) social skills or adaptive behavior

(3) bowel or bladder control

(4) play

(5) motor skills

C. Abnormalities of functioning in at least two of the following areas:

(1) qualitative impairment in social interactions (e.g., impairment in nonverbal behaviors, failure to develop peer relationship, lack of social or emotional reciprocity)

(2) qualitative impairments in communication (e.g., delay or lack pf spoken language, inability to initiate or sustain a conversation, stereotyped and repetitive use of language, lack of varied make-believe play)

(3) restricted, repetitive, and stereotyped patterns of behavior, interests, and activities, including motor stereotyped and mannerisms

D. The disturbance is not better accounted for by another specific Pervasive Developmental Disorder or by Schizophrenia.

DSM-IV Diagnostic Criteria for Asperger's Disorder

A. Qualitative impairment in social interaction, as manifested by at least two of the following:

   (1) marked impairment in the use of multiple nonverbal behaviors such as eye-to-eye gaze, facial expression, body postures, and gestures to regulate social interaction

   (2) failure to develop peer relationships appropriate to developmental level

   (3) a lack of spontaneous seeking to share enjoyment, interests, or achievements with other people (e.g., by lack of showing, bringing, or pointing out objects of interest to other people)

   (4) lack of social or emotional reciprocity

B. Restricted repetitive and stereotyped patterns of behavior, interests, and activities, as manifested by at least one of the following:

   (1) encompassing preoccupation with one or more stereotyped and restricted patterns of interest that is abnormal either in intensity or focus

   (2) apparently inflexible adherence to specific, nonfunctional routines or rituals

   (3) stereotyped and repetitive motor mannerisms (e.g., hand or finger flapping or twisting, or complex whole-body movements)

   (4) persistent preoccupation with parts of objects

C. The disturbance causes clinically significant impairment in social, occupational, or other important areas of functioning.

D. There is no clinically significant general delay in language (e.g., single words used by age 2 years, communicative phrases used by age 3 years).

E. There is no clinically significant delay in cognitive development or in the development of age-appropriate self-help skills, adaptive behavior (other than in social interaction), and curiosity about the environment in childhood.

F. Criteria are not for another specific Pervasive Developmental Disorder or Schizophrenia.

DSM-IV Pervasive Developmental Disorder not otherwise specified (including Atypical Autism):

This category should be used when there is a severe and pervasive impairment in the development of reciprocal social interaction or verbal and nonverbal communication skills, or when stereotyped behavior, interests, and activities are present, but the criteria are not met for a specific Pervasive Developmental Disorder, Schizophrenia, Schizotypal Personality Disorder, or Avoidant Personality Disorder. For example, this category includes "atypical autism"-presentations that does not meet the criteria for Autistic Disorder because of late age at onset, atypical symptomatology, or subthreshold symptomatology, or all of these. (Sewell 1998, 10-13; American Psychiatric Association: Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition. Washington, DC, American Psychiatric Association 1994).

PDD-NOS, sometimes referred to as "atypical autism," is used as a diagnostic category when criteria are not met for a specific Pervasive Developmental Disorder. (Wolfberg 1999, 17).

TESTING INSTRUCTIONS (FINNISH VERSION)

Harjoitusten selitykset
Osallistuvien henkilöiden tulee tehdä seuraavat harjoitukset. Mikäli henkilö ei kykene toteuttamaan harjoituksia itsenäisesti, yritetään harjoitukset toteuttaa ensin kevyesti avustamalla. Mikäli henkilö ei kykene suorittamaan harjoitteita kevyesti avustettuna, yritetään niitä suorittaa runsaasti avustettuina. Mikäli henkilö ei kykene suorittamaan harjoitteita runsaasti avustettuna, katsotaan että henkilö ei kykene toteuttamaan harjoitusta.

Kävelyharjoitukset
Henkilön tulee suorittaa 4 kappaletta kävelytestejä itse valitsemassaan tahdissa (esim. normaali kävelyvauhti). Näihin harjoituksiin kuuluvat eteenpäin kävely sekä eteenpäin kävely samanaikaisen kognitiivisen tehtävän kanssa, ja vastaavat harjoitukset taaksepäin kävellen. Eteenpäin kävellessä kognitiivinen tehtävä toteutetaan sanomalla ääneen mahdollisimman monta eri hedelmän nimeä samaan aikaan kävellen. Takaperin kävelyn yhteydessä henkilön tulee sanoa ääneen mahdollisimman monta eri vihanneksen nimeä.

Tasapainoharjoitukset
Henkilön tulee suorittaa kaksi tasapainoharjoitusta: viivalla kävely ja yhdellä jalalla seisonta. Viivalla kävelyssä henkilö kävelee 10 metriä suoralla viivalla (esim. teipillä lattiaan merkittynä) kädet nostettuina sivuille 90 asteen kulmassa. Yhden jalan seisonnassa henkilö seisoo yhden jalan varassa paikallaan (ei esim. hyppien), silmät kiinni ja menettämättä tasapainoaan 10 sekunnin ajan.

Laatikkoon astuminen
Henkilö astuu päältä avonaiseen matalaan laatikkoon. Testi toteutetaan kahteen kertaan, ensin siten että henkilö astuu toistuvasti laatikkoon ja pois yhteensä 10 kertaa edestakaisin. Tämän jälkeen henkilö tekee edestakaista astumista itsenäisesti 30 sekunnin ajan.

Tunneliryömiminen
Tunnelin läpi ryömiminen toteutetaan kaksi kertaa. Ensin henkilön itse määrittämällään vauhdilla katsotaan, kykeneekö henkilö ryömimään tunnelin lävitse. Tämän jälkeen testataan, kykeneekö henkilö ryömimään tunnelin läpi 30 sekunnissa.

Lisätietoa
Kaikista harjoitteista selviytymistä arvioidaan asteikolla 0–3 seuraavasti:

PISTEYTYS	
Ei kykene tehtävään	0
Vaatii runsaasti apua	1
Vaatii hieman apua	2
Kykenee itsenäisesti	3

Pisteytyksen yhteydessä ”hieman apua” tarkoittaa esim. suullista ohjeistamista, tai todella pientä fyysistä auttamista. Mikäli henkilö vaatii tehtävän suorittamiseen olennaisesti fyysistä apua, on kyseessä ”runsas apu”.

Eri harjoitteissa tehtävien toistojen määrä tulee kirjata ylös kirjauslomakkeiden kommentit osioon, mutta järjestys tulisi pitää vakiona testauskertojen välillä.

TESTING FORM (FINNISH VERSION)

PISTEYTYS	
Ei kykene tehtävään	0
Vaatii runsaasti apua	1
Vaatii hieman apua	2
Kykenee itsenäisesti	3

ETU- JA TAKAPERIN KÄVELEMINEN		
Harjoitus	**Pisteet**	**Kommentit**
Etuperin kävely suorittaessa kognitiivista tehtävää		
Takaperin kävely suorittaessa kognitiivista tehtävää		
YHTEISPISTEET		

TASAPAINO		
Harjoitus	**Pisteet**	**Kommentit**
Suoralla käveleminen		
Yhdella jalalla seisominen 10 s ajan		
YHTEISPISTEET		

LAATIKKOON ASTUMINEN		
Harjoitus	**Pisteet**	**Kommentit**
Laatikkoon astuminen		
Toistuva laatikkoon astuminen 30 sekunnin ajan		
YHTEISPISTEET		

PISTEYTYS	
Ei kykene tehtävään	0
Vaatii runsaasti apua	1
Vaatii hieman apua	2
Kykenee itsenäisesti	3

TUNNELIRYÖMIMINEN		
Harjoitus	**Pisteet**	**Kommentit**
Ryömiminen omaan tahtiin		
Tunnelin läpi ryömiminen 30 s:ssa		
YHTEISPISTEET		

NIMI	
PVM	

OSA-ALUE	**PISTEET**
Etu- ja takaperin käveleminen	
Tasapaino	
Askelnousu	
Ryömiminen	
YHTEENSÄ	

LESSON PLAN FOR SPORTS AND PHYSICAL EDUCATION

TIME: 10.04.2015 09:00-10:00	LOCATION: Gym hall	PARTICIPANTS: Kids	INSTRUCTOR: Väinölän koulu staff members	
SUBJECT AND OBJECTIVE OF THE LESSON: Introduction and familiarization in exercising for improving gross motor skills and balance. Cognitive: The aim is to help participants, especially kids with ASD to improve their gross motor skills by exercising in gym with the use of a special program, but the basic structure of the lesson remains the same. All exercises will be instructed according to the previous program and their abilities. Psychomotor: To develop basic understanding of the tasks for the participants, proper technique if they can. Socio-Emotional: Individual work, co-operation with group and staff members, friendly, calm and comfortable atmosphere, and ability to work with the partner.				
OBJECTIVES: PM: Develop individual's ability to exercise with the instructions and with use of the special equipment. SE:- Get prepared for the actual exercises for developing gross motor and balance skills.	CONTENT AND ACTIVITIES: **WARM-UP:** The same tasks as usually provided for the participants: running, jogging, jumping and etc.with the music. **MAIN PART:** Participants will exercise with help of some basic equipment in gym hall. There will be 3 different parts of the actual training session: introduction, familiarization and evaluation.	TEACHING STRATEGIES, GROUPING, EQUIPMENT: Command+Practice styles: Balance obstacles, cards with words and balance boards.	TIME: ±30 min The timing of each task can be definited by the staff memebers.	ASSESSMENT AND FEEDBACK: Encourage clients to try to do all movements and exercises properly and adding some challenges if it is needed. Make sure that everyone understood the basic idea of all exercises and also to

C:- Understand the idea of exercising in general and with help of some basic equipment.	**1 task:** Kids should stand motionless with their eyes closed without losing their balance. First trial is 5 seconds, and if they succeed the timing should increase up to 15 seconds (5,10,15). Participants are allowed to do it in their own phase and with help of the staff members, if they won't be able to complete harder options. **Main section:** **2 task:** Walking on a line followed by walking on balance obstacle. The length of the line is 10 meters and the amount of the balance obstacle should increase by each trial. The starting amount is 5 balance obstacle and up to 10. If participants won't be able to complete the track with 5 balance obstacle they should keep on going with the amount, which will be comfortable for them. Only forward walking. **3 task:** The same task as the			make sure that everyone gets all equipment, which needed-proper balance obstacle, cards and balance boards (based of the participant's ability).

	second one but it will be developed up to the point that participants should read different cards which will be showed for them and name the items of those cards. Only forward walking. **4 task:** Participants should try to balance on the balance board. First of all they can try to do it with the help of the staff members by holding their hands in front. If they will succeed they can balance by their own as much as they can. **COOL DOWN:** The same task as usually provided for kids-magic carpet.			

FINAL APE PROGRAM

https://www.dropbox.com/sh/gtbw7kp1n25oqz3/AADsbCWCBUiSY_rr7g1oNj_Ca?dl=0