

Addressing adolescent aggression by means of physical exercise: A case study

by

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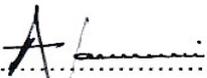
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Declaration

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I declare that this dissertation '**ADDRESSING ADOLESCENT AGGRESSION BY MEANS OF PHYSICAL EXERCISE: A CASE STUDY**' is my own work and that all sources that I have used or quoted have been indicated and acknowledged by means of complete references.


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(N.T Mdluli)

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ABSTRACT

Aggression in South African schools is a matter of great concern. A review of the existing literature indicated that physical exercises contribute to people's well-being. This study thus investigated to what extent physical exercises could be used to address the aggression of students in a secondary school. An empirical investigation was done by means of a mixed methods case study design. A purposive sample of 25 students was chosen from students in grades 9 to 11. The students completed an adapted Buss-Perry questionnaire on aggression to determine their levels of aggression. Thereafter they embarked on a 10 week physical exercise programme (30 sessions of 40 minutes each), before completing the same questionnaire. The results indicated that the programme alleviated their feelings of aggression, especially in the boys. Qualitative interviews with 10 of the participants who benefitted most from the exercises indicated how they experienced the programme. Recommendations were made for similar programmes and for future research.

KEYWORDS

aggression

adolescence

physical exercise

secondary school student

well-being

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ABBREVIATIONS

- ACP: Anger control programmes
ADHD: Attention Deficit Hyperactivity Disorder
CBM: Cognitive Behaviour Modification
GBG: The Good Behaviour Game
KZN: KwaZulu-Natal
PMT: Parent management training
PSST: Problem-solving skills training
SAPS: South African Police Service
SGB: School Governing Body

CHAPTER 1

INTRODUCTION AND OVERVIEW

1.1 INTRODUCTION AND JUSTIFICATION FOR THE STUDY

The aggressive behaviour of secondary school students is a concern for everyone, everywhere. The experience and incidence of aggression in its different forms such as fights, assaults, the use of obscene language, the writing of provocative graffiti and vandalism to property, among others, are all causes for worry with the education personnel, the teachers, the parents, the school governing bodies (SGBs), the student representative councils and the community at large (Black, 2002). Aggression also affects the students directly when they are personally involved in it, and indirectly when it stifles the smooth running of the school and leads to a climate that is not conducive to learning and teaching.

In relation to the abovementioned concern, Steyn and Roux (2009:1) point out that aggression among young adolescents has reached dangerous levels in contemporary society, especially in the school context. The researchers claim that some schools are characterised by violence, daylight assaults, and firearm-related injuries. Gun- and weapon-related violence is often reported in the schools. The researchers conclude that the manifestation of these incidents is likely to cause some people to regard and perceive schools as dangerous places, characterised by various acts of violence.

Through our experiences as teachers in secondary schools and via media reports such as radio, television and newspaper statements, it is also evident that the adolescents' interactions with others are becoming increasingly aggressive (Sunday Times, 2008). For example, in one incident at Lethabong Secondary School in Soshanguve, "a grade 10 pupil is said to have committed suicide on Valentine's day after being bullied by three grade 10 and grade 11 pupils at the school" (Sowetan, 2012:11). In another incident in the same school, a student assaulted a female teacher after she had reprimanded him for making a noise in the examination hall. In Umlazi in Durban, KwaZulu-Natal (KZN), a

school student went on a shooting spree. A few days prior to that incident, a female teacher was held at gunpoint and robbed of R20 (Naidoo, 2008:1). Other forms of aggression also occur. With the advent of modern forms of communication, children are now able to harass their peers by means of mobile phones and e-mails (Beran & Li, 2007:15). This behaviour is known as 'cyber-bullying'.

Statistics on some shocking and recent aggressive acts were released by the Centre for Justice and Crime Prevention. The report states that 22,2% of high school students had been threatened with violence or had been victims of assault, robbery and/or sexual assault at school in the previous year (The Witness, 2013:2). The report further states that crimes of sexual assault increased from 3,8% to 3,9%. Violence at schools was not limited to students but also involved the teachers who were often the victims of verbal violence (52,1%), physical violence (21,4%) and sexual violence (3,3%) by the students.

The abovementioned examples are not isolated incidences. It has been indicated in the literature that aggression is a national social issue in South Africa. The involvement of high school students in violent activities is prevalent in most schools and in all the provinces. This situation was indicated in studies by Burton and Leoschut (2013:21) who released the results per province of the percentage of students who had been victims of violence at high school. These were for the Free State (30,4%), the Western Cape (28,7%), Limpopo (25,2%), the Northern Cape (23,6%), the North West Province (23,3%), KZN (22,6%), Mpumalanga (22,3%), the Eastern Cape (17,7%) and Gauteng (13,4%). Burton and Leoschut (2013:22) further posited that, regarding Kwazulu-Natal in particular, violence was significantly more prevalent in high schools located in urban areas (26,2%) compared to those situated in metropolitan areas (21,7%) and in rural areas (20,8%). The researchers also found that in a sample of 5 939 students, the percentage of students who were assaulted increased from 3,7% to 8,2% from 2008 to 2013; the number of sexual assault victims grew from 3,8% to 3,9%; and the number of victims of theft escalated from 49,4% to 49,9%.

There is a worrisome price to pay for aggressive behaviour in education. For instance, Cooper (2002:9) noted that the destructive nature of aggressive behaviour in the school context interferes with the teaching and learning processes. Nevitt, Radhus and Greene (2003:506) also asserted that aggressive adolescents often fail their grades at school. They frequently neglect to do their homework and thus experience difficulties with schoolwork in general. Sadock and Sadock (2003:150) furthermore warned that the significant detrimental effects of aggressive behaviour in day-to-day living, such as its influence on the recipients' self-esteem, social status, and happiness, should not be underestimated. Aggression could furthermore have devastating consequences for others. One of the consequences of the problem of aggression in South Africa is the growing need to erect more maximum-security prisons for juveniles aged 13 to 19 years (e-News, 2003). Mchunu (2009(a) & (b):2) reported that there are 13 correctional facilities for juvenile delinquents in South Africa. He further indicated that a considerable number of the youths who ended up in these facilities were incarcerated on counts of aggressive behaviour. Statistics from a report (Department of Correctional Services Annual Report, n.d.) showed that in July 2009 34 589 juvenile offenders, aged between 14 and 25 years were sentenced, and of these, 1 654 were adolescents under the age of 18 years; by August 2012, the statistics of the youth in South African prisons were 2 652 adolescents in KZN, of whom 189 were in the prison in Glencoe (KZN) alone, and 29 583 in the entire country.

The primary mechanism to address the issue of aggressive behaviour has been to incarcerate offenders. However, the Council for Scientific and Industrial Research (1998) reported that being in prison often causes the adolescent offenders to become increasingly involved in crime, in that some adolescents tend to use their time in prison to plan or to commit more acts of crime in their attempt to re-establish their self-worth and dignity. Thus, a prison often presents itself as an institution where the prisoners can learn and be taught more criminal acts by other offenders. Thus, it would be better to address the *causes* of aggression and strive to prevent aggressive acts as much as possible.

Research has established that aggression stems from different factors. Baron, Byrne and Branscombe (2006:2) declared that a major contributing factor to aggressive acts and a significant risk factor in youth violence in schools may be the continuous exposure to media violence. Aggression can also emanate from the students' family backgrounds or from the value systems of the communities and the schools. If the students are unstable due to factors related to their families, the communities and the schools, they may display deviant behaviour and exhibit destructive tendencies (Gasa, 2005:2). Dr Nkosinathi Sishi, head of the KZN Education Department warned in *The Witness* (2013:2) that one cannot look at violence without looking at the society the students come from. In the same publication, independent child specialist and former KZN child-line director, Linda Naidoo, said that horrific incidents of violence have occurred among children. Many children felt misunderstood and lacked their parents' support. The children also see acts of violence at home and they become angry. Consequently, they may lash out at each other in a desperate cry for help. Myburgh and Poggenpoel (2009:2) claimed that adolescents who have been exposed to aggression have a tendency to also expose others, such as their peers, parents and teachers, to hostility. This climate and environment places everybody's lives at risk and it is detrimental to the culture of learning and teaching at school.

The literature reveals that the learners and teachers in South African schools are exposed to a plethora of stressful factors, such as mental depression, economic depression, suicidal tendencies, high death tolls fuelled by HIV/AIDS, and exceedingly high poverty levels, to name but a few. Lehohla (2008:4) pointed out that approximately 57% of the South African population lives in poverty. Economic depression may mean that some parents are unable to pay their children's school expenses, and many of these children consequently suffer from education underachievement. When their parents die because of HIV/AIDS, the children become orphans and homeless, and some are compelled to leave school. These social factors may affect the adolescents' psychological well-being. Breet, Myburgh and Poggenpoel (2010:1) argued that these factors could contribute to an increase in the aggression levels in society, especially aggressive behaviours that are destructive in nature. Myburgh and Poggenpoel (2009:2)

further claim that adolescents who have been exposed to aggression have a tendency to also expose others such as their peers, parents and teachers (as noted above).

Locus of control plays a role in respect of how challenging circumstances are handled. Swart (2004:23) points out that some people believe that they have no personal control over their circumstances, and function from an external locus of control. Colaman (2006:427) defines an *external locus of control* as a situation where people believe that whatever happens in life is related to chance, luck, fate or the actions of powerful others. Thus, these people are perceived as passive agents with no control over what happens in their lives. However, there is a counter-understanding that focuses on the power of an internal locus of control. Contrary to an external locus of control, *internal locus of control* refers to the fact that people believe they have the power and right to choose freely and to take the responsibility for their choices in response to what they want to see happening in their lives. According to the literature, individuals with an internal locus of control can manage stressful situations effectively by using problem-solving strategies. Thus they do not resort to aggressive behaviour.

Added to the benefits of an internal locus of control, is the issue of the relationship between exercise, physical activity and physical and mental health, which were explored by researchers such as Pienaar and Kemp (2009:527-542). According to them, physical activities can benefit an individual's mental health. The benefits may be obtained from doing vigorous activities such as aerobics, or from a gentle stroll in the park. These kinds of physical activities are said to improve one's emotional and mental well-being, as well as physical health. The literature also, however, indicates the relationship between physical activity, depression and other negative mood states for diverse groups. Studies that have been conducted include diverse populations and age groups (for example, adolescents, middle-aged and older adults), and both genders. It was suggested that exercise, physical activity and physical activity interventions have beneficial effects across several physical and mental health outcomes. The participants in this research who engaged in regular physical activity, displayed a variety of desirable health outcomes. Similarly, the participants in randomised clinical trials of

physical activity-intervention show better health outcomes, including a better general and health-related quality of life, better functional capacity and better mood states (Penedo & Dahn, 2005:1).

It is against the abovementioned exposition as background that this study seeks to establish the extent to which physical exercise could assist the teachers and the adolescents to deal with and cope with the adolescents' aggression, and also to encourage debate on this important matter.

The specific research problems that the study pursued and the aims of the research are explained in the next two sections.

1.2 THE RESEARCH PROBLEM

In view of the above exposition, the general research problem has been stated as follows:

What is the impact of physical exercises on adolescent aggression?

Accordingly, two specific research questions are stated:

Research question 1: Will physical exercises significantly lower the participants' level of aggression?

Research question 2: What are the participants' views on the role of a physical exercise programme to address their aggression?

1.3 AIMS OF THE RESEARCH

The overall aim is to investigate whether physical exercise can indeed serve as an effective strategy to address adolescents' aggressive behaviour in a particular secondary school.

The specific aims of the study are stated as follows, namely

- (i) to review the literature on adolescent aggression, as well as the influence of physical exercise on adolescent aggression;
- (ii) to determine, by means of an empirical investigation, what the impact of physical exercise is on adolescent aggression;
- (iii) to determine, by means of interviews, how a group of adolescents experienced a physical exercise programme; and
- (iv) to make recommendations in respect of how physical exercises may be used effectively to alleviate adolescent aggression.

1.4 THE RESEARCH PARADIGM: THEORIES OF AGGRESSION

Tabane (2012:13) pointed out that a *research paradigm* aims at explaining what lens or lenses the researcher is going to use to look at and analyse the data. The prevailing theories on aggression can be classified into three groups, namely biological theories, drive theories and the theory of social learning.

These theories are explained thoroughly in the next section, and will also be addressed in depth in Chapter 2 (section 2.2).

1.4.1 Biological theories of aggression

A biological understanding of aggression perceives it as instinctual. Thus, aggression is the manifestation of a genetic or chemical influence. Empirical evidence shows that a

cerebral electrical stimulation can induce or inhibit aggression (Smith, 2008:1). Smith furthermore indicates that observational studies of certain animals showed that some breeds are very aggressive whilst others are naturally passive. Studies have also shown that the presence or absence of particular chemicals and hormones in the system affects aggression. For example, high levels of the hormone testosterone, and neurotransmitters such as serotonin, dopamine and non-adrenaline, influence the levels of aggression in animals. Daley (2008:144) argues that these neurotransmitters have a remarkable effect on human beings as well. Serotonin has been used pharmacologically as an effective treatment to combat erratic aggression. Smith (2008:1) mentions that we will continue to see accumulating empirical evidence of the biological causes of aggression in the next decade or two as medical technology advances. In addition, Smith (2008:1) stated that the vastly developing field of genetics will in all likelihood pinpoint to the genetic sources of aggression as the Human Genome Project proceeds.

1.4.2 The drive theory of aggression

Smith (2008:1) asserts that the drive theory of aggression attributes aggression to an impulse created by an innate need. The most well-known drive theory of aggression is the frustration-aggression hypothesis, namely that frustration and aggression are linked in a cause and effect relationship. According to Smith (2008:1), frustration is a cause of aggression, and aggression is a result of frustration.

Other researchers who have also examined the frustration-aggression hypothesis determined that frustration is only one source of aggression and that a variety of other causes exist. Earlier researchers of this theory, such as Berkowitz (1993), also argued that frustration is merely a weak instigator of aggression, and that the presence of other factors could elicit greater aggressive behaviour.

1.4.3 The theory of social learning

Unlike the other aggression theories, the theory of social learning does not attribute aggression to an internal mechanism. Instead, it attributes it to social factors. The theory of social learning was developed by Albert Bandura (1973). He theorised that children learn aggression by observing the behaviour and its consequences in others. Hudley (2003:275-288) argued that the proposition of the theory of social learning was made famous by various 'Bobo' studies that demonstrated the power of both live and filmed models to influence children to enthusiastically hit a 'Bobo' doll.

Smith (2008:2) contended that there are two important principles underlying the theory of social learning. The first one is that aggression is learned from social behaviour, and that it is maintained by other conditions. One example is operant conditioning, a term that was coined by Skinner in 1973. *Operant conditioning* is a form of learning where an individual's behaviour is shaped or modified by its consequences. The behaviour may change in form, frequency, or strength. Operant conditioning can be clarified through the following analogue: if, after performing an aggressive act, an animal or human being receives a positive reinforcement, such as food or a toy, he/she is likely to repeat the behaviour in order to gain more rewards. In this way the aggressive act becomes positively associated with the reward, which encourages a further display of aggression. Smith (2008:2) argued that aggressive responses can also be acquired through social modelling or social referencing. By demonstrating aggression one can unknowingly encourage aggression in suggestible children. By modelling the behaviour of television, movie, or video game characters, acts of aggression become increasingly more frequent and violent. Bandura (1973:97) contends that the highest rate of aggressive behaviour is found in environments where aggressive models abound and where aggressiveness is regarded as a highly valued attribute. Govender and Killian (2001:1) argue that continued exposure to acts of violence is likely to induce a process of learning and imitation, culminating in the acceptance of violent conduct as a dominant and normal mode of conflict-resolution.

As mentioned before, involving aggressive adolescents in physical exercises may alleviate their aggression.

To investigate the research problem of how physical exercises may facilitate this, the following research design will be used.

1.5 THE RESEARCH DESIGN AND METHODOLOGY

1.5.1 Data-collection

Mouton (2001:55) defined a *research design* as a plan of how you intend conducting the research. The purpose of a research design is to generate data to be able to respond to the key research questions or to the hypotheses of a study.

In order to generate data in this study, a mixed methods case study research design will be used. A *case study* is when the research “examines a bounded system (i.e., a case) ... in detail, employing multiple sources of data found in the setting” (McMillan & Schumacher, 2010:485). In this research the case is one particular group of adolescents who participated in the physical exercise programme at one specific school selected for the study. *Mixed methods research* is research where the investigator uses both a qualitative and a quantitative research approach in a single study in order to understand a research problem more comprehensively (Creswell, 2005:110).

Martens (2003), as well as Migiro and Magangi (2011), explain various advantages of mixed methods research which include the triangulation of data to increase validity. *Triangulation* refers to the use of different data-collection methods within one study in order to ensure that the data are telling you what you think they are telling you. That is, it facilitates a comparison of quantitative and qualitative data sets to produce well-validated conclusions. Furthermore, the approach helps to explain the quantitative results with subsequent qualitative data, or vice versa. And lastly, it enhances a study

with a supplementary set of data, either quantitative or qualitative (Migiro & Magangi, 2011: 3759).

Qualitative research methods are traditionally used in the social sciences. It aims at an in-depth understanding of the phenomena, and largely collects and uses data in the form of texts or images. The possibilities continue to expand into new forms, such as text-messaging, e-mails, and videotapes (Creswell 2005:114). In contrast, quantitative research primarily collects and uses data in the form of numbers or statistics (Creswell 2005:115). Most academics agree that the primary aim of quantitative research is to generalise information with regard to an issue.

In this study, the quantitative section will comprise of a one group pre-test (which will be carried out before the implementation of the physical exercise programme), and a post-test design (which will be carried out after the implementation of the physical exercise programme). The group will comprise of 25 adolescents, and include boys and girls. The researcher decided to work with both boys and girls to enable the participation of both genders. The 25 participants would be those whose aggression scores indicated that they most needed the physical intervention. A questionnaire on aggression, adapted from Buss and Perry's (1992) questionnaire on aggression (Appendix H) will be used to identify the participants. This questionnaire will be used to determine the level of aggression in the research participants before the start of the 10-week physical exercise programme and also at the end of the programme.

As indicated, the adolescent participants will be enrolled in a 10-week physical exercise programme. The physical exercise activities will be performed three times a week. (The details of the physical exercise programme appear in Appendix I). After the ten weeks of physical exercises, the questionnaire on aggression will again be used in a post-test. This means that the same questionnaire will be used in the pre-test and in the post-test.

The qualitative section of the research will involve semi-structured interviews by means of an interview guide. (See Appendix F for the interview schedule.) These semi-

structured interviews will be conducted to investigate how the participants experienced the programme and what the influence of the physical exercises was on them. This will allow the researcher to gain a detailed picture of the participants' feelings, beliefs and attitudes towards physical exercises as a method to address aggression. Interviews allow the participants to respond to the questions in their own way and to elucidate their answers (Karjonboon, 2004:75). The interviews will be conducted with only ten of the adolescent participants. The participants will be purposefully selected from those who indicated a significant reduction in their aggression scores between the pre-test and the post-test sessions.

The interview data will be complemented by means of informal observations. These observations will be recorded in a field journal.

The abovementioned investigation aims at establishing to what extent physical exercises can be used to address aggression in adolescents at secondary school level. The researcher is a secondary school principal and is able to investigate the students' behaviour and perceptions at this level. The school where the research is to be done is the same school where the researcher works. It is located in a semi-rural area.

1.5.2 Ethical considerations

The following ethical measures will be adhered to throughout the investigation:

The Provincial Head Office, namely the KZN Department of Education, will be informed of the research and their permission will be sought to conduct the research. (Appendices B and G show the letter requesting approval and the letter granting the approval). Thereafter ethical clearance will be sought from the University of South Africa before embarking on the investigation. (Appendix A shows the Ethical Clearance Certificate). Permission will also be requested from the Circuit Manager. (Appendix C shows the letter that was written to the Ward Manager). Since most of the participants will be minors, permission will be requested from the parents or guardians for their

children to participate in the proposed study. (See Appendix D for the parent's or guardian's consent form.) Prior to the commencement of the study, the researcher will meet the parents and the teachers of the participants and explain the aim of the study to them. Thereafter, the participants themselves will be asked for their informed consent to participate in the study. (See Appendix E for an example of the student assent form). The participants will be informed that participation is voluntary and that they may withdraw from the research study at any time, should they feel uncomfortable to continue participating.

The participants will be ensured of the avoidance of any harm during the physical exercises by working closely with a physiotherapist to ensure that the planned physical exercises would be suitable and safe for the learners to do. The anonymity and confidentiality of the research participants will be ensured by using pseudonyms instead of their actual names.

Further details of the ethical research are provided in Chapter 3 (section 3.8).

1.5.3 Sampling

Purposeful sampling will be utilised. *Purposeful sampling* is a method of sampling which is based entirely on the judgement of the researcher, in that a sample is composed of elements that contain the most characteristic, representative or typical attributes of the population (Singleton, Straits, Straits & McAllister, 1998:153). The participants will be a group of adolescent students identified as experiencing problems with aggression, and they will be identified by means of observation and by requesting the students to complete a questionnaire on aggression. (Details about this questionnaire are given in Chapter 3, section 3.6.1).

In order to obtain their participation and to avoid stigmatising the participants as "aggressive", the word *aggression* will not be used in the identification processes. Rather, 'well-being' will be used. This will not constitute deceit as the two concepts are

two sides of the same coin. Within the scope of this study, the absence of aggression constitutes well-being, and in addressing aggression the aim is to lead the participants to physical, emotional and psychological well-being. The researcher will make use of only this one group for the purpose of this investigation. There will be no control group, as this is not a classical experimental design.

1.5.4 Validity and reliability

Validity is defined as a relationship of accuracy between the responses and the reality the responses were intended to capture (Gomm, 2004:152). According to Punch (1998:42), validity determines if a test measures what it is supposed to measure. For the quantitative phase of this study, two aspects of validity were chosen, namely content validity and face validity.

1.5.4.1 Content validity

Gray (2004:92) states that the term *content validity* is associated with the validation of the content of a test. According to Ary, Jacobs and Razavier (1990:434), *content validity* refers to whether the items of a questionnaire are adequate for measuring what they are supposed to measure and whether they constitute a representative sample of the behaviour domain under investigation. The results from a review of the literature and the contribution of experts in the field were used to judge the content validity of the questionnaire.

1.5.4.2 Face validity

This aspect of validity is completely dependent on the personal judgement of the researcher/s doing the investigation. Gasa (2005:82) contends that *face validity* refers to the extent to which the questions of a questionnaire, at their face value, measure the construct it is supposed to measure. The questionnaire used in this investigation is the questionnaire on aggression by Buss and Perry (1992). Experts in the field, for example

the supervisor of the study, will use their judgement to determine the face validity of the questionnaire.

1.5.4.3 Reliability

According to Gasa (2005:82), a questionnaire is reliable if independent administrators of it or a comparable instrument consistently yields similar results under comparable conditions. The following two questions will determine the reliability of the test, namely 'Will the respondents answer the same questions in the same way if they were asked again?' and 'Can the questions used produce stable responses?'

The reliability of the questionnaire was ensured by asking an appropriate number of questions on 'aggression'. The reliability was enhanced by the large number of items that focused on a factor.

1.5.4.4 The trustworthiness of the qualitative data

Regarding the qualitative phase, the following strategies were important in this research:

- prolonged and persistent field-work;
- multi-method strategies;
- the language used and verbatim accounts;
- low-inference descriptors;
- the involvement of multiple researchers (the researcher, a physiotherapist, and the supervisor);
- mechanically-recorded data;
- the reviews of the participants;
- conducting the research in the natural school environment;
- making use of the participant's home language wherever necessary; and
- ensuring the non-existence of researcher bias.

In the next section the most important concepts that are used in the study are defined and explained.

1.6 CLARIFICATION OF THE CONCEPTS

The following concepts that were used in this study are clarified, namely aggression, physical exercises, adolescence and secondary school student.

1.6.1 Aggression

There seems to be no consensus on a single definition of *aggression* as a concept (Ramitez & Richardson, 2001:51). Preininger and Rapmund (2008:5) define *aggression* as behaviour of an overt nature, intended to instil harm upon another. *Aggression* is also described as behaviour of which the primary or sole purpose or function is to injure another person or organism, whether physically or psychologically (Colaman, 2006:18). Naicker (2009:21) explained it as an act that injures another person's property. Swift, Cairns and Cairns (2002:224) argued that some aggressive behaviour is prototypic, such as physical and verbal aggression, whilst other forms are less prototypic, and include hurtful acts that are covert, more disguised and manipulative. These subtle aggressive behaviours include social aggression, indirect aggression and relational aggression.

What seems to matter most is the manner in which aggression is expressed. That is, aggression is expressed either constructively or destructively. Aggression is expressed in a constructive manner if it has to do with the survival, personal and healthy growth of the individual, family, group and/or community. On the other hand, aggression is expressed in a destructive manner if it harms the self and/or others, or the environment (Tesser, 1995:383-418).

1.6.2 Physical exercise

Physical exercise is simply defined as “any bodily movement that works your muscles and requires more energy than resting” (National Heart, Lung and Blood Institute, 2012:1).

1.6.3 Adolescence

Colaman (2006:14) defines *adolescence* as a period of development from the onset of puberty to the attainment of adulthood, beginning with the appearance of secondary sexual characteristics, usually between 11 and 13 years of age, continuing through the teenage years, and terminating legally at the age of maturity, usually 18 years of age. An adolescent, therefore, is a person in a period of adolescence.

1.6.4 Secondary school student

In this study the adolescents are secondary school students. Sayer (1984) defines a *secondary school student* as a post-primary school student; a child who exudes uncertainty about his or her self-concept; is generally aged between 13 and 18 years; is physically and sexually mature; and is cognitively fully-developed and able to reason rationally.

The South African School’s Act, Act no. 84 of 1996, defines a *learner* as any person, whether a child or an adult, who receives or must receive education. In this study *learner* refers to a child who receives tuition in a school on a full-time basis. In the context of this study a ‘learner’ and a ‘student’ are seen as synonyms. ‘Student’ will be used consistently, as this term is most often used in the international arena.

1.7 DIVISION OF THE CHAPTERS

Chapter 1:

Presented an introduction and background to the research. An overview was given of the research design and data-collection methods. Important concepts were defined, and the programme of the study was outlined.

Chapter 2:

Provides a summary of the conceptual framework of the study. Recent and relevant literature that relates to the topic of aggression and the influence of physical exercise on aggression are reviewed.

Chapter 3:

The research design and methods of data-collection and analysis are presented. Research ethics, as well as issues of validity and reliability are also addressed.

Chapter 4:

Comprises a presentation and discussion of the findings of the research.

Chapter 5:

The main conclusions of the research are presented. The limitations of the research study are highlighted, and recommendations are made to address adolescent aggression, and for further research.

1.8 SUMMARY

This chapter provided an overview of the study. It gave an account of the significance of conducting a study on adolescent aggression and the possible role of physical exercise to address and possibly alleviate aggression. The research problem and the aims of the research were indicated. The chapter gave a brief description of the research methodology to be employed in carrying out the study. The key concepts were defined and clarified.

In the next chapter (Chapter 2), the focus is on the literature review, using information from various publications, such as books, articles and other documents relevant to the topic.

CHAPTER 2

THEORETICAL PERSPECTIVES ON AGGRESSION AND PHYSICAL EXERCISE

2.1 INTRODUCTION

In Chapter 1 an overview of and background to the study were presented. Chapter 2 presents a review of the literature. In particular, the following is explained, namely the theoretical perspectives on the causes of adolescent aggression, the factors related to adolescent aggression, manifestations of student aggression and managing aggressive behaviour in schools. Lastly, the chapter will also present the benefits of physical exercises from current scholarship reviews.

2.2 THEORETICAL PERSPECTIVES ON THE CAUSES OF ADOLESCENT AGGRESSION

2.2.1 Biological theories of aggression

Biological theorists postulate that aggression may be attributed to either genetic or biological factors (Di Lalla, 2002). They contend that aggressiveness is transmitted by means of a genetic inheritance from one generation to the next. Accordingly, Venter, Poggenpoel and Myburgh (2005:1) state that aggression develops before birth and continues during childhood into adulthood.

Biological theorists believe that some genes related to aggression and present in the parents may be passed on to their children. The psycho-neurological disorders which may be hereditary, such as attention deficit hyperactivity disorder (ADHD) and schizophrenia should bear testimony to the above belief. Copps (in Bauer & Shea, 1999:71) agrees that approximately 30% of fathers and 20% of mothers of children with ADHD have inherited the disorder themselves. They also argue that schizophrenic parents will give birth to children with schizophrenia. Likewise, they contend that the

male species is more aggressive than the female because of a male hormone (testosterone) that enhances aggression in males.

Groebel and Hinde (1984:4) argue that the genetic element called the Y chromosome that is transmitted from father to son is associated with abnormal tallness (asynchrony). Abnormal aggressiveness in males comprises the normal XY constitution. Males with the XYY constitution of chromosomes show more aggressiveness and also maintain an unusual 'super male' image. Furthermore, Manning (in Groebel & Hinde, 1989) argues that any child with the XYY chromosome abnormalities is amenable to aggression, since he/she is exposed to all the intricacies of parental, familial and cultural influences during his/her development. Mabitla (2006:16) also reported that children with abnormal chromosomes can be identified by an increased incidence of severe temper tantrums and more behavioural problems.

Research in the first half of the 20th century provided the first supporting data on the relationship between genetics and aggressive behaviour (Siegal, 2005:10). Recent studies support earlier studies which indicate that the aggression in a child may indeed have been inherited. The abovementioned studies contend that prenatal development, health status and health habits (such as smoking, alcohol and drug abuse), exposure to radiation and the mothers' nutritional level, are all critical and determining factors for the development of aggressive behaviour. In supporting this view, Moeller (2001:73) postulates that prenatal problems in the development of the brain and the central nervous system can lead to psychological problems after birth, and any genetic dysfunction may cause an increase in aggression as the child develops into adolescence and adulthood.

Moeller (2001:73) also noted that a new-born child's observable physical and behavioural characteristics are a result of his/her genetic endowment, in conjunction with the prenatal environment to which the organism has been exposed. Children with certain genetic dispositions may be more sensitive to particular environmental stimuli and may, therefore, be more likely to exhibit aggressive behaviour (DiLalla, Elam &

Smolen, 2009:451). The above is in line with Freud's (1963:318) view of *catharsis* (change of energy), that emphasises that if the strength of the aggressive drive begins to build up, something must be done to release the energy (the exhibition of aggressive behaviour), before it becomes too intense. Shaffer and Kipp (2010:99) argue that environmental influences are factors that can impact on the release of that energy.

Theorists have explained how the genes may predispose children towards aggressive behaviour. Neurological abnormalities, such as diseases and disorders that affect the nervous system may also produce overt behavioural aggression (Moeller, 2001:81). For example, recent research findings indicated that neurological abnormalities, such as ADHD, as well as the localised dysfunction of the brain may lead to aggression (Gosalakkal, 2003:9). Neurological theorists contend that anti-social and aggressive behaviour originate in the limbic system and the frontal cortex. Moeller (2001:82) concludes that damage to and dysfunction in the cortex reduces the ability to inhibit these impulses, thus allowing them to be expressed in overt and angry behaviour.

2.2.1.1 Neurological abnormalities

Mabitla (2006:16) reported that children who experience inefficient transmission of neurological impulses may suffer from ADHD that is related to aggression. He further (2006:16) indicated that ADHD is a mental disorder of childhood affecting between two and 10% of school-aged children worldwide. Colaman (2006:63) argues that it is at least three times more common in boys than in girls, and is characterised by distractibility, persistent inattention, hyperactivity, or impulsivity. Children who suffer from ADHD may struggle socially and academically, and they frequently drop out of high school or impulsively commit reckless, delinquent or aggressive acts without thinking about the consequences (Shaffer & Kipp, 2010:312).

Gunam (2012:24) contends that in order to understand how neurological abnormalities occur, it becomes imperative to explore the workings of neuro-transmitters. *Neuro-*

transmitters are brain chemicals that communicate information throughout the brain and the body. They relay signals between nerve cells, called 'neurons'.

2.2.1.2 *Neuro-transmitters and hormones*

Gosalakkal (2003:11) states that serotonin and nor-epinephrine are two neuro-transmitters that are found in the limbic system which are directly associated with children's aggression. The same researcher further argues that serotonin is widely distributed in the central nervous system. There is some indication that suggests that serotonin may inhibit aggression. High levels of serotonin are associated with high self-esteem, mood-control and social status, but the inverse is also true. Low levels of serotonin are related to impulsive, reckless, violent or suicidal behaviour (Bauer & Shea, 1999:75). The serotonin levels among anti-social and aggressive children are reported to be very low. It has also been reported that nor-epinephrine is associated with children's aggression, and that when aggressive boys are compared with their non-aggressive peers, aggressive boys have relatively low levels of nor-epinephrine (Moeller, 2001:85).

Research has also discovered that boys and men are verbally more aggressive, on average, than girls and women (Shaffer & Kipp, 2010:567). The male sex hormone, testosterone, is reported to contribute to the sex differences in aggression. Shaffer and Kipp (2010:567) define *testosterone* as an anabolic steroid hormone from the androgen group which is secreted in the testicles of males and in the ovaries of females. Researchers further indicate that small amounts are secreted by the adrenal glands.

Biological theorists state that testosterone has an effect on behaviour, including sexual and aggressive behaviour. Research has indicated that aggression is enhanced during puberty when the production of testosterone increases. McDermott (2006:7) states that it is likely that individuals with higher levels of testosterone will more frequently engage in aggressive acts than those who possess relatively low levels.

Apart from the biological factors of aggression, psychological factors may also contribute to the aggression displayed by secondary school students. Hence, our next discussion is on the psychological factors.

2.2.2 Psychological theories of aggression

Researchers such as Venter et al. (2005:1) have re-affirmed the ideas of Sigmund Freud (1963) that aggression may develop before birth, which, together with the sexual drive, contribute to the development of the personality and finds expression in behaviour. Like Freud, Lorenz (1966:41) believes that aggression is innate an inherent fighting instinct, as significant in humans as it is in animals. Lorenz (1966:41) contends that the suppression of aggressive instincts, common in human societies, allows these instincts the chance to build up, occasionally to the point where they are released during instances of explosive violence. The theories of Freud (1963) and Lorenz (1966) emphasise the role played by frustration in redirecting an individual towards aggression.

For this reason, the frustration-aggression theory will be clarified below.

2.2.2.1 The frustration-aggression theory

The frustration-aggression theory was proposed and developed by researchers such as Dollard, Miller, Barker and Berkowitz (in Dollard, Doob, Miller, Mowrer & Sears, 1939). Colaman (2006:299) defines *frustration* as the blocking or prevention of a potentially rewarding or satisfying act or sequence of behaviour, or the emotional response to such a hindrance. In simple terms, it means that when human beings fail to achieve their goal or intent they may become aggressive. This may be particularly true when people have been very close to achieving their goals. This explanation confirms the theory of the psychologist, Clark Hull. Hull (1984:51) postulated that frustration produces aggressive energy, which activates aggressive behaviour. Dollard et al. (1939) also posited that the occurrence of aggressive behaviour always presupposes the existence of frustration, and the inverse - the existence of frustration, always leads to some form of aggression.

Felson and Tedeschi (1993:40), under the influence of Hull's work, describe the following factors as associated with the strength of the instigation to aggressive behaviour:

- The amount of the frustration correlates with the strength of the response that follows the frustration.
- The degree of the interference with a response is directly related to the instigation to aggression.

The frustration-aggression theory concludes that frustration (as aversive stimuli) may instigate aggression. However, for that to happen, relevant and/or suitable aggressive cues should be present in a person. Hence, it may be important to also look at the aggressive cue theory.

2.2.2.2 *The aggressive cue theory*

The aggressive cue theory is Berkowitz's (1962) most rigorous theory. He revised the work on aggression of former theorists. He argues that frustration as aversive stimuli may instigate aggressive reactions. He maintains that even though such aversive stimuli do not directly produce aggressive behaviour, they create the readiness for aggressive action. This implies that frustration does not always lead to aggression but only to the readiness for aggressive emotions and actions. Berkowitz (1962:258-259) cited *classical conditioning* as an example of how stimuli become aggressive cues, as follows, namely a stimulus may acquire aggressive meaning by being associated with positively reinforced aggression or by the association with previous unpleasantness or pain.

Despite the contribution that Berkowitz (1962) made through the aggressive cue theory, he revised this theory and developed two other theories, namely the cognitive neo-association model and the reactive aggression theory. These theories are briefly explained next.

2.2.2.3 *The cognitive neo-association model*

As noted above, Berkowitz (1993) revised his original aggressive cue theory. The essence of the cognitive neo-association model is that when an aversive stimulus (unpleasant event) takes place for an individual, it may cause unpleasant feelings such as pain, sadness or frustration. This type of feeling develops into something negative or produces negative effects. Examples of aversive events, according to Berkowitz (1993), are, namely frustrations, provocations, loud noises, uncomfortable temperatures and unpleasant odours.

Anderson and Bushman (2002:30) argue that the cognitive neo-association theory assumes that cues present during an aversive event become associated with the event and with cognitive and emotional responses triggered by the event. The response is only determined by the individual's interpretation of the negative effect. For instance, according to Gasa (2005:26), the blockade of a goal would not instigate aggression if an individual does not experience it as an unpleasant event. Moreover, Berkowitz (1993:191) argued that frustration produces instigation to aggression only to the degree that it generates a negative effect.

Gasa (2005:27) also argues that people react aggressively only if they relate an incident to a previous negative experience. This means that the previous experience should be stored in the memory. He (2005:27) concludes that if the incident is not perceived as negative, despite how bad it may be, the chances of an aggressive reaction are low to none. This is in line with Collins and Loftus' (1975) assertion that aggressive thoughts, emotions and behavioural tendencies are linked together in the memory. Anderson, Anderson, Dill and Deuser (1998) crafted a simplified scheme of an associative memory structure, as shown in Figure 2.1 that follows.

Aggression concepts.

Retaliation script

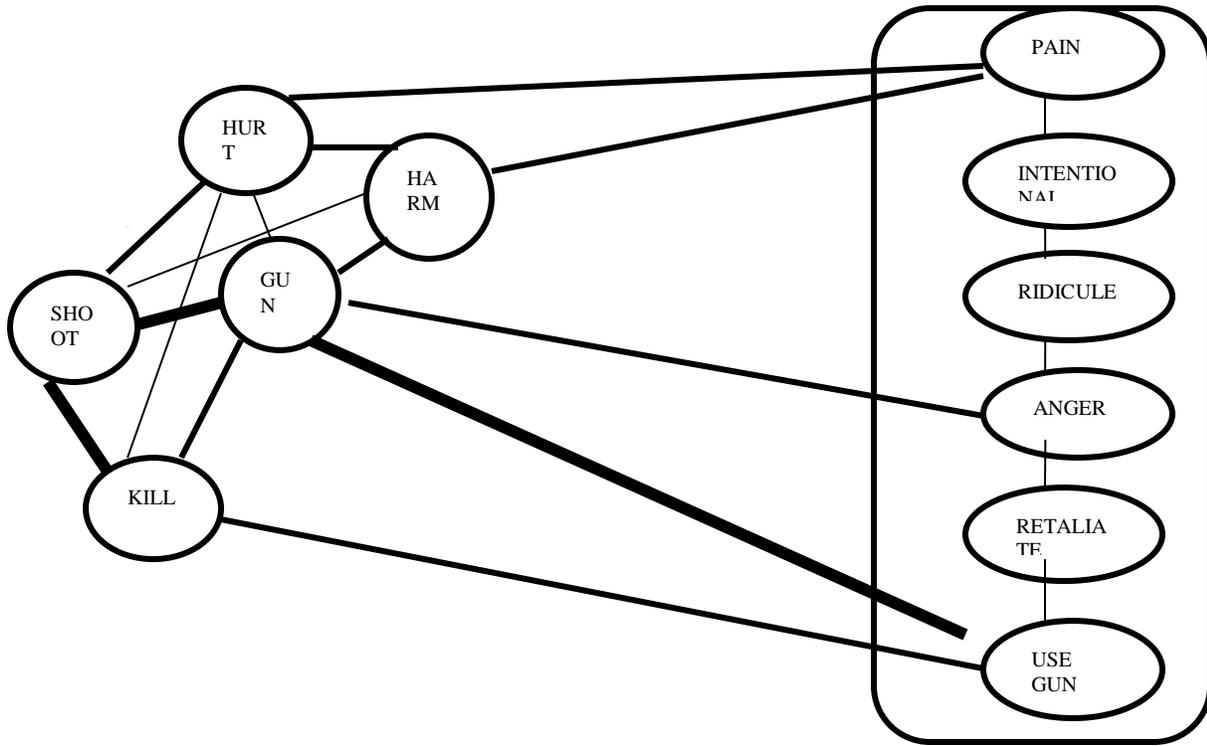


Figure 2.1: Simplified associative networks with aggression concepts and a retaliation script (Anderson et al., 1998).

In the above diagram (Figure 2.1), the concept of a gun is associated or linked to a number of concepts related to aggression. The structure is characterised by two concepts, namely those with similar meanings (for example, hurt, harm), and those that are frequently activated simultaneously (for example, shoot, gun). The above two concepts develop strong associations. In Figure 2.1 the associations are illustrated by lines between the concepts. Thicker lines represent stronger associations, and a shorter distance represents greater similarity of meaning. Anderson and Bushman (2002:30) conclude that when a concept is primed or activated, this activation spreads to related concepts and increases their activation as well.

2.2.2.4 *The reactive aggression theory*

Berkowitz (1993) introduced this theory to emphasise his point that aversive stimuli cause negative effects, which in turn cause an instigation to aggression in the form of an 'urge to hurt' (Gasa, 2005:27). If an individual associates cognitions as having a negative effect, that may lead directly to the instigation of aggression. This instigation causes aggressive behaviour (Berkowitz, 1993:45).

Berkowitz (1993:56-58) stresses that high provocation produces anger, which is aversive, and high evasiveness interferes with the experience of empathy. According to Gasa (2005:28), this means that if an individual's empathy is low and he or she has an aversive experience, pain cues are associated with increased aggression and reinforce aggressive behaviour.

The last biological theory of aggression that is explained is that of excitation-transfer. This theory is explained in the next section.

2.2.2.5 *The theory of excitation-transfer*

The excitation-transfer theory was formulated by Zillmann (1983) in trying to understand aggressive behaviour. In this approach he perceives aggression to be motivated by arousal. He (1983) defines *arousal* as the excitation of the sympathetic nervous system as evidenced by bodily reactions such as an increased heart rate, perspiration and an elevated blood pressure.

Zillmann (1983) posits that physiological arousal may dissipate slowly. He theorises that if two arousing events are separated by a short amount of time, the arousal from the first event may not contribute to the second event. He further theorises that if the second event is related to anger, the additional arousal should make the person even angrier. Anderson and Bushman (2002:32) developed Zillmann's (1983) notion of excitation-transfer by suggesting that anger may be extended over long periods of time

if a person has consciously attributed his or her heightened arousal to anger. They conclude that, even after the arousal has dissipated, the person remains ready for aggression for as long as the self-generated label of anger persists.

Zillman (in Felson & Tedeschi, 1993) postulates that cognitive regulation of aggressive behaviour is impaired by high levels of arousal. He states that a person who is attacked and experiences a high level of arousal will not retaliate unless he/she is predisposed to do so by past learning. He argues that when a person is attacked, he or she will plan to retaliate in a manner that corresponds to the level of the attack. Felson and Tedeschi (1993: 76) conclude that the stronger the provocation, the greater the excitement or the arousal, and the more intense will the aggressive behaviour be.

In the next sections, the social learning theories are explained. These theories include parental influence, the age of the mothers, trauma, onset of puberty, access to firearms, poverty, drugs, the mass media and the school ethos.

2.2.3 The social learning theory of aggression

The social learning theory was developed by Albert Bandura (1973). He believed that aggression is acquired via direct experience or by observing others (vicarious means) that function as role-models, and also by interacting with others. As evident in the above, the point of departure for this theory seems to be its postulation that aggression does not depend on internal drives. This theory argues that some people may even learn complex skills vicariously, and also that some may learn aggressive behaviour through trial and error. Accordingly, Baron and Richardson (1994:33) argue that people may acquire a variety of aggressive responses when rewarded for such behaviour. They also contend that receiving reinforcements for acts of aggression increases the probability of aggressive behaviour.

Baron and Richardson (1994:35) categorise rewards and punishments for aggressive behaviour as follows:

- Aggression may come from sources external to the individual, and include tangible rewards and punishment, social praise or rejection, and the reduction or increase in aversive treatment by others.
- Aggression may be regulated by vicarious experiences, for example, observing the rewarding or punishing consequences of aggression in others.
- Finally, rewards and punishment may be self-administered.

According to Bandura (in Felson & Tedeschi, 1993:106), there are four processes by which modelling can instigate or lead to aggressive behaviour. These are:

- A direct function of modelling serves to inform the observer about the causal means-ends relations in the situation.
- An inhibitory function of a model teaches the observers that they should avoid the punitive outcomes associated with aggressive conduct.
- The observation of others who engage in aggressive behaviour causes emotional arousal in the observers, which may enhance the likelihood of imitative aggression or may heighten the intensity of aggressive responses.
- The observation of a model may have stimulus-enhancing effects by directing the observers' attention to the kind of implements or tools being used.

Bandura (1983) postulated that in order to engage in aggressive action, individuals need to learn how to use a weapon, they need to ascertain the movements that make physical contact painful for the victim, or they must understand what words or actions will be considered hurtful to their targets.

Govender and Killian (2001:1) argue that continued exposure to acts of violence is likely to induce a process of learning and imitation. This should culminate in the acceptance of violent conduct as a dominant and normal mode of conflict-resolution. In addition, Bandura (in Felson & Tedeschi, 1993:103) showed that learning by observation involves three interrelated processes:

- The individual must notice or pay attention to the cues, behaviour and outcomes of the modelled event.
- These cognitive processes are transformed into imitative response patterns that are new for the individual.
- Finally, given the appropriate inducements or incentives, the learned behaviour pattern will be performed.

The social learning theory acknowledges the contribution of biological factors to aggression. According to this theory, people are endowed with neuro-physiologic mechanisms that enable them to behave aggressively, but the activation of these mechanisms depends on the appropriate stimulation and is subject to cognitive control. The specific forms of aggressive behaviour, the frequency with which it is expressed, the situations in which it is displayed, and the specific targets selected for attack are largely determined by the social learning factors (Baron & Richardson, 1994:33).

Other theorists have expanded on the social learning theory. Consequently the script theory was formulated.

2.2.3.1 *The script theory*

Huesmann (1986, 1998) expanded on the theory of social learning and proposed the script theory. The script theory contends that when children observe violence in the mass media, they may learn the aggression scripts. He further argues that scripts define situations and guide behaviour. The above contention is clarified by Anderson and Bushman (2002:31) as follows, namely the person selects a script to represent situations and assumes a role in the script. Once a script has been learned, it may be retrieved at some later stage and be used as a guide for behaviour. The scripts are described as sets of particularly well-rehearsed and highly associated concepts in the semantic memory. Scripts often involve causal links, goals and action plans. The more a person cognitively engages with the script, the more the script gains accessibility and strength. According to Anderson and Bushman (2002:31), the rehearsal of the script

has two consequences: firstly, it creates multiple links to other concepts in the memory. This increases the number of ways in which the script can be activated. Secondly, the rehearsal of the script increases the strength of the links themselves.

Next follows the behavioural theory of aggression.

2.2.4 The behavioural theory of aggression

Similar to the theory of social learning, the behavioural theory emphasises the learning of aggression within the social context. Behavioural theorists postulate that aggression can be learned, maintained and unlearned through the processes of classical and operant conditioning. These theorists believe that aggression tends to be learned through classical conditioning, and strengthened and maintained through operant conditioning (Gasa, 2005:38).

Moeller (2001:29) argues that, according to classical conditioning, if a stimulus for an aggressive response repeatedly occurs at the same time and in the same place as some initially neutral stimulus, that aggressive response will eventually begin to occur in the presence of what initially was a neutral stimulus. In Pavlov's terms, the environmental stimulus becomes the conditioned stimulus for the conditioned response of aggression. In operant conditioning, aggressive responses are reinforced, thereby strengthened and maintained. For instance, the aggressive response might produce some positive pay-off. In this case the aggression it is strengthened through positive reinforcement. In conclusion, Moeller (2001:29) stated that children can learn aggression through both positive and negative reinforcement.

2.2.5 Conclusion

Theorists on the causes of aggression have done important research in this regard. The instinct theorists conclude that aggressive behaviour is largely innate. The frustration aggression theorists maintain that frustration elicits a persistent instigation (i.e., drive)

towards aggression. Cognitive models such as the aggressive-cue theory, the cognitive neo-association model and the reactive aggression theory suggest that the way people think about and interpret threats or provocations will influence how they feel and how they behave. The diagram in Figure 2.1 clearly illustrates the cognitive neo-association model. Similarly, the extent to which an individual experiences emotional arousal or negative affect will influence the cognitive interpretation of the extent of the danger to the self (Gasa, 2005:39).

In contrast to the above, the social learning theorists attribute aggression to direct experience and observational learning. The exposure to many aggressive people that may involve an individual in aggressive episodes and the presence of aggressive models increase the likelihood of the imitation of the aggressive behaviour (Gasa, 2005:39). The script theory expands on the social learning theory by proposing that children learn aggressive scripts by observing violence in the mass media.

Adolescence is one of the critical stages with regard to cognitive development and is relevant to this study. Hence our next discussion will look at factors that empirical evidence has shown are related to adolescent aggression. This illustrates the practical manifestation of the previous theories that were discussed.

2.3 FACTORS RELATED TO ADOLESCENT AGGRESSION

Venter et al. (2005:1) argue that various factors play a significant role in contributing towards adolescent aggressive behaviour. They argue that these factors include the inability to cope with frustration during puberty, uncomfortable environments, poor socio-economic circumstances, poor family relationships and exposure to aggressive role-models such as parents demonstrating aggressive behaviour.

2.3.1 Parental influences

2.3.1.1 Parental aggression and alcoholism

Research has indicated that parents who indicate poor self-control and aggressive and violent behaviour may serve as role-models for their children. Adolescents who observe their fathers frequently beating their mothers, will have different views on issues, and are likely to show similar behaviour towards their partners (Szyndrowski, 2005:11). Gunam (2012:26) contends that this kind of aggression can also be learnt from other adult role-models, such as teachers.

According to Bemak and Keys (2000:17), aggressive behaviour in children develops over time as the child internalises a family system characterised by harsh, inconsistent discipline, poor supervision, inappropriate parental modelling, and the overall poor management of the adolescents' aggressive behaviour. It is important to note that ineffective parents tend to have a very narrow repertoire of disciplinary strategies which is often limited to either verbal or physical aggression (Lochman, 2002:17).

Two major parental risk factors which tend to characterise hyper-aggressive children are the following: firstly, they tend to be born to teenage mothers (under the age of 18); and secondly, their parents tend to show high rates of psycho-pathology (Moeller, 2001:98). A *psychopath* is a person suffering from a mental illness or mental distress or a manifestation of behaviour and experiences which may be indicative of a mental illness or of psychological impairment. Research has associated oppositional defiant disorder and conduct disorder with parental alcoholism and anti-social personality disorder. According to Hill (2002:149), the parents' behaviour increases the likelihood of the child showing further oppositional or aggressive behaviour.

Robbins (2000:121-122) pointed out that the excessive drinking of alcohol does not only promote aggression, but it serves as an excuse for it. The consumption of alcohol can be linked to the commission of physical and verbal aggression by husbands with regard

to their wives and children. McAdams and Lambie (2003:1) assert that parents who abuse substances try to maintain a closed-home environment where everyone is controlled. This is problematic for the adolescents who feel frustrated, neglected and abused. They may vent their anger by screaming and abusing others at school, both verbally and physically. Thus, there is a link between alcohol-abuse and verbal aggression. Parents who drink alcohol excessively are prone to using vulgar language in the presence of their children. Such parents may imprint similar behaviour in their children so that they may also use this type of language (Szyndrowski, 2005:9). Substance-abuse does not only promote aggression, it also serves as a catalyst for divorce, separation and single-parent homes (Robbins, 2000:125). All of these may enhance the aggression of the children who are affected.

2.3.1.2 Divorce, separation and single-parent homes

Divorce or separation can influence the onset of behavioural problems in adolescents, leading to aggressive and anti-social behaviour (Delfos, 2004:138). Research has found that adolescent boys react more aggressively to divorce, as they are more demanding and ready for action than adolescent girls, who are more emotionally labile and inwardly-directed. Heavens (2001:66) argues that parental separation and divorce affect an ever-increasing number of adolescents who respond to the situation with anger, resentment, bewilderment, shame, anxiety, depression, confusion and aggression, as divorce is generally very stressful for them. Adolescents find it difficult to face divorce when it happens. As a result, they end up adopting tactics such as aggressive behaviour in order to cope with the situation (Gasa, 2005:45-46).

2.3.2 Adolescent mothers

Research indicates that children born to adolescent mothers are at a great risk of chronic physical aggression during their early years of childhood (Mack, 2010:10). Consequently, they develop behavioural problems, and are often delinquent during the course of their lives. Research further established that most of these teenage mothers

leave school early, are socially less competent, display higher rates of stress, report more internal and external behavioural problems and exhibit delinquent behaviour. In South Africa 33% of all the women who give birth are under the age of 18 years (Shaffer & Kipp, 2010:234).

Adolescent mothers are not psychologically prepared to become parents, a fact that can greatly affect their babies' developmental outcomes (Shaffer & Kipp, 2010:234). Mack (2010:9) asserts that adolescent mothers have a higher probability of coming from broken homes and low-income families, have little or no education, utilise an aversive parenting style and engage in prenatal substance-abuse. This leads to aggressive behaviour as exhibited by their children.

2.3.3 Trauma

Trauma refers to those experiences or situations that are emotionally distressing and painful. People who are traumatised generally find it hard to cope and to adapt to life. Delfos (2004:133) argues that the younger the child is when experiencing a traumatic event the more extensive and lengthy the consequences are. The result is that the experience may have a profound effect on the child. The traumatic experience affects all the developmental tasks such as the intellectual, socio-emotional, physical and motor development. It may start in early childhood and extend into adulthood.

Apart from coping with the trauma related to divorce and substance-abuse, adolescents also have to cope with pubertal changes, which often result in depression and restlessness (Shaffer & Kip, 2010:226). This can enhance their tendencies to aggression.

2.3.4 The onset of puberty

Rimland (2005:3) argues that it has been found that a large number of cases of aggressive or self-injurious behaviour are the adolescents' responses to the challenges

of puberty. He further mentions that children change in body size and shape when they enter the adolescent stage and reach sexual maturity. When the pubertal changes are peaking, the adolescents exhibit signs of moodiness, bouts of depression and restlessness, and they feel close to their parents with whom they often argue (Shaffer & Kipp, 2010:226).

Gunam (2012:30) reports that a girl who matures early may look different from her female classmates, who may tease her and poke fun at her womanly attributes. Peplar (2005:9) is of the view that young adolescent girls may be affected by their early maturation, leading to their involvement with deviant peer groups and to family conflict. These girls tend to perform poorly at school and drop out more readily than their late-maturing classmates.

On the other hand, early maturing boys enjoy a number of social advantages over boys who mature late (Shaffer & Kipp, 2010:227). They tend to be poised, confident in social settings and popular with their peers. Alternatively, studies have discovered that late-maturing male adolescents are more eager, anxious and attention-seeking, less masculine and less physically attractive. They tend to feel socially inadequate and inferior, have lower educational aspirations and also score lower in school achievement tests (Shaffer & Kipp, 2010:227).

2.3.5 Access to firearms

Studies have found that adolescents may regard the access to firearms as appropriate. Firearms may give young people, particularly those who feel powerless, a feeling of power and bravado, which can have fatal consequences. This fact seems to link with the high levels of violence in secondary schools and it may, in some instances, result in the death of innocent children. Naran (2006:8) cited an incident where a student was shot dead by one of his fellow students near the school grounds of a Gauteng school. Naidoo (2008:1) reported of a 15 year-old student who was arrested for the possession of an unlicensed firearm. The availability of guns for adolescents who typically resort to

violent and aggressive behaviour in social situations leads to the likelihood that aggressive encounters may have fatal outcomes (Bemak & Keys, 2000:19).

2.3.6 Poverty

Many aggressive and violent adolescents come from poverty-stricken and low socio-economic backgrounds. Huston and Ripke (2006:426) contend that poverty can be correlated positively with violent crimes. Studies found that poorer children are more likely to experience greater life event-stresses, which in turn could result in behavioural problems. Children from poverty-stricken and low socioeconomic backgrounds are at higher risks of displaying aggression, even later as adults, and of having poorer educational outcomes and lower occupational attainment (Huston & Ripke, 2006:425).

2.3.7 Drugs

De Wet (2006:2) reports that the use of and trading in drugs, as well as the carrying of weapons to school, are the most wide-spread violence-related types of behaviour among secondary school students. National surveys reveal that schools are places where alcohol and other drugs are both present and accessible to students (Gunam, 2012:35). This report is supported by earlier statistical data. Finn and Frome (2003:38) established that 33% of the students in grades nine to twelve recently reported that drugs were available to them at school, and 36% of the students whose ages ranged from 12 to 19 years reported that marijuana (dagga) was easily accessible, not only in the school buildings, but also on the school grounds and buses.

Breslow and Smothers (2004:6) indicate that alcohol and drugs often produce psychomotor stimulatory affects that lead to an increase in sensation-seeking and impulsivity, as well as an increase in aggressive, confrontational and provocative behaviour. The problem of drugs and alcohol may be intensified by the influence of television and other mass media (Huston & Ripke, 2006:319).

Hence, our next discussion is on television and the media.

2.3.8 Television and the media

According to Baron et al. (2006:431), watching violence in the media increases aggression in children. Bemak and Keys (2000:21) support this view by postulating that the prevalence of violence in the media renders the youth prone to violent and aggressive behaviour. In accordance with the social learning theory and the script theory, students learn by observing what other persons do. By observing what is shown in the movies, they may learn violent and aggressive behaviour, especially considering that films often make violence appear acceptable (Siegel, 2004:158). In many instances the violence is justified in the films and it may even be portrayed as rewarding (Orpinas, 2006:52).

Apart from television and the media, Venter et al. (2005:1) found that inadequate school resources and a poor school ethos may facilitate aggression in adolescents at secondary school. This issue is discussed next.

2.3.9 Inadequate school ethos and discipline

The school may contribute to the adolescents' anti-social behaviour and aggression. The lack of resources in many South African schools has not only decreased the teachers' but also the students' morale. The teachers and the students have become disillusioned and frustrated by the government's inability to deliver services to the schools (Masondo, 2011:6).

Research has also found that the teachers' effective classroom management, and positive school norms and values are critical for excellent academic achievement and for proper student conduct. Gunam (2012:38), as well as Moeller (2001:279), point out that if the teachers arrive at school unprepared, and do not deliver their lessons confidently and enthusiastically, and if they are not consistent in terms of applying

school rules or are overly authoritarian, the students experience a feeling of hopelessness and frustration. Some students then resort to unacceptable anti-social behaviour, which includes aggressive behaviour, and which compromises the learning environment.

In addition to the above, it was established that school rules and discipline codes have been seen to contribute to aggressive behaviour, particularly if they require rigid and unquestioned conformity. This may lead to feelings of anger, resentment and rejection (Gunam, 2012:39). Gunam further contends that when the rules are designed purely for heightening control without any proper explanations being given to the students, those who find it difficult to make sense of the rules tend to become agitated and frustrated. Consequently, they are inclined to be defiant. This behaviour may be reinforced over time (Delfos, 2004:194).

Harsh disciplinary practices such as corporal punishment have no positive effect on the development of the child (Delfos, 2004:207). Sadly, the findings indicate that despite corporal punishment being abolished and its abolition being gazetted in the South African School's Act, Act 84 of 1996, it continues to be administered in many schools around the country. It has been indicated that the use of corporal punishment is positively related to higher rates of student interpersonal aggression (Lochman, 2002:71). Harsh disciplinary measures, such as beatings, may be detrimental to those who feel humiliated by such actions, which, in turn, results in them retaliating with hostile, anti-social and aggressive behaviour (Delfos, 2004:207).

Huston and Ripke (2006:427) stated that for every aggressive act, there is a consequence, which does not merely affect the individual concerned adversely, but also the entire school and its community.

The varying manifestations and consequences of student aggression in secondary schools are therefore discussed briefly below. It is hoped that these consequences may be alleviated by means of physical exercises, which is the aim of this study.

2.4 THE MANIFESTATIONS AND CONSEQUENCES OF STUDENT AGGRESSION IN SECONDARY SCHOOLS

Adolescent aggression manifests itself in various forms in the secondary school. The following are some of these manifestations.

2.4.1 Bullying

Bullying refers to a social act in which a student (e.g., an adolescent) exerts power or influence over another student in a negative manner to achieve a desired effect or outcome (Jenson & Dieterich, 2009:3). It occurs when a more powerful person directs his/her aggression repeatedly at a less powerful person (Gunam, 2012:44). Research has found that bullying may be psychological, physical, verbal or social. Moreover, it can also be exercised through the electronic media (cyber-bullying). Shaffer and Kipp (2010:571) contend that bullying is most frequent in early adolescence (the sixth to the eight grades) and is equally common in urban, suburban and rural areas.

Academic research found that the consequences of bullying may vary depending on the victim. It may include loneliness, anxiety, a feeling of depression, an erosion of the self-esteem and a growing dislike or avoidance of school. Suicide is one of the possible long-term consequences of bullying. Shaffer and Kipp (2010:572) indicate that some victims of bullying may become sedentary, physically weak, reluctant to fight back, and ultimately resort to taking their own lives.

2.4.2 Physical, verbal and sexual bullying

Nelson (2006:134) argues that in humans, bullying manifests itself in various forms, namely physically, verbally, sexually, with or without a weapon and it may be impulsive or premeditated. Marsh, Williams and McGee (2009:246) state that the effects of such bullying compromise the learning environment and contribute to severe psychological distress among the students and the teachers. Research at the Education Department

of the University of the Free State revealed an extremely high rate of verbal, physical and sexual bullying at secondary schools by both the students and the teachers (Carter, 2006:27).

2.4.2.1 *Physical bullying*

Physical bullying involves activities where actual physical harm is intentionally done to a person. This may include hitting, kicking, shooting, pushing or shoving others, throwing objects, breaking windows, defacing property, and setting objects alight.

2.4.2.2 *Verbal bullying*

Verbal bullying involves using words to mentally harm another person. This may include making threats or writing intimidating notes or letters, calling people names, spreading gossip or teasing others. Girls are more inclined to make use of verbal and indirect bullying than do boys (Smit, 2003:31).

2.4.2.3 *Sexual bullying*

Sexual bullying may manifest itself through sexualised verbal bantering and the sexual abuse of the victims (Carter, 2002:30). It is relatively common for boys to make use of sexual bantering to embarrass or humiliate girls. This includes uttering insults, as well as using sexually denigrating and foul language. This may involve name-calling such as 'whore', 'tart', and 'bitch'. Boys may also touch girls inappropriately against their will. Girls may retaliate by calling the boys 'dick head', 'poof' or 'gay'. These words are incisive and damaging, and are considered swear words in heated exchanges between the sexes (Mabitla, 2006:35). Girls may also show other forms of sexual aggression by wearing sophisticated make-up, colouring or styling their hair, shortening their skirts and wearing tattoos to gain the boys' attention (Mabitla, 2006:36).

2.4.3 Vandalism and arson

According to De Wet (2004:206), vandalism is on the increase in countries such as South Africa, Canada, Australia, the United States of America, France and Britain. Research reports confirm that school vandals are likely to be youngsters between the ages of 11 and 16 years. Both male and female students engage in vandalism. Nonetheless, male students are more likely to engage in damaging school property than female students (Finn & Frone, 2003:46). These students have low levels of identification with their schools and poor school achievement. Damaging a building can also be an expression of resisting authority (Delfos, 2004:161).

Other than vandalism, schools face the possibility of arson. *Arson* is a crime of intentionally and maliciously setting fire to buildings, wild-land areas, vehicles or other property with the intent of causing damage. According to Jones (in Moeller, 2001:270), arson accounted for approximately 57% of all school fires, or about eight school fires per day. He contends that in 80% of the cases, the arsonists were juveniles. Arson at school is connected with inadequate impulse-control, and is an expression of fierce aggression against the teachers and parents (Delfos, 2004:161).

2.4.4 Low self-esteem

Self-esteem refers to a person's overall emotional evaluation (self-judgement) of his or her own worth. Some studies postulate that a low self-esteem is related to anti-social and aggressive behaviour among adolescent secondary school students (Moeller, 2001:200). Moeller argues that such students may be unable to gain recognition from others in academic, sport and/or extra-curricular activities. When they fail to gain recognition, they may suffer from anxiety, insecurity and fear (Dellasega & Nixon, 2003:8), and they may express their feelings through anti-social behaviour in the form of absenteeism, reclusiveness, substance-abuse and aggression.

Ancer (2009:7) states that students who are victims of repeated aggression tend to have poor coping mechanisms in ordinary situations. They may also have a low self-esteem and may be anxious or passive, and struggle to assert themselves. On the other hand, they may also respond too impulsively or aggressively to an event, making them a sure target for aggressors who thrive on getting reaction from their victims.

2.4.5 Hyperactive and disruptive behaviour

Hyperactivity refers to busy, overactive and restless behaviour (Delfos, 2004:169). Aggressive students tend to disrupt the lessons in the class as they cannot sit still. Thus they move around the classroom and disturb their classmates during the teaching and learning process. Some of these students could be suffering from ADHD. ADHD is an example of a psychological disorder related to hyperactivity. It is also known as 'hyperkinetic' disorder. ADHD is a mental disorder or neuron-behavioural disorder characterised by significant difficulties of inattention or hyperactivity and impulsiveness, or a combination of the two conditions.

It involves continual unrest which occurs in a generalised way in all situations. Delfos (2004:170) postulates that an adolescent with ADHD cannot process many stimuli at the same time. This means that the limited processing of stimuli causes him or her to move from one stimulus to another, because processing two stimuli at the same time presents problems. That which presents itself at that moment captures the attention. Thus, the adolescent will stop the previous activity that he/she was engaged in, and often leave it unfinished. For example, the adolescent will be busy writing and will raise a hand and ask the teacher a question, but before the question can be answered, the idea of pinching another child comes to mind, which he/she then proceeds to do. Delfos (2004:170) further argues that such behaviour makes it likely for those children to be rejected by their peers, their teachers and even their parents. Consequently, underachievement and aggression at school are possible outcomes.

2.4.6 Underachievement

Keller and Tapasak (in Bester & Du Plessis, 2010:2009) postulate that anti-social and aggressive children do not perform well at school. Students who have poor academic skills become frustrated and lose their academic motivation, and may consequently resort to anti-social and aggressive behaviour. The anti-social and aggressive behaviour may include disrupting the lessons, playing truant, joining deviant peers, harassing other students, dropping out of school, easily becoming bored, and also becoming delinquents (Moeller, 2001:280).

2.4.7 Stress and physical illness

Apart from underachievement, aggressive students may be prone to fear and may easily be intimidated. Fear and intimidation may lead to prolonged absenteeism, frequent resignations by staff and thus disruption of the school community, and even illness caused by stress, anxiety and depression (Makwabe, 2007:4). Fear stifles people's thinking and actions. It creates indecisiveness, which results in stagnation. Fear can also drive people to destructive habits. To numb the pain of distress and foreboding, some students may turn to drugs for artificial relief.

Teachers who feel vulnerable themselves are less likely to provide additional educational services beyond school hours for fear of intimidation, preferring instead to retreat from the "war zone" as quickly as possible at the end of the school day (Bemak & Keys, 2000:10). In South Africa the teachers live in a constant crisis due to the violence meted out to them by the students, and also their frequent experiences of depression, anxiety and stress (Makwabe, 2007:4). Consequently, the teachers may take long periods of leave from school because of stress-related physical problems, and this prolonged absenteeism may affect teaching and learning adversely. The absence of effective teachers increases the prospects of the students' aggression in the class, because there is no one to supervise and monitor them. Dibetle (2008:7) confirms that

the high levels of stress due to school-based violence can result in teacher stress and absenteeism.

As indicated before, recurrent acts of aggression may be detrimental to both the teachers and the students. Accordingly, Carter (2006:27) argues that the victims of aggressive acts cannot cope with the resulting stress, anguish and humiliation. The aggressive behaviour displayed by violent adolescents can affect other adolescents mentally, psychologically and physically, most notable as post-traumatic stress disorder (Moeller, 2001:161).

Researchers and clinicians argue that stress and depression contribute to physical symptoms such as headaches, weakness, back problems, diarrhoea and bladder problems. Recent research also links student aggression to coronary heart disease. Aggressive students often possess 'type A' personalities. 'Type A' personalities tend to be very competitive and self-critical. They strive towards their goals without feeling a sense of joy in their efforts or accomplishments. Consequently, aggressive students with 'type A' personalities are more prone to develop coronary heart disease (Robbins, 2000:90). Mental illnesses may also develop.

2.4.8 Mental illness

The consequences of aggression on students can be devastating, to the extent that they may suffer from depression, which may even eventually lead to suicide (Shaffer & Kipp, 2010:572). *Depression* is a mood or state of sadness, gloom and pessimistic ideation, with a loss of interest or pleasure in normally enjoyable activities. The physiological and hormonal changes that accompany sexual maturation during adolescence may also contribute to increased moodiness and restlessness, with the young adolescents experiencing loneliness and a sense of low self-esteem (Shaffer & Kipp, 2010:433). Furthermore, the researchers indicate that during these periods the bouts of serious and sub-clinical depression may increase, affecting as many as 15% to

20% of the adolescents, with more girls than boys showing an elevation in depressive symptoms.

In severe cases of depression it can be accompanied by, for example, anorexia and consequent weight loss, insomnia or hyper-insomnia, asthenia, feelings of worthlessness or guilt, a diminished ability to think or concentrate, or recurrent thoughts of death or suicide (Colaman, 2006:202). Irritable behaviour in students can be an indication that they may be experiencing anxiety or depression (Delfos, 2004:201).

2.4.9 Conclusion

It is evident that aggression among adolescents has serious and detrimental consequences for the learning and teaching process in the secondary school. Student aggression compromises the culture of learning and teaching. Most critically, it threatens the individual's basic human rights, as outlined in the Bill of Rights (chapter 2 of the S.A. Constitution Act 108 of 1996, section 10(Human dignity), section 28 (Children's rights), and 29 (Right to education). Gunam (2012: 54) postulates that education includes the rights of the students and the teachers to learn and teach in a safe environment, free from all forms of violence and aggression. He concludes by stating that unfortunately this is not the case in many schools in South Africa, as the current school climate and education setting not only exposes children to violence, but also teaches them how to be violent.

The above exposition shows that techniques to prevent violence and strategies to intervene with at-risk aggressive adolescents need the serious attention of the education policymakers. This is the main aim of this study that strives to investigate the possibility of using physical exercises to alleviate feelings of aggression in school students.

Accordingly, what follows is an in-depth literature study on managing aggressive and disruptive behaviour in the schools.

2.5 MANAGING AGGRESSIVE BEHAVIOUR IN SCHOOLS

Research has identified some effective intervention mechanisms to address adolescent aggression. The intervention programmes vary from group intervention programmes to individual treatment therapies. The group interventions seem to be appropriate not only to address aggressive behaviour but also to support those individuals who are at risk of experiencing aggressive behaviour. The intervention programmes that will be discussed are the following, namely: Cognitive Behaviour Modifications (CBM); Anger-control programmes (ACP); Problem-solving Skills Training (PSST); Parent Management Training (PMT); the Good Behaviour Game (GBG); the teaching pyramid (the promotion, prevention and intervention model); and most importantly for this research, the effect of physical exercise programmes on aggression.

2.5.1 Cognitive Behaviour Modifications (CBM)

In CBM the behavioural change strategies should be incorporated into the daily routines of the students to mitigate the negative effects of aberrant classroom behaviour. According to Crooks and Peters (2005:170), the early identification of disruptive behaviour can facilitate more timely interventions, thereby addressing problems before they become pervasive and require expensive, long-term interventions. The CBM address and remediate behavioural excesses and deficits. It uses elements of behaviour therapy (such as modelling, feedback and re-enforcement) and combine them with cognitive approaches (such as cognitive think-aloud). Its principal aim is to teach the adolescents cognitive strategies such as anger-control and self-copying in terms of changing behaviour (Gunam, 2012:74).

Gunam (2012:72) argues that some studies in CBM used verbal self-instruction to improve the attention and performance with regard to cognitive tasks. This was done with students who exhibited hyperactive behaviour or poor self-control. The teacher would model a cognitive task such as colouring-in figures or copying line patterns by using overt self-instructions -- that is, talking aloud while colouring-in or copying, and

then prompting the students to do the same. The rationale for this instructional sequence was to guide the students to progress from overt to covert self-tasking, thus improving their attention to and comprehension of the task at hand, and subsequently reducing off-task behaviour (Robinson, Smith, Miller & Brownell, 1999:196).

There are several examples of CBM programmes. They include, for example anger control programmes, training in problem-solving skills, and parent management training. Their aim is to provide new coping techniques for the management of anger, and may also help with alternative ways of dealing with social conflict.

Each of the abovementioned programmes will now be explained briefly.

2.5.2 Anger-control Programmes (ACP)

ACPs were developed by Eva Feindler and her colleagues (in Barry & Lochman, 2004:1). The programmes teach adolescents how to modify their aggressive and impulsive behaviour when faced with aversive or stressful situations. These programmes have been shown to lead to significant changes in the problem-solving abilities and the self-control of aggressive adolescents.

2.5.3 Problem-solving Skills Training (PSST)

This PSST programme was developed by Kadzimir and his colleagues (in Barry & Lochman, 2004:1). It aims at treating oppositional defiant disorder or conduct disorder in youths of varying ages. PSST involves 12 or more sessions designed to teach the students problem-solving steps and to introduce effective ways of applying the steps. It includes applications to real-life situations, and provides the opportunities of role-playing the use of the steps. The training also involves the parents.

2.5.4 Parent Management Training (PMT)

This programme consists of 13 sessions of observing behaviour; positive reinforcement; attending to school interventions; holding family meetings; negotiating; contracting; compromising; and dealing with problem behaviour. The research outcomes show that a combination of PSST and PMT is more effective than either programme alone (Barry & Lochman, 2004:2).

2.5.5 The Good Behaviour Game (GBG)

The literature describes the GBG as a classroom-based behaviour management strategy that facilitates pro-social behaviour and reduces disruptive behaviour (Van Lier, Muthen, Van der Sar & Crijnen, 2004:468). Unlike the activities of the CBM which are designed and monitored by the teachers or the parents alone, in the GBG the design (class-rules) is formulated by the teacher in conjunction with the adolescents. According to Van Lier et al. (2004:469), the positively-formulated rules are accompanied by pictograms that are attached to the writing board. The adolescents are then placed in groups consisting of three to four members, with each group having a fair mix of disruptive and non-disruptive students. Each group is given a number of cards and the teacher takes away a card if the group violates a rule. The group that still has a card or cards at the end of the class period is rewarded with compliments or stickers for appropriate behaviour. The winning teams receive tangible rewards at the end of the period (weekly or monthly), according to their cumulative performances.

The GBG is based on Skinner's behavioural theory of positive and negative reinforcement processes that strengthen a specific type of behaviour (Gunam, 2012:73). Positive and negative reinforcement processes increase the probability that the compliant behaviour will occur again in future (Miltenberger, 2008:78). In GBG the adolescent's positive compliant actions are praised and rewarded by the teacher, increasing the possibility of the response being repeated. All of the adolescent's negative actions, including non-compliance, are punished by the teacher by taking away

a card, thus decreasing the probability of the response occurring again (Burger, 1993:407). Gunam (2012:73) contends that the above process is compatible with the action research model of Conwill (2003:239-248), who also used praise and reward and positive and negative reinforcement to control the students' disruptive behaviour. Barry and Lochman (2004:3), in supporting this idea, argue that no student exhibits bad behaviour all the time. They emphasise that if an adolescent behaves well, the teacher should react and praise the positive behaviour. In addition, the teacher should provide more opportunities for the adolescent to act appropriately and should then give positive feedback.

It is against this background that Miltenberger (2008:78) postulates that the GBGs encourage the adolescents to manage their own and their classmates' behaviour through a process of group reinforcement and mutual self-interest, by the addition of stimulus reinforcements and by the removal of an aversive stimulus.

Research has discovered that gradually, over time, the students would learn to obey the classroom rules even in the absence of the GBG (Gunam, 2012:74). Once the students consistently achieve success, the token economy is discontinued, and the natural contingencies of reinforcement, such as praise, good grades and work-outcomes, are used to maintain the desirable behaviour (Miltenberger, 2008:506). Gunam (2012:74) concludes that the results of the GBG intervention strategy show that the GBG has a significant role to play in redeeming delinquency and juvenile infractions later on (Van Lier et al., 2004:469).

2.5.6 The Teaching Pyramid Model: The Promotion, Prevention and Intervention Model

According to Fox, Dunlap, Hemmetter, Joseph and Strain (2003:48), the Teaching Pyramid Model reflects a three-tiered model of classroom strategies for promoting the social-emotional development of all adolescents and addressing the needs of those adolescents who are at the risk of or who already exhibit challenging behaviour. The

pyramid framework has four levels of practice, namely relationships, a supportive environment, social and emotional teaching strategies, and intensive individualised interventions.

Each of these levels will now be briefly explained.

2.5.6.1 Level 1: Relationships

Relationships of high quality give the students a sense of being valued and cared for by significant others whom the students have learnt to trust (Cooper, Smith & Upton, 1994:142). The authors regard respect as contributing to such relationships. Thus, they propose that the parents and the teachers should let the adolescents know that they care for them and respect them. This would help to remind the adolescent that it is the inappropriate behaviour and not the individual that is being disapproved of (Barry & Lochman, 2004:3). The students benefit significantly from these relationships, as they learn important social skills and develop self-confidence, positive self-esteems and other emotional competencies (Hemmetter, Ostrosky & Fox, 2006:590). Building these relationships also include being positive. The parents and the teachers need to remain calm and model positive problem-solving techniques to the adolescent. Moreover, they should not become angry in response to the adolescent's anger (Barry & Lochman, 2004:3).

The Teaching Pyramid Model emphasises the importance of building positive relationships within the family before problems occur (Hemmetter et al., 2006:590). Marais and Meier (2010:41) argue that the family is the most immediate and perhaps the most influential system affecting the child. Consequently, Garrison and Reynolds (in Hemmetter et al., 2006:590) contend that it is important to ensure that interactions relating to an adolescent's challenging behaviour happen within the framework of on-going supportive family relationships. Such relationships are essential for promoting the positive behaviour of the adolescents.

The school may also establish supportive relationships with professionals such as mental health consultants, behaviour specialists and professional psychologists. These professionals may support and work collaboratively with the teachers and the parents in order to promote the adolescent's social and emotional competence. If the supportive relationships are on a sound footing, the adolescents may develop positive self-concepts, confidence and a sense of safety that will help to reduce the occurrence of challenging behaviour (Fox et al., 2003:49).

2.5.6.2 Level 2: A supportive environment

This section of the Teaching Pyramid Model includes practices that focus on teaching the adolescents about routines, giving clear directions and arranging the environment to support their engagement, and appropriate behaviour (Hemmetter et al., 2006:592). According to Fox et al. (2003:49), the combination of giving adolescents positive attention for their pro-social behaviour, teaching them about routines and expectations, and making changes to the physical environment, may contest the adolescents' engagement in daily activities and prevent or decrease the likelihood of challenging behaviour.

Creating supporting environments also involve the teachers. The teachers need to create classroom environments that are conducive to teaching and learning. The classroom environment should be warm and inviting. One way of ensuring that is to improve communication. There should be on-going communication and cohesion between the teacher and the adolescent. Thus, the adolescent would be more likely to approach the teacher when problems arise (Barry & Lochman, 2004: 3). The classroom should also have appropriate and colourful charts which are neatly presented. This helps to create the enthusiasm necessary for the students to excel (Gunam, 2012:77).

According to Marais and Meier (2010:53), a supportive environment will encourage the development and maintenance of the students' dignity, self-respect and self-esteem. Gunam (2012:77) supports this by arguing that the teachers need to employ strategies

to manage disruptive children by maintaining discipline without administering corporal punishment. Ngcobo (2011:2) indicates that corporal punishment in South Africa is both a patriotic and an ethical concern. It is a patriotic issue in the sense that it is the teachers' duty to defend and to protect the Constitution, namely that 'beating', 'hitting', 'spanking', 'padding', 'whipping', 'thrashing', 'thumping', and 'caning' are not part of what the Constitution seeks to advance. Secondly, he argues that it is unethical and immoral to support any act that undermines the spirit of the Constitution. Thus, to create and maintain a supportive environment, class rules should be set that always have to be obeyed. The rules should focus on decreasing aggressive behaviour. If an adolescent breaks a rule, he or she should immediately suffer the consequences (Barry & Lochman, 2004:3).

2.5.6.3 Level 3: Social and emotional teaching strategies

According to Gunam (2012:77), the third level of the Teaching Pyramid Model focuses on strategies for teaching the adolescents appropriate skills to control their anger, to solve their problems, to communicate their emotions effectively, and to persevere with difficult tasks. Fox et al. (2003:49) state that the adolescents need to develop competence in emotional literacy, anger- and impulse-control, interpersonal problem-solving, and friendship skills. When the adolescents are able to do this, they are less likely to engage in problematic behaviour (Hemmetter et al., 2006:592).

Problem-solving includes the identification of a problem, generating multiple potential responses (both positive and negative), evaluating alternative responses, and planning for the implementation of the best response. The adolescents should be supported to understand problem-solving skills and they should be provided with opportunities for action to assist them in applying the principles to solve their own problems (Barry & Lochman, 2004:1), and thus prevent frustration and possible anger.

The teaching of social skills and emotional development requires the following range of strategies, namely teaching the concept, modelling, rehearsing, role-playing, prompting

adolescents with regard to their own contexts and providing feedback and acknowledgement when positive behaviour occurs (Hemmetter et al., 2006:592). Teaching the concept of social skills, and modelling and rehearsing should come about through attending to coping statements. To practise these statements, it may be valuable to apply the statements in relevant social situations (Barry & Lochman, 2004:3). Hemmetter et al. (2006:593) argue that the new social and communication skills that have been acquired by the adolescents enhance positive relationships with their peers and other adults. This may lead to better behaviour (Fox et al., 2003: 51).

2.5.6.4 Level 4: Intensive individualised interventions

Fox et al. (2003:50) postulate that even when the teachers establish positive relationships with their students, implement preventative practices and use explicit teaching strategies, a number of the adolescents are likely to continue displaying challenging behaviour. That is, the strategies of the Teaching Pyramid Model (levels one to three) may not be sufficient to reduce the aggressive behaviour in some adolescents merely because they need more intensive support and individualised attention because they may be suffering from a behavioural disorder such as autism or ADHD (Rapport, Chung, Shore & Isaacs, 2001:48).

The plan for addressing an adolescent's challenging behaviour should be comprehensive and developmentally appropriate. It should be developed in partnership with the families and other relevant persons in the adolescent's life. These people may include professionals, family members and other adults who interact with the adolescent on a regular basis (Hemmetter et al., 2006:573). The individuals may also help with monitoring the intervention process. It is critical that the monitoring is done in a caring way and that it does not violate the privacy of the adolescent.

There exists a growing body of evidence that suggests the psychological benefits of physical exercises in addressing the aggression of adolescents. That was the impetus

for embarking on this research project, namely to investigate how physical exercises can effectively address adolescent aggression.

Hence, what follows is a discussion of adolescent aggression and physical exercise.

2.6 THEORIES ON THE PSYCHOLOGICAL BENEFITS OF PHYSICAL EXERCISE

Explanations exist that account for the effectiveness of physical exercise in addressing the aggression of adolescents. Daley (2008:143) states that the most popular explanation is the endorphin hypothesis. This hypothesis states that “exercise is associated with the release of endogenous opiates such as beta-endorphins and consequently improved mood and feelings of a well-being” (Daley, 2008:143). Endogenous opiates are chemicals produced by the human body that bind to opiate receptors in the brain. Their function is to mimic the analgesic effects of morphine. In the Harvard Mental Health Letter (2009:3) and also by Donaghy (2007:84) this contention is supported where they state that the release of endorphins increase after exercise.

Endorphins are among the brain chemicals known as neuro-transmitters, which function to transmit electrical signals within the nervous system. Endorphins can be found in the pituitary gland and in other parts of the brain, or distributed throughout the nervous system. Stress and pain are the most common factors reported to lead to the release of endorphins. Endorphins interact with opiate receptors in the brain to reduce our perception of pain, and they act similarly to drugs such as morphine and codeine. Nonetheless, the activation of opiate receptors by the body’s endorphins does not lead to addiction or dependency. In the Harvard Mental Health Letter (2009:1) it is further indicated that exercise promotes the release of not only endorphins, but also of nor-epinephrine which improves the supply of oxygen and energy to the brain.

The monoamine hypothesis provides another explanation. This biological hypothesis suggests that physical exercise leads to an increase in the availability of brain neurotransmitters (dopamine, serotonin and nor-adrenalin) that can reduce depression (Daley, 2008:147). The brain neuron transmitters are endogenous chemicals that transmit signals from a neuron to a target cell across a synapse.

Fox (2000:89) documented that physical exercises promote the individuals' self-esteem because they feel they are playing an active role in their own psychological development. Self-esteem is almost synonymous to well-being, which, in the context of this study, means the absence of aggression. *Self-esteem* may refer to the degree to which individuals feel positive about themselves. Ekeland, Heian and Hagen (2005:792) investigated the effect of physical exercises on the adolescents' self-esteem and found that directed play and/or physical education programmes contributed to the enhancement of the participants' self-esteem. Physical exercises neutralise stress chemicals such as adrenaline to improve feelings of relaxation (Donaghy, 2007:84). Daley (2008:147) also argues that physical exercises are a source of distraction or a time-out strategy that help to break the vicious cycle of pessimistic thinking or worrying and depressing thoughts. This explains why people often report a reduction in stress or depression levels after doing physical exercises.

2.6.1 The physiological and psychological benefits of physical exercises.

A plethora of academic studies have been conducted on the effects of physical exercises and/or physical activities. These studies focussed mainly on their effect on various physiological and psychological conditions. Some of the physiological conditions include blood pressure, cancer, diabetes mellitus and osteo-arthritis. Some of the psychological conditions are stress, depression, suicide and substance-abuse. Aggression and physical exercises have been the subject of study for many years. Nonetheless, there is only a very limited literature available on the effect of physical exercises on adolescent aggression.

What follows is a brief discussion where physical exercises have been proven to be the most effective and successful strategy in treating physiological and psychological conditions.

The health benefits of physical exercises (physiologically and psychologically) as an intervention programme motivated the researcher to investigate if it could be used to address (reduce) adolescent aggression. Physical exercises have been used extensively and have produced many benefits. The health benefits of physical exercises that highlight their effectiveness are explained by Dubbert (2002:613) as follows:

- Moderate to high physical fitness was more significantly associated with lower mortality rates than low physical fitness.
- Higher levels of activity and fitness were protective factors in older as well as younger populations. In longitudinal studies, it was indicated that persons who became more fit over time reduced their risks in comparison to those who remained at low levels of fitness.
- Physical exercises are also reported to decrease the risk of mortality due to cardio-vascular diseases. Observational and experimental studies supported the benefits of physical activity for lowering blood pressure.
- Observational data and plausible biological mechanisms provided evidence for the protective effect of physical activity on colon cancer, but not on rectal cancer.
- Observational studies also strongly suggested the protective effect of physical activity on the development of non-insulin dependent diabetes mellitus.
- Observational data in humans and experimental studies in animals also indicated that physical activity is important in maintaining healthy joints. Physical activity can control pain and other symptoms in people who have already developed osteo-arthritis in a joint that has been injected.
- A growing body of epidemiological research on adults suggests that people who are more active have lower levels of anxiety and symptoms of depression.

- In a laboratory study that varied the duration of acute bouts of exercise with moderately fit college women, Rejeski, Gavon, Hobson and Norris (1995) found that exercises for 10, 25 or 40 minutes produced more improvement in the affect than did an attention-control condition.
- Babyak, Blumenthal, Herman, Khatri, Doraiswamy and Moore (2000:633-638) published the results of a controlled trial of endurance exercises (walking or jogging three times a week), anti-depressant medication (sertraline), or their combination in older adults who met the diagnostic criteria for major depressive disorder. After 16 weeks, all three groups indicated clinically-significant improvements in their depression scores. After 10 months, participants in the exercise-only group had significantly lower relapse rates than the participants in the medication groups. Exercising on one's own during the follow-up study was associated with a reduced risk of relapse. These results are an impressive addition to the existing literature suggesting that exercising can be an effective alternative to anti-depressant medicine.
- There is also evidence that exercises can improve at least some aspects of cognitive functioning.
- In a study examining exercises and other components of an intensive rehabilitation program for older adults with chronic obstructive lung disease, only the patients who did exercises improved on measures of verbal fluency (Emery, Schein, Hauck, & MacIntyre, 1998:232-240).

2.6.2 Conclusion

It is clear that there are several intervention strategies available that can be implemented to address adolescent aggression. The interventions are meant to ensure that the culture of effective teaching and learning at school is upheld and protected. The responsibility for the implementation of such strategies lies squarely on the shoulders of the teachers, the parents and the students. The focus of this study, in particular, is the intervention strategies that involve physical exercises.

2.7 SUMMARY

In this chapter the researcher explained several theoretical perspectives on the causes of aggression. The main theories that were discussed were the biological, psychological and social learning theories. Factors related to adolescent aggression were also discussed. Various forms by means of which adolescent aggression manifests itself were discussed, as well as methods or interventions of managing aggressive behaviour. The possible positive effects of physical exercises on aggression were explained and discussed briefly.

It should be noted that this will be the focus of the investigation reported on in this dissertation.

In accordance with the above, the empirical research aims at investigating how physical exercises can be used to address the aggression of adolescent students in secondary school.

The following chapter (Chapter 3) provides an explanation of the research design and data-collection methods.

CHAPTER 3

THE RESEARCH DESIGN AND DATA-COLLECTION

3.1 INTRODUCTION

The literature review presented in Chapter 2 highlighted several significant issues. It provided an exposition of the theoretical perspectives on the possible causes of aggression, the factors related to aggression, the manifestations of aggression, and finally, ways how adolescent aggression in secondary schools can be addressed.

Chapter 3 explains and justifies the research design that was considered to be appropriate for this study. In particular, it addresses the following, namely the research problem and the aims of the research, the research questions and the hypotheses, the research design (a mixed methods case study), sampling, quantitative data-collection, validity and reliability, quantitative data-analysis, qualitative data-collection, trustworthiness, qualitative data-analysis as well as ethical considerations.

3.2 THE RESEARCH PROBLEM AND THE AIMS OF THE RESEARCH

In the design the main research problem is addressed, in this study namely:

What is the impact of physical exercise on adolescent aggression?

Thus, the overall aim is to investigate if physical exercises can indeed serve as an effective strategy to address adolescents' aggressive behaviour in a particular secondary school, and to make recommendations of how physical exercises may be used effectively to alleviate adolescent aggression (see sections 1.2 and 1.3).

3.3 THE RESEARCH QUESTIONS AND THE HYPOTHESES

The research questions and the hypotheses are directly related to the main research problem. A *hypothesis* can be defined as a formal means to study the expected research outcomes, more firmly fixing the direction of a study (Cohen, Manion & Morrison, 2007). A hypothesis provides some tentative propositions about the relationship between two or more phenomena or variables. For the quantitative research question, both a null hypothesis and an experimental hypothesis were stated as follows:

- **Research question 1:** Will physical exercises significantly lower the respondents' level of aggression (as indicated by the questionnaire on aggression which was adapted from Buss and Perry's (1992) questionnaire on aggression)? (See Appendix H.).

H₀₁: Physical exercises will not significantly lower the respondents' levels of aggression (as indicated by the questionnaire on aggression).

H₁: Physical exercises will significantly lower the respondents' level of aggression (as indicated by the questionnaire on aggression).

This question is addressed quantitatively.

- **Research question 2:** What are the participants' views on the role of a physical exercise programme to address their aggression?

This question is addressed qualitatively.

3.4 THE RESEARCH DESIGN: A MIXED METHODS CASE STUDY

As indicated in Chapter 1 (section 1.5.1), a mixed methods case study research design was used in the study. The case, or bounded system, that was studied in this research

is one particular group of adolescents who participated in the physical exercise programme at one specific school selected for the study. According to McMillan and Schumacher (2010:397), a mixed methods design has the following advantages, namely it provides more comprehensive data, it compensates for the limitations of using a single method, it allows for the investigation of different kinds of research questions, and it also enhances the credibility of the findings. In this study the mixed methods research design was a sequential explanatory design (McMillan & Schumacher, 2010:403), in which the quantitative phase would be followed by the qualitative phase and thereafter a quantitative phase would follow again:

Quant → Qual → Quant

Thus, quantitative and qualitative research approaches were used to answer the two main research questions. This option is supported by the ‘compatibility thesis’ – which holds that the marriage of the quantitative and qualitative approaches is epistemologically coherent (Howe, 1988:10). According to Firestone (1987:16), a quantitative approach is traditionally associated with the positivist paradigm, while a qualitative approach is usually based on the interpretative paradigm. The interpretative or constructivist paradigm implies the use of “systematic procedures with multiple socially constructed realities” (McMillan & Schumacher, 2010:488). The positivist paradigm holds that there is a stable, unchanging, external reality, which can be investigated objectively, implementing, for example, the testing of hypotheses. On the other hand, the interpretative paradigm is based on the thinking that reality consists of peoples’ subjective experiences of the external world (Gasa, 2005:79).

The two paradigms provide different perspectives on reality – the one is not superior to the other (Terre’Blanche & Durrheim, 1999:6). Quantitative and qualitative approaches encourage the researcher to adopt certain conventions of presentation that advance certain kinds of arguments for the credibility of his/her conclusions. That is, the results of the two approaches complement each other to provide a more comprehensive understanding of the phenomenon (Firestone, 1987:20).

As indicated above, the researcher used the mixed-methods approach. The two approaches (quantitative and qualitative) have been distinguished on the basis of the type of data used (textual or numeric, structured or unstructured), the logic employed (inductive or deductive), the type of investigation (exploratory or confirmatory), the method of analysis (interpretive or statistical), the approach to the explanation (the variance theory or the process theory), and for some, on the basis of the presumed underlying paradigm (positivist or interpretive/critical, rationalistic or naturalistic) (Bazeley, 2003:122).

What follows is a discussion of how the two approaches were utilised in this case study.

3.5 SAMPLING

The school where the research was conducted has an enrolment of 297 students. The researcher is the principal of the school. This school was purposefully selected on the basis of convenience and on the grounds of the observed phenomenon of aggression amongst the students. The Circuit Manager of the Department of Education and the staff in the school were informed about the purpose of the investigation. Permission for the research was obtained from the Department (see Appendices B and G) and the Circuit Manager (see Appendix C).

First of all, all the students in grades 9, 10 and 11 who showed an interest in participating in the study completed a questionnaire on aggression. (Grade 12 students were not involved since this was their final year of study at the secondary school and the researcher did not want to cause any disruption in their studies.) From these students, a sample of 25 was identified with the help of the subject teachers and the classroom managers, as those who needed support for their aggression the most. They completed a questionnaire on aggression adapted from Buss and Perry's (1992) questionnaire (see Appendix H).

The students participated in a physical exercise programme lasting ten weeks. They met three times per week during which they exercised for about 40 minutes at a time (for an explanation of the programme, see Appendix I). They thus participated in 30 sessions. After completing the 10-week programme, they again completed the same questionnaire in a post-test. This allowed for the testing of the hypotheses. The researcher decided to make use of 25 adolescent boys and girls, because it would be easier to prepare and manage a physical exercise programme for that number of participants than for a greater number. The involvement of both boys and girls also meant that physical exercises which were compatible for both boys and girls were used.

From the adolescents who participated in the programme, only ten were selected for in-depth interviews. The ten adolescents were those who benefitted the most from the physical exercise programme, because they would be information-rich. Put differently, the selected ten participants were those whose aggression levels or scores in the questionnaire (from pre-test to post-test) decreased significantly after the physical exercise intervention programme.

As indicated, the students completed the questionnaire on aggression (the questionnaire is explained in section 3.6.1). Thus, the respondents were selected purposefully. The same participants participated in the physical exercise programme for three days a week. Ten of these 25 participants were interviewed after the completion of the programme. Thus, the sampling was a combination of purposive and convenience sampling, in particular, what McMillan and Schumacher (2010:326) call “extreme case” sampling.

This sample did not enable the researcher to confidently claim that what was true for the convenience sample was also true for the population (Gomm, 2004:71). This means that the results from this sample cannot be used for generalisation purposes to other schools because the convenience sample is not necessarily representative of other schools (Gray, 2004:89). Nonetheless, the results are useful for similar schools and in similar contexts. Since there are many schools with the same rural circumstances and

character, this study is useful and relevant to students who struggle with aggression in similar South African contexts.

In the next two sections the methods of quantitative data-collection (section 3.6) and qualitative data-collection (section 3.7) will be explained.

3.6 THE COLLECTION OF THE QUANTITATIVE DATA

3.6.1 The questionnaire on aggression

The first research question was investigated quantitatively. The researcher used the questionnaire on aggression to elicit responses from the student participants (see Appendix H). This questionnaire was completed by the selected participants. This was done to determine their levels of aggression before and after the completion of the physical exercise programme (see Appendix I for the exercise programme).

The questionnaire consisted of 29 items. Two examples are, “If I have to resort to violence to protect my rights, I will”; and “I became so mad that I broke things”. For each item the respondents had to choose one of the five options on a Likert-type scale. The options were the following:

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1	2	3	4	5

Thus, it was a self-report questionnaire. The adolescents completed the questionnaire in the researcher’s presence to answer questions if needed. The questionnaire was implemented after having been pilot-tested (see section 3.6.3).

A structured questionnaire has the following advantages:

- it requires little time to complete;
- it is available at a low cost;
- it does not require extensive writing;
- it is useful for testing the specific hypothesis.

3.6.2 The validity and the reliability of the questionnaire

The validity of the questionnaire is a very critical aspect of the research. Since this was an exploratory study only, there were two aspects of validity that were considered, namely content validity and face validity.

According to De Vos, Strydom, Fouché and Delport (2005:160), *content validity* refers to the representativeness or sampling adequacy of the content (e.g., the topics or items) of an instrument. According to Monette, Sullivan and De Jong (2002:15), it has to do with whether a measuring instrument or device covers the full range of meanings or forms that would be included in a variable being measured.

Gravetter and Forzano (2003:87) state that *face validity* is the simplest and least scientific definition of validity. It merely looks at the superficial appearance or face value of a measurement procedure. The relevant question is, 'Does the measurement technique look as if it measures the variable that it claims to measure – in this case, aggression?'

A questionnaire on aggression should include both types of validity. According to the researcher's judgement, it had content and face validity. The supervisor of the study agreed on this point.

A questionnaire is reliable to the extent that independent administrations of it or comparable instrument consistently yield similar results under comparable conditions. Its reliability is influenced by the number of items that focuses on each variable. This

aspect was, therefore considered and addressed in compiling the questionnaire. It was ensured that there would be sufficient items on aggression to ensure reliability.

3.6.3 Pilot-testing the questionnaire on aggression

The questionnaire was pre-tested in a pilot study with ten adolescent boys and girls in the school where the researcher teaches. It was ascertained that some of the participants did not understand certain questions in the questionnaire. The reason for the challenge was the fact that English was their second language. Consequently, the researcher rephrased the questions for them in a simpler language to ensure that they understood it.

3.6.4 The administration of the questionnaire on aggression

Guidelines with regard to the questionnaire that were considered were the following:

- There was an introduction to the questionnaire. The introduction served to introduce and explain the questionnaire to the participants, and it served to motivate them to complete the questionnaire.
- The introduction also outlined the purpose of the research.
- The introduction assured the participants of confidentiality.

The questionnaire was administered to the selected grades 9, 10 and 11 students. The researcher was personally involved in the administration of the questionnaire in order to clarify possible misunderstandings. Each student was given a questionnaire. The researcher read out the instructions and explained them. Since the questions were in English, the respondents were encouraged to ask for explanations as English was their second language. All the participants completed the questionnaire within 40 minutes.

3.6.5 Analysis of the quantitative data

The questionnaire consisted of a five point Likert-scale with 29 questions. The data of each student were added up for a total score. The biggest score a student could attain was 145. The greater the score, the more aggressive the participant was. The data were completed and analysed twice, once before and once after the 10-week physical exercise programme.

3.7 THE COLLECTION OF THE QUALITATIVE DATA

As indicated, a qualitative approach was also used in this case study. This approach gives a clear understanding of the participants' views and experiences. It captures the participants' perceptions as they occur naturally (Wiersma & Jurs, 2009:232), and in their actual words (Johnson & Christenson, 2011:18). According to Babbie (1998:90), qualitative studies are done for three purposes, namely

- to satisfy the researcher's curiosity and desire for a better understanding of the phenomenon;
- to test the feasibility of undertaking a more extensive study;
- to develop the methods to be employed in any subsequent study.

In this study the main purpose was to obtain an in-depth knowledge and understanding of the role of physical exercises to alleviate the adolescents' aggression.

3.7.1 Semi-structured interviews

The researcher made use of interviews as a means of collecting the data. The type of interview used in this study was a *semi-structured interview*. (The interview guide appears in Appendix F.) Semi-structured interviews assisted the researcher to gain a detailed picture of the participants' beliefs about, and perceptions and accounts of the particular topic, in this case the effect of physical exercises on their feelings of

aggression (De Vos et al., 2005:296). This type of interview is flexible. Accordingly, De Vos et al. (2005:296) pointed out that a semi-structured interview allows the researcher to have a set of predetermined questions in the interview schedule, but the interview is guided by the schedule rather than dictated by it. Consequently, the researcher was able to follow-up particularly interesting avenues that emerged during the interview, and the participants were able to provide the researcher with a fuller picture of the effect of physical exercises on their feelings. It also allowed the researcher to pay particular attention to the complexity of the issue (De Vos et al., 2005:296). (The interview schedule appears in Appendix F.)

In the interviews the researcher was the primary instrument of data-collection. Patton (1990:14) argues that validity in qualitative methods hinges, to a great extent, on the skills, competence, and rigor of the person doing the data-collection. According to Winegardner (n.d.:3), the researcher needs to conform with the following, namely good communication skills, the ability to listen effectively, the skills to create an atmosphere of trust, the capability of establishing rapport with the participants, and a sensitivity to his own personal biases and to all the verbal and non-verbal cues and nuances of the people and the settings in the research context. (An extract of an interview is presented as Appendix J.)

During the interviews, as well as during the administration of the physical exercise programme and directly thereafter, the researcher jotted down field/observation notes in a field journal.

3.7.2 Piloting the interview questions

The researcher piloted the interview instrument. To test the semi-structured interview questions, the instrument was used with students in one grade 9-class, who were on average 15 years old. Conducting a pilot study assisted the researcher to investigate some of the practical aspects of conducting the interviews (De Vos et al., 2005:294). The researcher discovered that the students needed guidance as far as the language is

concerned, as they were using English as a second language. Consequently, although the questions were asked in English, each question was translated to IsiZulu (which is the participants' mother tongue). The participants were encouraged to speak IsiZulu when responding to the questions. This measure was taken to ensure that they could freely express themselves.

Some items in the interview guide were reformulated into a simple and common format. The reformulation of the language items was also done where the misunderstanding of certain words was suspected. For instance, in one question 'impact' was changed to 'result', and in another question, 'alternative' was changed to 'other' (see Appendix F). The researcher also learnt that the introduction to the interview was very important. In particular, the researcher made use of ice-breakers, and reminded the participants about the issue of confidentiality and anonymity. They were also reminded about their honesty, and the fact that their responses to the questions would not have any effect on their school-marks or school-credits. The researcher found that some learners were somewhat apprehensive before the introduction, but soon thereafter the uneasiness and anxiety subsided.

3.7.3 Recording the data

The interviews were recorded by making use of an audio tape recorder. The audio tape recorder used is a very small recorder, namely the Olympus digital voice recorder vn-7600, smaller than most cell phones. The interviewees soon seemed to have forgotten that it was there. They were relaxed, and freely answered the questions.

All the interviews were transcribed verbatim, and thus reflected the adolescents' own words. (See Appendix J.) The challenge was that transcribed words lost meaning in terms of tone and emotions. Nonetheless, an effort was made to take down notes on those aspects in brackets in the transcripts.

3.7.4 Analysis of the qualitative data

According to De Vos et al. (2005:218), *data-analysis* means the categorising, ordering, manipulating and summarising of the transcribed data to obtain answers to the research questions. The purpose of the data-analysis was to reduce the data into an intelligible and interpretable form in order to be able to answer the research questions and to draw conclusions.

The transcribed data was processed manually. No computer software programmes were used to identify, manipulate or code the data. Not using computer software data-analysis programmes had an advantage in that it gave the researcher the opportunity to personally explore the meaning of the data (Wolcott, 1995:66).

Each interview question became a category. In that sense the analysis was deductive. Thus, 'How the participants experienced the programme', became one category. However, within each category, the data-analysis was inductive, in line with Tesch's method of data-analysis (Poggenpoel, 1998:343). For this, the researcher

- read through the transcripts and jotted down the ideas as they came to mind;
- selected one interview (e.g., the best interview) and identified the underlying meaning of what it was all about and wrote this in the margin;
- did the above for several participants and made a list of all the topics;
- took the list and returned to the data, gave codes to the topics, and wrote the codes next to each segment of the data.

In this way, the category, 'How participants experienced the programme', involved two sub-categories namely 'enjoyable' and 'challenging' (see Table 4.5).

3.7.5 Trustworthiness of the qualitative data

To ensure the trustworthiness (validity and reliability) of the qualitative data, the following measures were adhered to (McMillan & Schumacher, 2010:331) (also see section 1.5.4.4), namely

- prolonged and persistent field-work of five months at the relevant school;
- multi-method strategies, namely a questionnaire and interviews, as well as observation notes;
- using the adolescents' own language, IsiZulu, and accounts;
- making use of low-inference descriptors;
- involving multiple researchers, namely the researcher, a physiotherapist and the study's supervisor;
- using a tape recorder, the Olympus digital voice recorder vn-7600, to record the interviews;
- asking the adolescent participants to review the transcribed interviews;
- conducting the research in the natural school environment;
- the researcher ensured that there was no researcher bias by discussing the findings with the research supervisor and the students who participated in the research.

3.8 ETHICAL CONSIDERATIONS

Wassenaar (2006) asserts that it is often mistakenly assumed that qualitative research is exempt from ethical considerations. He points out that the argument that is sometimes put forth is that the method is generally conversational and that the data-analysis attempts to preserve the integrity of the data collected. Thus, there is often the belief that qualitative research is ethically sound by virtue of being qualitative research (Brinkmann & Kvale, 2005). However, the "participants in qualitative research are entitled to the same protections and respect as those in the quantitative research" (Wassenaar, 2006:71).

There is an increased interest by institutions of higher learning to strengthen ethical protocols in research. The reason is to ensure the welfare and protection of the research participants (Wassenaar, 2006). The ethical compass of this study was provided by a particular set of philosophical principles, as outlined by Wassenaar (2006:67-68) and Babbie (2007:62-70). These are discussed below.

3.8.1 The principle of voluntary participation

Babbie (2007) points out that social research often disrupts the regularity of the lives of those who consent to participate in the research. Thus, it is critical and crucial that the principle of voluntary participation is upheld by the researcher. *Voluntary participation* refers to the fact that the research participants should be given the opportunity to consent and/or dissent from participating in the research project. That is, they should not be compelled to participate. In other words, they should participate of their own free will.

Babbie (2007) points to the possibility that the participants could participate in a research project because they may have anticipated and associated their participation to a benefit that may accrue them if they did. In the current study, the researcher made use of student participants whom he did not teach. This implied that the adolescents would not have to face the researcher again if they did not want to participate. They were also informed that they would not receive any compensation for their participation.

3.8.2 The principle of informed consent

A great deal has been written on the principle of informed consent. Nonetheless, there seems to be limited literature that explains how this principle would work throughout the practice of research. This often results in what Liberman (1999:47) refers to as 'moral dilemmas' that arise from the moral relationship between the researcher and the participant.

Brinkmann and Kvale (2005) cautioned that (qualitative) researchers should develop what they call 'phronesis' or 'practical wisdom' in dealing with ethical issues. *Practical wisdom* has to do with the ability to understand events, such as informed consent in this case. Richards and Swartz (2002) perceived *informed consent* as something that should not be seen as a once-off activity that happens only before the research commences, but as a continuous process where the researcher constantly checks with the research participants if they are still comfortable participating in the research.

In the current study, informed consent was sought from the KZN Department of Education (see appendices B and G), the Ward Manager of the school district (see Appendix C), the parents or guardians since the students were under 18 years of age (see appendix D), and the students themselves (see Appendix E). The participants were assured that there would be no reprisals if they decided to withdraw their assent and discontinue their participation in the study. Ethical clearance was also obtained from the College of Education Ethical Clearance Committee at UNISA (See Appendix A).

In line with the above, the participants were not deceived to ensure that they participated. The basic thrust of this principle is that deceiving people, particularly if you want them to participate in a research study, constitutes an unethical study (Babbie, 2007).

3.8.3 The principle of no harm: Anonymity and confidentiality

Social research has the obligation of never to harm the research participants, irrespective of the fact that they have given their consent to participate in the study. The principle of *no harm* to the participants refers to the fact that the researcher is required "to ensure that no harm befalls research participants as a direct or indirect consequence of the research" (Wassenaar, 2006:67). It is also pivotal that the researcher considers the subtle effects that may harm those who choose to participate in the research. Wassenaar (2006:67) points out that harm could include what he refers to as "wrongs" – the participants may not be harmed, but be *wronged* by the research. For example, the

participants' responses may be distorted to meet particular expectations of interpretations. This would not harm the participants, but they would be wronged.

Qualitative research involves processes where the participants may have to convey their intimate private experiences to the public. For instance, for the purposes of this study, the adolescents may have to divulge their personal feelings, how they feel about other people and also about particular situations. These feelings should be honestly portrayed. The identities of the participants should, however, not be revealed in the research report. In the light of this principle, the current research used pseudonyms for the names of the participants to protect their identities throughout the research process in order to preserve their anonymity and to safeguard confidentiality. Accordingly, the audio files were allocated a password, and kept under lock and key. The participants were also requested not to divulge the contents of their conversations to other people.

3.8.4 The principle of beneficence

The principle of beneficence called on the researcher to design research that contributed positively to the lives of the participants and of society in general - what could be referred to as 'worthwhile' research. The South African government views the provision of education as key to develop the country. As such, researchers in education should undertake research projects that are relevant to pressing issues in the communities. To this end, doing research on adolescent aggression has the potential to contribute to its better understanding. The current research also has potential benefits for the participants and for readers who are enticed by the issue which is being investigated.

3.8.5 The principle of honest analysis and reporting

Babbie (2007) reminds us that researchers have an obligation towards their colleagues in the research community to rigorously analyse the data and honestly report the results. Limitations and shortcomings of the research should be pointed out, and

surprising or unexpected findings should be reported. The researchers should point to the pitfalls and problems experienced in the course of conducting the study in order to allow other researchers in similar contexts to learn from their experiences (Babbie, 2007).

3.9 SUMMARY

This chapter explained the research design, namely a mixed methods case study design. A questionnaire to measure aggression and semi-structured interviews were the major data-collection methods that were used. Aspects of validity and reliability as well as trustworthiness were also addressed. Finally, the ethical considerations were explained.

The results of the investigation are presented and discussed in the following chapter.

CHAPTER 4

THE RESULTS AND A DISCUSSION OF THE RESULTS

4.1 INTRODUCTION

In the previous chapter the research design and data-collection methods were described in detail. In this chapter the results of the investigation in respect of the 25 students who participated in the investigation will be presented and discussed. The aim was to examine if physical exercises could serve as a strategy to alleviate the adolescents' aggressive behaviour in a particular secondary school.

The presentation of the data will be done in two sections: the quantitative data are presented first, followed by the qualitative findings.

4.2 THE RESULTS OF THE QUANTITATIVE DATA-COLLECTION

The following research question was tested quantitatively:

Research question 1: 'Will physical exercise significantly lower the respondents' level of aggression', as indicated in the questionnaire on aggression which was adapted from Buss and Perry's (1992) questionnaire?(See Appendix H.)

Accordingly, the following hypotheses were tested:

H₀: Physical exercises will not significantly lower the respondents' levels of aggression as indicated by the aggression questionnaire.

H₁: Physical exercises will significantly lower the respondents' level of aggression as indicated by the aggression questionnaire.

4.2.1 Raw data scores in the questionnaire on aggression of the 25 participants

The research initially started with 67 students who were interested to take part in the study. Of these 67 participants, 22 dropped out, and 25 were identified as most in need of the physical exercise programme in order to reduce their aggression. The sample of 25 students included 14 females and 11 males, because these were the students who needed the intervention the most (as clarified in section 3.5). The students completed both the pre-test and post-test questionnaires on aggression, and participated in the physical exercise programme three times per week over a period of 10 weeks. Thus, there were 30 physical exercise sessions.

The raw data scores are presented in Table 4.1 below. The data in the table are categorised as follows: the name of the participant (pseudonyms); gender; school grade; pre-test score; post-test score; and gain (i.e., the gain is positive, negative or constant). The numerical values in the questionnaire on aggression were as follows:

Table 4.1: Raw scores of the participants in the questionnaire on aggression

Name of participant (pseudonym)	Gender	School grade	Pre-test score	Post-test score	Gain +/-
Mazibuko Ayesha	F	9	99	89	-10
Khumalo Thandolwethu	F	9	81	81	0
Mazwi	M	10	75	69	-6
Luntu	F	10	105	97	-8
Hlophe Zama	F	9	88	68	-20
Masondo Ngishaye	M	10	88	88	-0
MgabhiSonke	M	10	83	81	-2
Xovizwe	F	9	61	61	0
Gradually	M	11	116	114	-2

Man X	M	11	96	89	-7
Khumalo Thandeka	F	10	78	75	-3
Bieber Naledi	F	9	74	71	-3
Thabethe Thando	M	10	85	69	-16
Dlomo Nomzamo	F	11	88	82	-6
Zuma Tebogo Snethemba	F	10	94	89	-5
Modise Katlego	M	10	93	82	-11
Buthelezi Thuli	F	10	88	83	-5
Menace Mhlongo	M	9	67	63	-4
Ayanda Mhlongo	F	9	84	73	-1
StholeKwanda	M	10	97	96	-1
Hlongwane Rasarasa	M	11	91	84	-7
Nxumalo Malizwi	F	9	77	71	-6
Syanda	M	9	89	83	-6
Mkhize Naledi	F	9	95	94	-1
Slikoluhle	F	9	77	62	-15
Total:			2 169	2 014	

Table 4.1 indicates that in three instances the scores remained the same, and in the remaining 22 instances the students became less aggressive, with counts of between 1 and 20. Overall, the aggression scores were reduced from 2 169 to 2 014, which is significant.

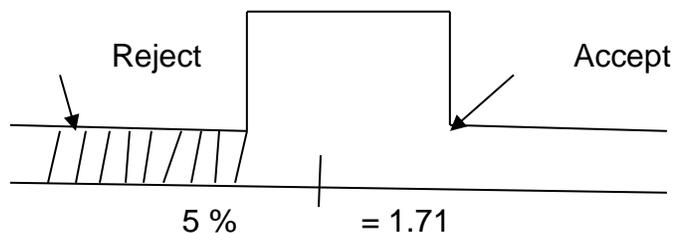
4.2.2 Analysis of the pre-test and the post-test results of the students

4.2.2.1 Analysis of the pre-test and the post-test results of the whole group of students

The overall pre-test score of all 25 participants was 2 169, as indicated above. The average (mean) of the pre-test results data was 86,76. The overall post-test results of all participants were 2014. The average of the post-test results data was 80,56. The averages in the pre-tests and the post-tests were respectively determined as follows:

- Mean (pre-test) = $\frac{\mu_0 = \sum x}{n}$
 = $\frac{2169}{25}$
 = 86,76
- Mean (post-test) = $\frac{\mu_1 = \sum x}{n}$
 = $\frac{2014}{25}$
 = 80,56

Since the sample was 25 (less than 30), the null-hypothesis was tested on the 5%-level of significance by means of a t-test. The calculation of implementing a t-test was executed manually as follows:



Df = n-1
 = 25 - 1
 = 24

Test statistic $t = \frac{\mu_0 - \mu_1}{s} (\sqrt{n})$
 = $\frac{86.76 - 80.56}{11.65600275} (\sqrt{25})$
 = 2,65973841
 = 2,66 2dp

Since $2,66 > 1,71$, the null-hypothesis was rejected and it was concluded that at the 5%-level of significance physical exercises significantly lowered the respondents' level of aggression.

4.2.2.2 Analysis of the pre-test and the post-test results of the boys

The hypotheses were also tested separately for the boys and the girls, since some researchers (Khan, Huang, Gillman, Field, Austin, Colditz & Frazier, 2007:373) argue that the male adolescents would be more comfortable with physical activity than the female adolescents, because boys' lifestyle at the adolescent stage is physically active in comparison to the lifestyle of girls who spend most of their time indoors. The physically active lifestyle of adolescent boys benefits them when doing physical exercises. The pre-test and post-test results of the adolescent boys yielded the following results, as indicated in Table 4.2:

Table 4.2: Pre-test and post-test results on the aggression of the boys

Name of participant (pseudonym)	Pre-test Score	Post-test Score	Gain
Mazwi	75	69	-8
Luntu	105	97	-8
MasondoNgishaye	88	88	0
MagabhiSonke	83	81	-2
Gradually	116	114	-2
Man X	96	89	-7
Menace	67	63	-4
Sithole	97	96	-1
Hlongwane Rasarasa	91	84	-7
Syanda	89	83	-6
Total	907	761	

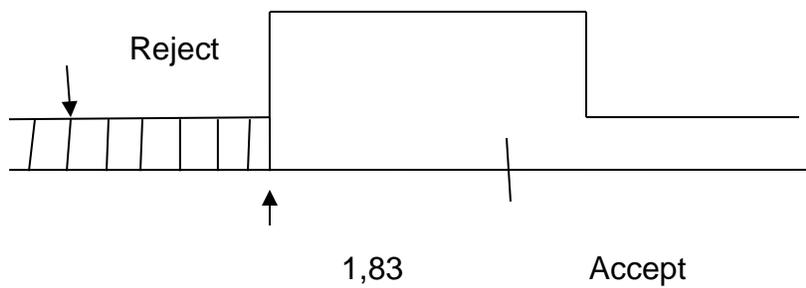
Table 4.2 shows that in a significant number of the male participants (nine out of 10) their aggression levels were lowered from the pre-test score to the post-test score. Only one boy's aggression level did not change. The overall pre-test score of the ten male participants was 907. The average (mean) from the pre-test data was 86,76. The overall post-test results of the ten male participants was 761. The averages in the pre-test and post-test results were respectively determined as follows:

$$\begin{aligned} \text{Mean pre-test } \mu_0 &= \frac{\sum x}{N} \\ &= \frac{907}{10} \\ &= 90.7 \end{aligned}$$

$$\begin{aligned} \text{Mean post-test } \mu_1 &= \frac{\sum x}{N} \\ &= \frac{761}{10} \\ &= 76.1 \end{aligned}$$

Since the sample was ten, which is less than 30, the t-test on the 5%-level of significance was used.

The null-hypothesis states that physical exercises would not significantly lower the respondents' level of aggression. The calculation was done manually as follows:



It is a one-tailed test on the lower tail.

$$\begin{aligned}
 \text{Test statistic } t &= \frac{\mu_0 - \mu_1}{\frac{s}{\sqrt{n}}} \\
 &= \frac{90,7 - 76,1}{\frac{13,379}{\sqrt{10}}} \\
 &= 3,4508
 \end{aligned}$$

Since test statistic 3,4508 > t critical (1,83), the null-hypothesis was rejected and it was concluded that at the 5%-level physical activity significantly lowered the levels of aggression in the ten adolescent male students.

4.2.2.3 Analysis of the pre-test and the post-test results of the girls

The pre-test and post-test results of the adolescent girls are indicated in Table 4.3.

Table 4.3: Pre-test and post-test results on the aggression of the girls

Name of participant	Pre-test Score	Post-test Score	Gain
Mazibuko Ayesha	99	89	-10
Khumalo Thumi	81	81	0
Hlophe Zama	88	68	-20

Xovizwe	61	61	0
Khumalo	78	75	-3
Biber	74	71	-3
Thabethe	85	69	-16
Dlomo	88	82	-6
Zuma	94	89	-5
Modise	93	82	-11
Buthelezi	88	83	-5
Ayanda	84	73	-11
Nxumalo Malizwi	77	71	-6
Mkhize	95	94	-1
Slikoluhle	77	62	-15
Totals	1262	1150	

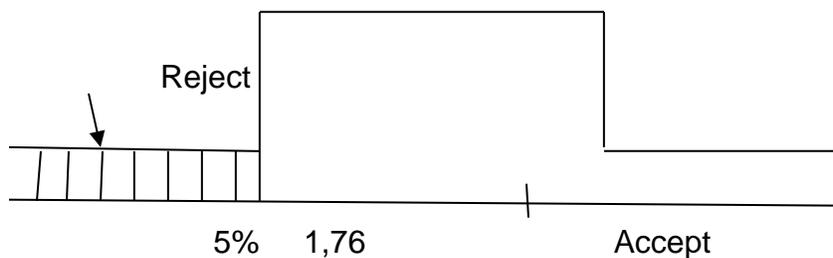
Table 4.3 shows that most of the female adolescents significantly gained from the exercise programme, as indicated by the lower post-test scores in comparison to the pre-test scores. Only two girls did not gain anything from the programme. Not one of the girls became more aggressive during her participation in the programme. The overall pre-test score of all 15 the female respondents was 1 262. The average (mean) from the pre-test data was 84,3. The overall post-test total was 1 150. The average (mean) of the post-test data was 76,66. The averages for the pre-test and the post-test results were respectively determined as follows:

$$\begin{aligned}
 \text{Mean pre-test } \mu_0 &= \frac{\sum x}{n} \\
 &= \frac{1262}{15} \\
 &= 84,1333 \\
 &= 84,13 \quad 2\text{dp}
 \end{aligned}$$

$$\begin{aligned}
 \text{Mean post-test} &= \frac{\sum x}{n} \\
 &= \frac{1150}{15} \\
 &= 76,6667
 \end{aligned}$$

Since the sample was fifteen, which is less than 30, a t-test at the 5%-level of significance was implemented to test the null-hypothesis which states that physical exercises will not lower the respondents' level of aggression.

It is a one-tailed test:



$$\begin{aligned}
 \text{df} &= n - 1 \\
 &= 15 - 1 \\
 &= 14
 \end{aligned}$$

$$\begin{aligned}
 \text{Test statistic } t &= \frac{\mu_0 - \mu_1}{5} \sqrt{n} \\
 &= \frac{84,13 - 76,67}{9,47} (\sqrt{14}) \\
 &= 2,947
 \end{aligned}$$

Since test statistic (t-test) = 2,947 > 1,76, the null-hypothesis was rejected and it was concluded that at the 5%-level of significance, physical exercises lowered the girls' level of aggression.

4.3 DISCUSSION OF THE QUANTITATIVE RESULTS

As indicated in the previous sections, the group as a whole, as well as both genders separately, indicated a statistically significant decrease in their levels of aggression after having completed the physical exercise programme over ten weeks. All the groups' average statistical decrease of their aggression level between the pre-test and the post-test was 6,2 (the pre-test mean was 86,76 and the post-test mean was 80,56). This result is in line with the findings by other researchers (as indicated in section 2.6). Thus, physical exercises decreased the level of aggression in the adolescents of both genders, although the research could not pinpoint in particular which theory/theories was/were applicable/ relevant to account for the decrease in the adolescents' aggression after completing the physical exercise programme.

Although both genders gained 'well-being' from the exercises, a more in-depth analysis of the results of the two genders reveals the following: Table 4.2 and Table 4.3 indicate that there is a significant statistical decrease in the aggression of the boys and the girls respectively. The statistical decrease in the aggression of the boys between the pre-test and the post-test was 14,6. (The pre-test mean was 90,7 and the post-test mean was 76,1). The statistical decrease in the aggression of the girls between the pre-test and the post-test was 7,5. (The pre-test mean was 84,13 and the post-test mean was 76,66). It is evident that the statistical decrease in aggression after the physical exercises was greater for the boys (14,6) than for the girls (7,5). The level of participation of the boys and the girls in the physical exercise programme was the same. This indicates that the decrease in aggression was greater for the boys than for the girls. This issue needs further investigation. However, the qualitative data throw some light on this finding (see section 4.4). Hence, the mixed methods approach (using quantitative and qualitative data), complements each other in providing a more comprehensive understanding of the phenomenon (Firestone, 1987:20).

4.4 RESULTS OF THE QUALITATIVE DATA-COLLECTION

4.4.1 Background data of the interview participants

Of the 25 student participants ten were selected for in-depth interviews. The ten who were selected were those whose aggression scores were reduced the most from the pre-test to the post-test sessions. This is an example of extreme case sampling. The aim of the investigation was to understand the participants' views on their experiences of the physical exercise programme in addressing their aggression. The interviews were tape-recorded and transcribed verbatim. Eight questions were asked in the interviews (see Appendix F) and they were structured into categories (see Table 4.5). As such, they were restated as statements (see section 3.7.4). Within the categories, sub-categories were identified. Certain verbatim quotes from the raw data were used to confirm and justify important findings.

In order to ensure that the principle of confidentiality was respected, the participants used pseudonyms. This method ensured that there was no link between the data and the participants, thereby ensuring their anonymity and the confidentiality of the data.

The table below depicts the interviewees' aggression scores from the pre-test to the post-test.

Table 4.4: The pre-test and post-test scores of the interviewees

Names of the participant	Gender	Grade	Pre-test score	Post-test score	Gain +/-
Mazibuko Ayesha	F	9	99	89	-10
Mazwi	M	10	75	69	-8
Luntu	F	10	105	97	-8
Hlophe Zama	F	9	88	68	-20
Man X	M	11	96	89	-7
Thabethe Thando	M	10	85	69	-16
Modise Katlego	M	9	93	82	-11
Ayanda Mhlongo	F	9	84	73	-11
Hlongwane Rasarasa	M	11	91	84	-7
Slikoluhle	F	9	77	62	-15

Table 4.4 shows that the aggression scores of the interview participants improved (lowered) with between 7 and 20 points.

4.4.2 Identified categories and sub-categories

The next table, Table 4.5, illustrates the categories and the sub-categories that were identified from the interviews. The identification of the sub-categories was influenced by the frequency of the responses from the participants. This concurs with Gay and Airasian's (2003:245) argument that the task of interpreting data is to identify the most important categories of meanings, and not necessarily every category.

Table 4.5 The categories and sub-categories identified from the interviews

Category	Sub-category
How the participants experienced the programme.	Enjoyable. Challenging.
The feelings of the participants <i>before</i> performing the physical exercises.	Anticipation. Reluctance.
The participants' feelings <i>after</i> they performed the physical activities.	Fulfilment. Uneasiness.
A comparison between the male's and the female's participation in the physical exercises.	<p>More participation by the males.</p> <p>Traditional patriarchal and systemic values and norms.</p> <p>The male and female participation was equal.</p> <p>Traditional gender roles: the values and norms that society expects from the males and the females (mostly to the detriment of women).</p> <p>Greater emphasis on the women's values, norms and responsibilities compared to the men's which deprive them from equal participation in physical activities.</p> <p>The community's safety and security issues which pose a threat to women's physical activities.</p> <p>Stereotypes: gender stereotyping and socialisation by the parents and society, and its result in the physical activities of the boys and the girls.</p> <p>Gender stereotypes in the interview participants and its results in the physical exercise programme.</p>

<p>The participants' perceptions on male and female aggression.</p>	<p>Male adolescents are more aggressive than females.</p> <p>Male and female aggression is generally the same.</p> <p>The only gender difference is in the type of aggression.</p>
<p>The contribution of other student spectators in the participants' interest in performing physical exercises.</p>	<p>The participants' varying opinions on the role/ contribution of student spectators in the participants' level of motivation and interest in the physical exercise programme.</p>
<p>The participants' opinions about ways of keeping fit other than a planned physical exercise programme.</p>	<p>Hard work.</p> <p>Long vigorous walks.</p> <p>Debate between any kind of physical activity works versus only 'vigorous' activity works.</p>
<p>The participants' opinions on how they plan to handle their feelings of aggression in the future.</p>	<p>Pledge to continue with physical exercises.</p> <p>Confiding your feelings to someone else.</p> <p>Crying.</p> <p>Sleeping.</p> <p>Listening to music.</p>
<p>The result of the physical exercises with regard to the participants' feelings of aggression in particular.</p>	<p>A reduction of the aggression level after the physical exercises.</p> <p>The possible production of the 'feel-good' chemicals: endorphins and serotonin after physical exercises.</p>
<p>The main benefits of the physical activities.</p>	<p>General improvement in physical fitness.</p> <p>Stress-relief and mood-improvement.</p> <p>More energy.</p> <p>Better concentration.</p>
<p>The participants' views on what did not work well with regard to the physical exercise programme.</p>	<p>Some physical exercise activities were not enjoyable.</p> <p>A number of friends in the peer group did not</p>

	<p>participate.</p> <p>Barriers and/or challenges caused by a mixed gender group.</p>
<p>The participants' recommendations on how the physical exercise programme may be improved.</p>	<p>Girls: Some of the more strenuous exercises should not be included.</p> <p>More mind stimulating physical exercises should be included.</p> <p>The use of skipping ropes.</p> <p>Boys: Gym equipment.</p> <p>More high-impact physical exercises.</p> <p>Gender divide during the physical exercise activities.</p> <p>The boys and the girls wanted the programme to continue indefinitely.</p>
<p>Observation field-notes</p>	<p>The result of the mixed gender group to the investigation.</p> <p>The preference for high impact aerobics physical exercises by the male participants.</p>

Each of the above categories in Table 4.5 will be discussed. Quotations from the interviews with the female participants are indicated with an 'F', and those from interviews with the male participants with an 'M'. The purpose of this section is to discuss the categories in detail, whilst exposing the major findings of the research. Direct quotations from the raw data are used to confirm and justify important findings.

4.4.2.1 *The experiences of the participants in the physical exercise programme*

All ten the participants who were interviewed described their experiences of the physical exercise programme as enjoyable and refreshing. They claimed that the physical exercises contributed to their feelings of well-being. This confirms the positive effect of physical exercises on their aggression-levels as highlighted in Table 4.1. Table 4.1

indicated a significant decline in adolescent aggression after the physical exercise programme was implemented. One of the participants who were interviewed on how he experienced the physical exercise programme noted,

It refreshed my mind and it relaxed me.... I also enjoyed that it was done after school.... So it was relieved my stress. (Hlongwane Rasarasa, M, grade 11).

The abovementioned finding is consistent with the results of the quantitative investigation in this study (as noted), where an average decline of 6,2 in adolescent aggression was recorded. This finding is also compatible with that by Dubbert (2002:613) who posited that physical exercises could improve at least some aspects of the human functioning.

Despite the general positive effect of the physical exercises, some female participants in particular experienced challenges. One of them had this to say,

Physical exercise made me experienced fatigue and pain in the muscles....

My parents would also get worried when I return home late, despite that I sought permission to participate in the study from them. (Ayanda Mhlongo, F, grade 9).

The female participants reported that pain was mostly felt at the beginning of the exercise programme and during the morning of the following day. This finding is consistent with the interviewer's observation that during the physical exercise sessions, the male participants adapted quicker and with greater ease compared to the female participants. The female participants seemed not to be used to physical exercises in comparison to the male participants. This observation is consistent with Kemp and Pienaar's (2009) finding that girls increasingly follow a sedentary lifestyle in comparison to boys. Other researchers also found that the participation in physical exercises

declines during adolescence, particularly with girls (Eime, Harvey, Sawyer, Craike, Symons, Polman & Payne, 2013:157). The researchers attribute the decline in participation to deterioration in the girls' body image and self-worth, the transition to high school with its greater workload. In addition to this, Khan et al., (2007:372) argue that the changes in the dopamine system that regulates motivation for locomotion is also a determining factor.

Other findings in the literature also indicate that the shortage of teachers in the primary schools is a major inhibitor to individual students' skills-development and their participation in physical activities in general (Independent Sport Panel, 2009). Regarding older students, a large body of research on physical activity concurs that the level of participation in physical exercises in general declines during the adolescent stage for both boys and girls. Khan et al. (2009:275) postulate that a great deal of the research used traditional statistical methods, and very few made use of modelling techniques, such as accelerated longitudinal analyses when analysing this decline. One study that used the abovementioned modelling techniques is the Amsterdam Longitudinal Growth and Health Study. The research by Van Mechelen, Van der Horst, Chin A Paw and Twisk (2007:1241) found that the total daily physical activity rates were higher for boys than for girls until they were 15 years old - after the age of 16 the physical activity rates were higher for girls than for boys. This finding is compatible with Khan et al.'s (2007:372) finding that the decline in physical activity is slower in girls than it is in boys. By the age of 18, the level of physical activity is higher in girls than in boys. Findlay, Garner and Kohen (2009) pointed out that it was not known whether the youth replaced their participation in organised activities with participation in informal activities. This question needs further research.

The frustration aggression theory (as discussed in section 2.2.2.1), prompted the interviewer to ask the participants if the pain caused by the physical activities did not facilitate anger towards it, since the frustration aggression theory posits that frustration has a tendency to redirect individuals towards aggression. All the participants denied that any aggressive feelings were aroused by the exercises. The participants'

responses were consistent with the findings in the literature where it advocates that physical exercise enables the management of anger. This finding is also contrary to the cognitive neo-association model (as discussed in section 2.2.2.3 which posits that when an aversive stimulus (unpleasant event) takes place in an individual, it could develop into something negative or produce a negative effect (Berkowitz, 1993). Gasa (2005) notes that perception or association is a prime determinant. He (2005:27) stated that if the incident is not perceived as negative despite how bad it is, then the chances of an aggressive reaction are little to none.

4.4.2.2 The feelings of the participants before the implementation of the physical exercise programme

The feelings of the participants before they participated in the physical exercises were varied. These feelings included positive feelings ('anticipation') and negative feelings ('reluctance'). One participant noted,

Sometimes, I would feel bad about the physical exercises... when I was in a bad mood.... My bad mood would be caused by fatigue and muscle pains [caused by the previous exercises]. But as I got used to the physical exercises my mood improved. (Ayesha Mazibuko, F, grade 9).

The above comment is compatible with the interviewer's observation that the female participants in particular would be reluctant to do physical exercises the next day if they had experienced pain and fatigue the previous day. This is how one of the participants expressed what they felt like doing when they had had such an experience the previous day,

When I was exhausted and feeling some pain, I felt like going home.... I even ran off one day. (Modise Katlego, F grade 10).

It is evident from the above responses in the interviews that the female participants were sometimes reluctant to exercise when they were in a poor frame of mind. According to the participants, their dispositions could be negative when they had experienced pain and sprains during the previous day's physical exercises. In addition to this, a large body of research articulates that there are various causes of mood changes in adolescents. Rimland (2005:3), as alluded to in section 2.3.4, stated that mood swings could be caused by the onset of puberty, which is often characterised by changes in the body size and shape, bouts of depression, and restlessness. Revilla (2014:1) concurred with this statement by postulating that the moods of a teenager going through puberty can fluctuate between excitement, anger, anxiety and depression. The findings of the researchers mentioned above are compatible with those of the biological theorists who attribute aggression to either genetic or biological factors (Revilla, 2014; Rimland, 2005:3). Revilla (2014) further argued that the adolescents are increasingly concerned with their body image, which often leads to a reduced self-esteem and mood swings. This observation could have facilitated the negative feelings even before the exercise programme was implemented.

4.4.2.3 The feelings of the participants after performing the physical exercises

It was evident from the responses of the female participants in the interviews and their perceptions that, in spite of the pain and their reluctance or negativity towards physical exercises, they believed and felt that their moods had improved after the physical workout. This finding supports the statements made by the biological theorists that an improvement in mood could be attributed to physical exercises. For example, Hiskins (2013:1) argued that it could be attributed to a reduction in lactic acid after physical exercises whereas an increase in lactic acid may contribute to a bad mood. Hiskins (2013:1) further claimed that lactic acid is released into the muscles when the muscles have used up their normal energy stores, but still has intense energy needs. Small amounts of lactic acid operate as a temporary energy source, thus helping to avoid fatigue during a workout. However, the build-up of lactic acid during physical exercises is claimed to create a burning sensation in the muscles that can slow down or halt an

individual's athletic activity. It takes approximately 20 to 60 minutes to fully remove the lactic acid (lactate and hydrogen ions) produced during strenuous exercises. Hiskins (2013:3) concluded that the absence of lactic acid, hence reduced pain, should contribute to improved mood levels.

One female participant noted that sore muscles, pain and sprains discouraged her from attending parts of the physical exercise programme. She indicated,

When I felt pain I would decide not to attend.... Sometimes, I would envy the others when I see them doing it [the physical exercises]. But when it is painful, it's painful. (Slikoluhle, F, grade 9).

It is evident from the above statement that the challenge caused by pain seemed to derail the participant from attending the physical exercises workout. The researcher observed that the participant did not understand that muscle sprains or pains were likely to occur at the beginning of the training, particularly if the participant was not used to physical exercises, or to those physical exercises. Some students were absent from the workouts at the very stage that it could yield the greatest rewards, as was noted by Weir (2011:48).

The above participant, Slikoluhle, indicated that she took time off from the physical exercise programme to give her sore muscles time to recover. The literature provides insight on factors that might cause sore muscles. Kemp and Pienaar (2009:527) noted that adolescent girls were increasingly sedentary - the researcher therefore thought that this was the cause of the pains and sprains experienced by some of the females because their muscles were being developed and reshaped. In the same vein, Kirstein (2011:48) posited that starting out too hectic in a new physical exercise programme may be one of the reasons why persons develop negative attitudes to physical activity.

However, the participants mostly experienced positive feelings after they had done physical exercises. The male participants, in particular, were generally fulfilled. One male participant said the following,

I felt good and confident about myself.... Even if I was angry, I felt better afterwards. My stress was relieved.... I even repeated some of the physical exercises at home. (Hlongwane Rasarasa, M grade 11).

Other participants added,

After the physical exercises I could feel blood running and flowing.... I felt different and energetic. (Luntu, M grade 10).

I felt blood flowing fast in my veins and it felt so good to feel the heart pumping. At night I slept early and I had a deep sleep. (Thando Thabethe, F grade 10).

These findings are consistent with the statements by the National Heart and Lung Institute (2011) and by Guskowska (2004:611), namely that exercise increases the body temperature and the blood circulation in the brain. Exercise also impacts on the hypothalamic-pituitary-adrenal axis, and is a physiological reactivity to stress. Exercising alters the body's temperature levels. The student participants reported feeling better during the day and also after sleeping. Blood circulation in the brain is important as the blood carries oxygen and glucose. When one area in the brain and body is active, it would need a greater blood supply.

4.4.2.4 A comparison between the participation of the males and females in the physical activities

Eight of the ten participants observed that the male adolescents participated to a greater extent in the physical exercises than the females. Only two participants (one

male and one female) articulated a different view. The eight participants' main argument was that the physical qualities of male adolescents (their strength and power), benefitted them to have stamina and a greater interest in performing the physical activities. One participant declared as follows,

Boys participate more in physical activities. Boys have stronger muscles. Boys have more time for doing physical exercises. They are fitter and stronger. (Hlophe Zama, F, grade 9).

Another participant noted,

Males do physical exercises more often than girls.... traditionally there are many physical activities that were meant for boys rather than for girls, such as soccer, cricket, rugby and there are facilities at school and also in the community.... Females do family chores, such as cleaning, cooking and some have babies which take a great deal of their time as well. (Man X, M grade 11).

The perception that the male adolescents actively participate in physical exercises is popular with the adolescents. That perception is compatible with Kemp and Pienaar's (2009:527) observation that teenage girls are increasingly more passive than boys. Some of the participants reasoned that the male adolescents' participation in physical activities was due to their greater muscle strength and power. The perception of the participants seems to suggest that traditional roles, parental guidance and the infrastructure promote unequal participation between male and female adolescents in performing physical exercises. The participants posited that society's chauvinistic tradition prescribed more sports activities for males than for females. Consequently, the traditional patriarchal system has contributed to the school and community contexts that promote a difference in the participation between males and females. The interviewer deduced from the participants' responses that most of the participants perceived the traditional patriarchal norms and values as providing the male participants with the

opportunities and motivation rather than the female adolescents to perform physical exercises. Traditional patriarchal norms and values have a tendency to perceive the man as the breadwinner, provider, head of the household, as well as the protector in the household, and in the community.

Traditional patriarchal norms and values and gender stereotypes seem to buttress gender differences regarding physical activities. (A further discussion on the role and impact of traditional patriarchal norms and values and gender stereotypes with regard to the participants' perceptions of physical exercise activity is given in section 4.4.2.5.)

In contrast to the above, two participants held a different view on gender participation in physical exercises: one participant argued that the male and female adolescents participated equally in the physical activities. The participant indicated as follows,

No.... You know in my lifetime I stayed in rural areas and in the suburbs.... To me boys' and girls' participation in physical activities is just the same.... Only the demographic locations determine participation trends. In suburban places female adolescents participate in sports and various physical activities. Females run... females belong to sports clubs and even go to various physical training centres such as smart gyms and aerobic classesThe majority of female adolescents are either studying or working.... Very few have babies and sit at home to cook.... But still some male adolescents would be on street corners and some in the taverns as well. (Mazwi, M grade 10).

The above participant's response was complemented by another one who articulated the following,

No! There is no difference.... If it is true that males participate more, why is it that females were the majority from the beginning to the end of our physical exercises? Even drop-outs were mostly males rather than

females.... Maybe at home males exercise more and it is mainly because we [females] don't find time to do it. (Hlophe Zama, F, grade 9).

It is evident from the above two participants' responses that they do not accept or submit to the idea that males participate more in physical activities than females. The two participants believed that there were no internal barriers, psychological or biological factors, or internal motivations in women that prohibited them from doing physical exercises. The two participants believed that females, similar to males, had the motivation (reinforcing the value of the activity) to exercise. The factors that made it appear as if there were differences were the access to physical exercise equipment, which were determined by socioeconomic and demographic factors.

The interviewer may validate the participants' observation that in this research, the females were in the majority. There were 25 participants in the pre-test and post-test sessions. Of these, fifteen were females and ten were males. The researcher's observation is that the females (like the males) participated well in the physical activities. The drop-outs from the initial number were mostly males. The researcher's observation and finding is contrary to the finding by others, for example Buckworth and Claudio (2004:34), namely that the men reported higher levels of exercise compared to the women on most activity indicators.

All the female participants felt that they did not have as much time as the male participants to do physical activities. Thus, not having enough time was a most important barrier for the girls for not participating in physical activities. This barrier was related to the social and family activities of high school students, as reported in a study by Daskapan, Tuzun and Eker (2006:618).

Engelbrecht, Pienaar and Coetzee (2004:42) argued that a main challenge to black girls aged between 13 and 15 years as compared to white and coloured girls, was their sedentary lifestyles and low activity levels. Kriska (2000:12) also published a similar

finding and attributed the lower physical activity or the sedentary lifestyle of black girls to their poor socioeconomic conditions. In the same vein, Eime and Payne (2009:293) argue that a school is a setting of physical activity only for a limited period of one's life, and then it is important to foster transitions out of school and into the community. In communities with poor socioeconomic conditions, the transition to greater physical activity cannot occur because of a lack of infrastructure and recreational facilities. Khan et al. (2007:369) conclude that poor socioeconomic conditions furthermore contribute to ethnic and socio-economic disparities between the rich and the poor with regard to physical activity.

In contrast to the above, Van Mil, Goris and Westerterp (1999:541) attributed the girls' lower participation in physical exercises to the onset of puberty. Puberty is a period of sexual maturation and the achievement of fertility. Girls from poor socioeconomic backgrounds would lack the sanitary protection to participate in physical exercises.

Traditional gender roles and stereotypes regarding physical exercises also played a role. Two major theories explain gender differences with regard to sport and exercise: Bandura's self-efficacy theory, and Eccles's expectancy-values model (in Martin, Richardson, Weiller & Jackson, 2004:1). The two theories profess that important other persons and expectancies are the key determinants of achievement choices and behaviour. The importance or value of a task has a direct role in determining the choices people make. One participant had the following to say,

My grandfather expects me to do home chores.... To be outside household after school is dangerous.... Boys will stop you and demand love relationship.... Others can hurt and bully you. There is also risk of being raped. (Ayesha Mazibuko, F grade 9).

When she was probed, she articulated her views as follows,

It happened to me when I started running at home during holidays.... Some boys would stop me and demand talking to me. One asked me why I exercise. Girls would also gossip that I want to be different. Judging from the males' attitudes, comments and reaction, they seemed to think that I wanted their attention. (Ayesha Mazibuko, F grade 10).

All the female participants reported that they were obliged by their parents to do household chores. In contrast, the responsibilities of the males in their households were sporadic and minimal. The interviewer analysed the responses of the participants and discovered that the males seemed to believe that they had the right to be served by the females. This impacted on the time that the females had available for exercises.

It was also evident from the participants' responses in the interviews that they did not feel safe and secure in their communities. Three of the five female participants reported a fear of being raped when doing physical activities outside of the home. The fear of the female adolescent participants is justified because South Africa has one of the highest incidences of rape in the world. In 2009, 68 332 cases of rape were reported to the South African Police Service (SAPS). The statistics of the SAPS indicate that a person is raped every 35 seconds. According to National Institute for Crime Prevention and Rehabilitation, however, only one in 20 rape cases is reported to the SAPS (Robertson, 2013).

The participants reported that when the adolescent females had babies, they were expected to no longer behave like their peers. The perception is in line with the Eccles' expectancy-values model (in Martin et al., 2004:2). The society elevates the females with babies to the level of womanhood. Therefore, the community would regard them as adults. Consequently, it would be expected from them to raise their child. The responsibilities related to raising a child could prevent the females from participating in physical activities.

In addition to the above, it was evident from the participants' responses in the interviews that the females were not supposed to develop muscles (to be muscular). For example, one participant articulated this view as follows,

I don't like to be muscular, because I'm a lady. I only want to have a good shape.... I don't want to look like man. (Slikoluhle, F, grade 9).

All five the female participants had objections to females having muscles. The interviewer tried to ascertain why this was the case. One participant responded as follows,

It is said that females who are muscular become sterile.... so they can't get babies.... (Thando Thabethe, F, grade 10).

An article reported in the Daily Express (2009) indicated that women who participated in high-frequency high-intensity exercises had a lower fertility rate. However, it does not prove that exercises actually do cause fertility problems, as this article can only indicate associations, not cause and effect. There are also other limitations, including an assumption that the participants' physical activity levels remain the same over a 10 year period. Moreover, the article failed to take into account the fertility of the women's partners (Daily Express, 2009).

Another stereotype evident from the participants' responses was the perception that the female participants exercised to improve their bodies with the view of attracting the men's attention. One participant said,

Female participants seem to be exercising so that they don't become fat.... They want a nice appearance. (Luntu, M grade 10).

The interviewer observed that the above participant's statement conforms to a common traditional view where women are expected to dress well and wear make-up so that

they may look beautiful and graceful in order to attract the attention of men, whilst the men were expected to be physically fit so that they could look like super-heroes. The literature claims that the parents are the initial and major socialising agents of this stereotype in society. The parents describe their offspring differently, with the girls being described in terms of their physical appearance, while the boys are portrayed in terms of their physical abilities. Rheingold and Cook (1975:429) argued that an unobtrusive indicator of parental gender stereotyping of children shows the prevalence of dolls and domestic items in girls' rooms, and various traditionally masculine items in the boys' rooms.

The other stereotype which was evident was when a male participant described the physical abilities of the female participants as follows,

I don't like exercising with people who are soft and weak.... I end up giving up.... Females are not relaxed. (Hlongwane Rosaria, M grade 11).

The interviewer did not observe the women as soft and weak during the physical exercises. The only related observation which was made was that the female participants were not comfortable with some of the physical exercises – similar to the male students. Moreover, the female participants were able to complete the exercise programme in contrast to the male adolescents. The interviewer's observation during the physical exercises is in accordance with Brewer's (n.d.) notion that men do not indicate a higher physical endurance when compared to women.

4.4.2.5 The participants' perceptions on male and female aggression

Most of the participants believed that the male adolescents were more aggressive than the females. The interviewer observed that they were very sure and bold when articulating this view. One participant had this to say,

Males are very aggressive in comparison to females.... When there is a disagreement males are quick to say: 'Ngizokushaya'. ('I will beat you!')
(Ayesha Mazibuko, F grade 10).

Another participant (Ayesha Mazibuko, F grade 10) agreed, while another one added,

Boys are obviously more aggressive.... girls hardly fight in a match.... the bigger the prize, the more violent boys are likely to be. (Man X, M grade 11).

Thus, the participants' statements portrayed the males as physically more aggressive than the females. This idea is consistent with the observations of the biological theorists (as discussed in 2.2.1) who postulated that the male species is more aggressive than the female species because of a male hormone (testosterone) that enhances aggression in males. This idea is also in accordance with a finding by Hardley (2003:467), who argued that males often engage in physical aggression, whilst females are more likely to exhibit, what has been termed 'relational aggression' or 'indirect' forms of aggression. The participants' ideas that the females were not as quick as the males to want to fight was compatible with the findings by other researchers. For example, Quinsey, Skilling, Lalumiere and Craig (2004:115) argued that males were more likely than females to commit serious acts of aggression. The women generally coped with anger and frustration in less violent ways. Thus, it seems that the males commit acts of physical aggression more often than the females. The females seem to commit 'indirect' or 'relational' aggression.

Only two of the participants believed that the personalities of the male adolescents and the female adolescents were generally the same. One participant pronounced this view as follows,

It is a stereotype to think that men are more aggressive.... some females beat males. This stereotype is caused by the fact that females'

needs are more emphasised.... Females have more voice.... Females report when it hurts. (Man X, M grade 11).

The other participant added to the above by stating,

Assault against women is more publicised.... People believe everything the media say.... Assault by females is overshadowed. (Mazwi, M grade 10).

Edalati and Redzuan (2010:81) posited that females are often as physically aggressive as males and that the rate of the females' physical aggression is equal to that of the males. Felson (2006:21) also posited that females were just as aggressive as their male counterparts. Hamel (2007:105) and Button (2007:54) stated that research showed that men and women physically abused each other at the same rate.

In contrast to the above, there are studies that found that the females' aggression level was higher than the males'. Jenkins and Aube (2002:1106) revealed that women were more aggressive under certain conditions when compared to their male counterparts, and they were more likely to kick, hit or physically assault their husbands. Nonetheless, Edalati and Redzuan (2010:83) contended that, although some studies indicated that the rate of female aggression was higher, women were still physically weaker than men, thus the rate of injuries for women was higher. In all the situations, the injuries of the women were more pronounced than those of the men for physical assaults. A bigger challenge is that the issue of aggressive behaviour by women has been neglected by people and the society at large (Strauss, 2006:1086).

Thus, the view of the abovementioned two participants that the females' and the males' aggression was on the same level is supported in some research and disputed in others. In summary, there seems to be a great academic debate on whether women and men differ in their aggression.

4.4.2.6 *The contributions of student spectators on the participants' interest in performing physical exercises*

The participants had varying views on the perceived role of student spectators in respect of their interest in performing physical activities. Four of the participants reported to benefiting more from physical activities when there were student spectators. One participant voiced this belief as follows,

I like exercising when there are other people watching.... I feel good.... When there are no spectators I don't feel good.... And I give up easily when I face a challenge.... (Ayesha, F grade 10).

Another participant had this to say,

I commit myself to the exercises when people are watching.
(Slikoluhle, F grade 9).

It is evident from the participants' responses in the interviews that their motivation to exercise was extrinsic. In this regard, Jowett and Lavalley (2007) posited that the foundation of motivation was a reason - we have to have a reason to do something. Often we forget the importance of this and we do things out of habit. After a while we start to run out of motivation because we have lost sight of the reason for doing something. The reason for doing physical exercises of the participants in this particular case was to be physically fit, healthy and to have strong bodies and muscles (in the case of the boys).

The other three participants reported that the presence of spectators negatively affected their performances during physical exercises. One participant observed as follows,

I don't feel good when there are spectators.... Other people don't come with a purpose to support you. They come to judge you. They come to criticise what you do and how you do it. (Luntu, F grade 10).

Three of the participants reported that they both approved and disapproved of student spectators. This meant their judgement would be informed by the situation and the context of the physical exercises at a particular moment. One student participant had this to say,

It depends.... If you are able to perform best, it is motivating to see them watching....Their positive comments and reaction can help you to do even more.... But if you are obese....and your body can't adapt to some of the exercises, they would criticize and laugh at you.... It would be embarrassing.... (Luntu, F grade 10).

It is evident from the above responses in the interviews that the presence of spectators motivated the participants if their reaction to the participants' physical activities was positive and supportive. The reaction of the participants is in line with the notion of operant conditioning (as discussed in section 1.4.3), in the sense that the behaviour (exercising) is shaped, modified and strengthened by its own consequences. The consequences in this case, were the positive responses/reactions from the spectators. It is also evident that the presence of the spectators discouraged the participants if their reactions to the participants' activities were unsupportive and negative. Furthermore, it is also evident that some participants were not motivated by the spectators at all. This seems to suggest that their motivation for performing the physical activities was intrinsic. This is in line with what other researchers articulated, namely in order to have a strong motivation, an individual needs a reason that is strong, robust and compelling. It is supposed to come from within, according to Hartley (2011).

4.4.2.7 *The participants' views of ways of exercising other than the physical exercise programme in which they participated*

All of the ten student participants agreed that physical exercises promote and enhance an individual's psychological well-being. Nonetheless, some felt that there were other activities that could also promote such well-being. One participant had this to say,

Working hard at home or running when you are sent for errands by your parents, such as fetching water.... those activities make you feel as if you are exercising. (Thando Thabethe, F, grade 9).

The above statement is supported by the observations of a clinical psychologist and lecturer, Law (1999:1), who stated that any kind of physical activity makes people feel better. The chemicals released through the exercises lift people's moods, help them to concentrate, and improve the quality of their sleep. In general, healthy people should aim to be physically active for at least 30 minutes at a time five times per week. The individual can choose the activity, but it should be something that he or she enjoys. Another student participant had this to say,

A long, vigorous walk helps me ... the effect is similar to the physical exercises that we do. (Luntu, F, grade 10).

The interviewer observed that the participant emphasised the word 'vigorous'. Therefore, to the participant, a long walk could not promote well-being unless it was 'vigorous'. Most of the time, the interviewer observed, the male participants who were used to physical exercises, were more inclined to believe in 'vigorous' physical activities than the female participants. It should also be noted that as the fitness levels increase, more intense aerobics and resistance exercises would produce greater benefits. All the muscles, including those of the heart, need to be challenged to get stronger, and therefore the exercise programme should gradually become more challenging (Tweed, 2009:46). However, Dimeo, Bauer, Varahram, Proest and Halter (2001:114) claim that

physical exercises need not be 'vigorous' – they postulate that even a single exercise bout may result in a substantial mood improvement. According to them, physical activity does not necessarily need to be 'vigorous' to produce health benefits such as physical and mental well-being.

4.4.2.8 *The participants' perceptions on how they plan to handle their feelings of aggression in the future*

It is important to be able to handle feelings of aggression. Psychologists assert that the body responds to the way individuals think, feel and act. They often refer to this as the 'mind-body connection'. The participants reported several ways how they planned to handle their aggressive emotions when these feelings manifested in the future. Seven of the ten participants mentioned physical exercises in their responses. One participant had the following to say,

I will perform physical exercise.... it minimises stress and anger and it makes me feel better physically and emotionally. (Katlego Modise, F grade 10).

The participants' reasons for choosing physical exercises were similar to its benefits discussed in sections 1.1 and 2.6. In particular, the participants mentioned the following benefits, namely the reduction of stress, the lessening of anger, a decrease in anxiety, and an improvement in sleep patterns.

Apart from physical exercises to handle aggression, the participants pointed to their other plans to handle their feelings of aggression. Three female participants regarded talking to someone when feeling angry and irritated as another alternative. Added to that is the belief that talking to oneself is also beneficial. It is believed that talking to oneself to clarify one's thoughts can be advantageous, provided that one perceives oneself in a positive manner.

Another way of handling aggression that was mentioned by two of the participants is that of 'crying'. This method of handling aggression has been validated by Bylsma, Vingerhoets and Rottenberg (2008:1165) who pointed out that crying is often the result of feelings of sadness and frustration, but after crying many people experience a feeling of release and catharsis. Hendriks, Nelson, Cornelius and Vingerhoets (2008) argue that crying is evolutionary for a non-physiological reason. The attachment theory suggests that crying is a behaviour that is natural to humans from birth. As infants, babies learn that crying will result in comforting - this creates a relationship bond. This behaviour or habit of crying continues to create attachments in life (Hendriks et al., 2008).

To understand the effects of crying, it is necessary to understand what happens in our bodies when we cry. Vingerhoets, Cornelius, Van Heck and Becht (2000:354) explain this as follows, namely the part of the body that produces tears is called the lacrimal system. The lacrimal system is controlled by the sympathetic nervous system. The lacrimal nucleus is located in the brain stem and it has connections to many parts of the brain. One of those is the hypothalamus. This is connected to many emotional systems in the body. When the lacrimal nucleus is stimulated through one of these connections, it leads to crying.

One participant reported that he would go to sleep to handle his feelings of aggression, and stated the following,

I will sleep.... sleeping makes me forget.... at least for a short period of time.(Man X, M grade 11).

The claim by the participant is consistent with the findings of the National Sleep Foundation (2004) which observed that sleep is essential for a person's health and well-being. The National Heart, Lung and Blood Institute (2012:1) postulated that a good night's sleep improves learning and problem-solving skills. Sleep helps individuals to pay attention, make decisions and to be creative. The Institute also warns that a

deficiency in sleep may make people feel angry and impulsive, have mood swings, feel sad, depressed or stressed, or experience a lack of motivation.

Another student participant reported that playing music could be another strategy to handle aggressive feelings. The participant indicated this view as follows,

I usually play music when I feel angry and irritable.... I would go to church.... singing and the scriptures make me feel better.... music helps.... exercising outside can't work when weather is bad.... you could get sick. (Thando Thabethe, M grade 10).

The literature supports the claim by the participant that music has therapeutic effects on the mind and on emotional well-being. For example, Richards (2009:1) argued that listening to music may have beneficial effects on both the body and the mind. Certain rhythms and tones can help to excite or relax the body and the mind. It should also be noted that music and physical exercises may be combined to alleviate feelings of aggression.

4.4.2.9 The results of a physical workout on the participants' feelings of aggression in particular

All ten the participants reported to feeling better after physical exercises. The interviewer observed that the participants could describe their feelings as "feeling better" but could not explain *why* physical exercises made them feel better. One participant declared,

I felt different after the exercises.... I was in a better mood and feeling. (Slikoluhle, F grade 9).

The feeling of this participant is consistent with the findings of other researchers. Penedo and Dahn (2005:189) argued that possible reasons for participating in regular

exercises in order to be able to reduce anxiety and to improve the general mood are as follows:

- Physical exercises help to boost the production of the ‘feel-good’ chemicals, endorphins and serotonin. (A detailed explanation of the effects of endorphin and serotonin was given in chapter two, section 2.2.1.2.)
- Physical exercises help to distract an individual’s anxious thoughts. Whether that person is taking aim with a soccer ball or trying to get a yoga posture right, he/she is focussed on the activity rather than his/her stress or feelings of aggression.
- Physical exercises help to improve an individual’s sleep patterns. The lack of sleep has been found to contribute to stress, and it may also increase the chances of depression and aggression.
- Physical exercises help to improve the energy levels. With more energy individuals feel better and less aggressive.

4.4.2.10 General benefits of specific forms of physical exercise

The participants confirmed that physical exercises had benefits for them in promoting their well-being. One participant had the following to say,

Physical exercise makes me feel strong and I know it helps to have strong muscles and bones. (Ayanda Mhlongo, F, grade 9).

Another student participant concurred with the above statement by saying,

Physical exercise helps me to have a strong body which can’t easily get tired and you also don’t get sick easily. (Hlongwane Rasarasa, M, grade 11).

The abovementioned views of the benefits of physical exercises with regard to feeling strong and healthy and of not getting tired or ill easily, were consistent with existing findings in the literature. According to Tweed (2009:46), it is a myth to perceive physical exercises as exhausting. In their letter the Harvard Mental Health (2009:1) outlines many benefits of physical exercises in addition to those mentioned by the participants. These benefits include the following, namely physical exercises improve the chances of living longer and living healthier; it helps to prevent heart disease, certain kinds of cancers and type 2-diabetes; it prevents the insidious loss of bone, known as osteoporosis; and it improves the heart-lung and muscle fitness.

Seven of the participants felt strongly that the physical exercise programme in which they participated promoted their mental well-being by fighting stress. The finding of the participants on stress is consistent with that of Weir (2011:48) who stated that physical exercises may be a way of 'toughening' the brain so that stress has less of an impact. Two of the student participants declared,

If you are stressed you feel better after physical exercise.... You forget thinking about it (stressor) and you focus on the exercise. (Ayanda Mhlongo, F, grade 9).

Studying can be stressful.... sometimes the day becomes too long.... yoga would make you focus and concentrate.... In the end one feels better and is mentally refreshed.... (Modise Katlego, M, grade 10).

The above statements confirm the interviewer's observation that the student participants all adapted and concentrated well during the physical exercise programme. For example, when the interviewer, as the instructor during the physical exercises, counted the sets of physical exercises out loud, the student participants would also count them out loud with him. This finding is in accordance with the finding by Daley (2008:140) that physical exercises can serve as a source of distraction or a time-out strategy from the daily worries and depressing thoughts. Some of the biochemical changes caused by

physical exercises promote wellbeing beyond the apparent and immediate effects. One of these biochemical changes is namely that endurance exercises cause the heart muscles to be more sensitive to calcium. Calcium is the chemical messenger that signals the muscle cells to contract and to raise the lactate threshold. A high lactate threshold means that a person's body is able to efficiently remove lactic acid from the muscles as it is produced, and carry it in the bloodstream to the kidneys, where it is filtered out of the body as urine. To this, a number of researchers such as Nabkasorn, Miyai, Sootmongkol, Junprasert, Yamamoto, Arita and Miashita (2005:182) added that physical exercises alleviate depressive states and reduce the volumes of urine cortisol and epinephrine excretions, as well as improve conditions of physiological fitness.

When the participants were asked what the causes of their stress were or what they regarded as a threat to their well-being in the classroom, three of them stated that they felt uncomfortably hot in the classroom. Thus, they experienced 'heat stress'. Their comments on heat stress are compatible with other research that states that heat stress may be perceived as a threat, and facilitate aggression. Such a threat challenges the development of positive emotions and could contribute to poor performance at school (Keller & Schilling, 1997).

The preference for non-vigorous exercises, such as yoga, by the female participants is consistent with the interviewer's observation that the girls particularly enjoyed yoga. They would request that the yoga exercises be done even when these were not scheduled for a particular day. The girls' experiences of yoga were a confirmation of Forge's (2005) finding that mindful physical exercises (such as yoga which stimulated concentration), provide an immediate source of mental relaxation and mental quiescence. Mental relaxation and calmness are critical for females in particular, since they experience depression at approximately twice the rate of males, according to Bhehar and Oren (1995:3).

In spite of the female's greater enthusiasm for yoga above other types of exercise, all ten the participants enjoyed yoga as a mindful physical exercise. They indicated that

these exercises helped them to achieve a sense of wellbeing. An account of a biochemical analysis illuminates the reason for the participants' overwhelming support of yoga: Tsang, Chan and Cheung (2008:318) indicated that mindful physical exercises (such as yoga) increase the level of monoamine neuro-transmitters in the brain. This statement is compatible with the monoamine hypothesis as discussed in Chapter 2 (section 2.6). The literature explains that the monoamine neuro-transmitters play an important role in the secretion and production of neurotrophic-3 by astrocytes, a chemical which maintains neuron-integrity and provides the neurons with trophic support. Trophic support helps in the generation and positioning of motor neurons during every stage of the developmental process. It is also involved in axon guidance and synapse-formation (Tovar-Y-Romo, Ramirez-Jarquín, Lazo-Gomez & Tapia, 2014:1).

The participants could not clearly explain why physical exercises such as yoga (in particular) relieved their stress levels and aggression. They would merely state that when doing mindful physical exercises like yoga they would forget what stresses them and feel better afterwards. However, researchers are able to give a sophisticated account of how mindful physical exercises like yoga could relieve stress. Tsang et al. (2008:318) postulated that mindful physical exercises reduced the stress signals to the limbic system, and thus reduced the hypothalamus-pituitary-adrenal axis activity influencing the release of adrenal glucocorticoid. Glucocorticoid is significant in the metabolism and in dealing with stressors. It has to be controlled and reduced when necessary. Tsang et al. (2008:318) argue that the loss or diminishing of glucocorticoid secretion could lead to a state of deranged metabolism and an inability to deal with stressors which, if untreated, could be fatal. Mindful physical exercises also reduce stress leading to the up-regulation of the brain-derived neurotrophic factor and the down-regulation of adrenal cortisol.

4.4.2.11 The participants' views on what did not work well in the physical exercise programme

Three of the adolescents interviewed noted that they did not feel positive about the fact that the physical exercise programme was administered after school, at a time when they wanted to go home. The interviewer also observed from the attendance of the physical exercises that there was a maximum attendance when it took place during school hours. The participants' reasons for their poor attendance of the programme after school hours included that they made use of staff transport, and others went home in groups with their friends. One female participant reported that if she went home alone, she ran the risk of being exposed to certain social ills, such as bullying. Khan et al. (2007:372) also reported that inadequate transport and concerns about safety are inversely related to the adolescents' physical activity.

In addition to the above, one participant referred to the need for lunch during the exercises and mentioned,

Physical exercise took place after school when I was hungry. You know, when you are hungry, there is no physical power. (Modise Katlego, F, grade 10).

Two of the male participants believed that exercising with female participants deprived them of the maximum benefits of physical exercises. One male participant noted:

I don't like exercising with people who are soft and weak.... I end up giving up.... Females were not relaxed and I don't know the reason for this. (Hlongwane Rasarasa, M, and grade 11).

The above statement is compatible with the interviewer's observation that the male participants enjoyed high impact aerobics exercises, whilst the female participants enjoyed low impact exercises. (There is also some gender stereotyping evident in the

above interview response, which was discussed in section 4.4.2.4). Accordingly, four of the female participants reported that they disliked high impact physical exercises because they did not want to be muscular. For example, two participants said,

I don't like to be muscular, because I'm a lady.... I only want to have a good shape.... I don't want to look like a man.(Slikoluhle, F, grade 9).

I'm not interested in physical exercises that create muscles.... I'm afraid to have muscles.... How will people look at me and think of me (shaking her head).(Hlophe Zama, F, grade 9).

When asked why females should not have obvious muscles, the participant could not provide a clear answer to the question. She merely disapproved of muscles in females. The interviewer observed from another female participant's body language and attitude when discussing women with well-developed muscles, that such muscles were not deemed appropriate in women. The participants would indicate their distaste with frowns, a shrugging of the shoulders, and skewed faces. One male participant confirmed the above by stating,

They [the girls] think being muscular is for men.. They seem to be merely exercising so that they don't become fat. It is in the mind.... maybe, it is what they were grown up to believe. (Mazwi, M, grade 10).

The finding regarding the females' perception of a muscular body is consistent with that of Cohn and Adler (1992:78), namely that the social pressures placed on women force them to have thin figures. Furthermore, women tend to overestimate male preferences for thin female figures. The above belief is compatible with the finding by other researchers that men are more likely than women to judge the attractiveness of the other sex on the basis of physical attributes rather than on personality traits (Mazur, 1986:281). Perceived peer preferences also played a role. Khan et al. (2007:372) argued that perceived peer attitudes about body shape and fitness were associated with

physical activity in both boys and girls. For girls, the view that their friends wanted them to be thin, positively correlated with their level of physical activity; for boys, the view that their friends wanted them to be physically fit and muscular positively correlated with their physical activity.

4.4.2.12 The participants' recommendations on how the physical exercise programme may be improved

The participants made recommendations on how the exercise programme could be improved in order to maximise their well-being. Recommendations on how to improve the programme could be significant, if one considers the claim by other researchers that physical and mental health (well-being) are critical components in learning (Rothon, Head, Clark, Klineberg, Cattell & Stansfeld, 2009:421). One participant said:

Physical exercise should be administered during the day, before the end of the school day. (Luntu, F, grade 10).

However, according to the literature, the time when the exercises are done is not of critical importance. Nonetheless, enough time should be allocated for the physical exercises because more time equals more health benefits - muscle-strengthening activities need to be done to the point where it is hard for a person to do another repetition without help (United States Department of Health and Human Services, 2008).

The male participants made the most recommendations. According to the interviewer's observation, the male adolescents were familiar with most of the physical exercises and recommended other types of exercises in addition to those that were used during the programme. For example, one student participant said,

We need physical exercise equipment... like an ab-wheel for making six packs and the skipping rope too. (Hlongwane Rasarasa, M, grade 11).

Raftl (2012:2), from her personal experience with a skipping rope, postulated that it increases the blood flow, which means that more nutrients reach the person's skin, promote the elimination of toxins, contribute to hormonal balance and enhance the health of the lymphatic system. The literature describes the *lymphatic system* as the heart of a human being's immune system. A healthy lymphatic system will enable the lymph nodes to work properly to eliminate bacteria and other germs from the body.

Three of the male participants recommended that physical exercises be done more often and be continued indefinitely. This idea is supported by the findings of Hallal, Victoria, Azevedo and Wells (2006:1020), who declared that the promotion of physical exercises should start early in life, although the 'how much' remains unknown, and needs further research. The lifelong benefits of the adolescents' physical activity are unequivocal. In contrast, most of the female participants held the view that physical exercises were important for controlling the body's weight and shape. This view could deprive them of reaping the maximum benefits of physical activity, according to Nabkasorn et al. (2005:182), who argued that regular physical exercises promote the physiological and psychological well-being in adolescent females.

4.4.2.13 Observation field-notes

(i) Exercising in mixed-gender groups

All ten of the participants mentioned that they do not have a problem with doing exercises with the participants of the other gender. Nonetheless, the attire worn during the physical exercises seemed to pose a challenge for the female participants, in particular. Two of the female student participants confessed as follows,

I didn't feel comfortable doing stretching with boys around.... I thought that they may see my private body parts. (Ayanda Mhlongo, F, grade 9).

I did not like physical exercises such as stretching my legs in front of the boys... Boys would think: 'What is this girl doing with legs wide open!' (Aisha Mazibuko, F, grade 9).

The above statements are consistent with the interviewer's observation that some female participants did not feel comfortable with stretching their legs even though they were wearing skirts with tights or trousers. However, those who happened to wear skirts were affected the most, as they had to ensure that their undergarments were not showing. The interviewer also noticed a level of uneasiness as they elaborated on this point during the interviews. They were shy and uneasy, and were feeling slightly embarrassed.

(ii) The preference of the male participants for high impact aerobics exercises

The interviewer noted that the male participants showed an eagerness and anticipation to participate in high impact physical exercise activities compared to the female participants. One participant voiced his opinion as follows,

Men must do vigorous exercises in order to be strong.... If I happen not to succeed in my studies, I might end up as 'dagga-boy' [general worker in a construction site]. A man needs to be ready for the tough life ahead. My father needs to be sure that he gave birth to a man a strong man who can take his legacy to the future . (Thabethe Thando, M grade 10).

Khan et al. (2009:375) argue that boys who believed that their fathers wanted them to be physically fit and muscular were more likely to be physically active. The above

finding is consistent with the convictions of the social learning theory (discussed in Chapter two) where it is explained how the adolescent participants could acquire bodily kinaesthetic intelligence vicariously, particularly by observing other male figures at home or in the community. Smith (2008) confirmed the role of social modelling (as explained in section 1.4.3).

The interviewer also observed that the male participants' confidence levels were particularly high during high impact physical activities. They tended to compete with one another to ascertain who was stronger, and had much more endurance than the females. Although the aim was to be better at sports such as soccer, it would also alleviate aggression and facilitate emotional well-being. One participant noted,

Strong exercises in the programme and in my home soccer team take my body performance to another level.... I can fight for the ball..... I can protect it.... I have more energy and strength to do that. (Katlego Modise, M grade 9).

The Science Daily (2009:1) indicates in an article that girls take part in less vigorous playtime activities than boys. Girls tend to spend time in smaller groups and engage in verbal games, conversation and socialising. Most boys play in larger groups, which lend themselves more to physically active games, such as football. There may be a biological explanation for this gender difference (Steady Health, n.d.:1).

(iii) *The increase in the adolescents' self-esteem during and after the physical exercises*

The researcher observed that the participants in the physical activity programme seemed to gain in self-esteem during the pre-test and the post-test period. The more the participants engaged in physical activities, the more their self-esteem and human relations within the physical exercise group improved. One participant indicated as follows,

It felt good to do physical exercises with other people and I felt confident about myself.... It is not easy to do it alone.... With other people it's better.... (Thando Thabethe, F, grade 10).

This observation confirms Gasas's (2005:103) finding that the adolescents' withdrawal from social relations may be a sign of aggression. As Budhal (1998:65) puts it, lonely or isolated adolescents sometimes have a low self-esteem and may be less willing to take risks in normal social settings. This could make it harder for them to form relationships, thereby increasing their chances of loneliness, which might heighten aggressive behaviour. The researcher deduces from the above finding that there exists some correlation between loneliness or isolation and a poor self-esteem, which is likely to heighten aggressive behaviour. Nonetheless, the self-esteem is likely to increase if another person's reactions provide positive reinforcement (as argued in 4.4.2.6). If the other people's reactions are negative, the development of a low self-esteem may occur, which may heighten aggression (Budhal, 1998). The researchers' deduction above is compatible with Benner's (1984:95) statement that it takes people to make people feel better and it takes people to make people 'sick'.

4.5 SUMMARY

This chapter presented the results and a discussion of the results of an investigation of the two research questions. Research question 1 was, '*Will physical exercises significantly lower the participants' level of aggression?*' This research question was investigated quantitatively by means of a questionnaire that measured aggression, using a sample of 25 participants. The results were presented in tables 4.1, 4.2 and 4.3. Table 4.2 and Table 4.3 presented separate results for the male participants and the female participants respectively. In all the tables a statistically significant decrease in aggression from the pre-test to the post-test was indicated. Between these two tests, a ten-week physical exercise programme was followed.

Research question 2 stated, '*What are participants' views on the role of a physical exercise programme to address their aggression?*' This question was explored qualitatively by means of semi-structured interviews with ten participants, and observations. This helped to explain the results of the quantitative phase of the study.

In the next chapter the main conclusions of the research are presented. The limitations of the research are highlighted and recommendations for improving the physical exercise programme to alleviate aggression and for further research are made.

CHAPTER 5

CONCLUSIONS, RECOMMENDATIONS AND LIMITATIONS OF THE RESEARCH

5.1 INTRODUCTION

As indicated in chapter one (section 1.1.), the aggressive behaviour of secondary school students is a concern for everyone, everywhere. After having embarked on a literature review, it was clear that physical exercises may alleviate the students' aggression. Accordingly, the main research problem of the study was stated as, '*What is the impact of physical exercises on adolescent aggression?*' In line with this question, two specific research questions were stated, (i) 'Will physical exercises significantly lower the participants' level of aggression?' and (ii) 'What are participants' views on the role of a physical exercise programme to address their aggression?' In Chapter 3, the research design to investigate these two questions was explained, and the results were presented and discussed in chapter 4.

In this chapter, Chapter 5, the conclusions of the study are indicated. The conclusions are given for each separate question. Recommendations for presenting similar programmes in secondary schools, as well as for further research, are formulated. The limitations of the research are also presented.

5.2 CONCLUSIONS

The conclusions were drawn from the two research questions (as stated in section 1.2 and section 3.3), and the hypotheses which were stated as follows:

Research question 1: Will physical exercises significantly lower the respondents' level of aggression, as indicated by the questionnaire on aggression which was adapted from Buss and Perry's (1992) questionnaire?

Accordingly, the testing of the hypotheses focussed on the following:

- H_0 : Physical exercises will not significantly lower the respondents' level of aggression as indicated by the questionnaire on aggression.
- H_1 : Physical exercises will lower the respondents' level of aggression as indicated by the questionnaire on aggression.

Research question 2: What are the respondents' views on the role of the physical exercise programme to address their aggression?

Research question 1 and its related hypotheses were tested quantitatively, and research question 2 was investigated qualitatively.

The conclusions for both questions are given in the next two sections.

5.2.1 Conclusions with regard to research question 1

Generally, the quantitative results (see sections 4.2.1 and 4.2.2) indicate that, on average, physical exercises lowered the respondents' level of aggression, as can be seen in tables 4.1, 4.2 and 4.3.

To test whether the average differences between the pre-tests and the post-tests were statistically significant for the group as a whole and for the boys and girls separately, t-tests were calculated manually and tested on the 5%-level of significance (because there were only 25 students). In all three instances the researcher rejected the null-hypothesis and accepted the experimental hypothesis. The main conclusion with regard to research question 1 is therefore:

The physical exercise programme that was implemented three times per week for 40 minutes at a time for ten weeks, significantly lowered the levels of aggression of the participating secondary school students of both genders, but in particular of the boys.

5.2.2 Conclusions with regard to research question 2

Research question 2 investigated how the participants experienced the 10-week programme in which they participated three times per week for 40 minutes at a time (see Appendix I).

The following conclusions can be drawn:

- With regard to how the participants experienced the physical exercise programme, it can be concluded that, although the boys and girls often found the exercises challenging, especially the girls who seemed to live a more sedentary lifestyle, they also enjoyed it and found it refreshing (see section 4.4.2.1). Such feelings of enjoyment alleviate aggression, while the challenging nature of the exercises may be able to take their minds off troubling issues in their own lives.
- It can be concluded that before the participants started with the programme, they were filled with anticipation, although some of the girls were a little reluctant (see section 4.4.2.2). However, after having completed the exercises, they experienced fulfilment, even though they also suffered some physical uneasiness (see section 4.4.2.3). Such fulfilment counteracts aggression, according to the psychological theory.
- Regarding gender differences, it can be concluded that, as indicated above, the girls found the exercises more challenging than the boys, although more girls than boys participated in the programme. The boys enjoyed the vigorous exercises more than the girls. In their communities the boys participate more in physical exercises in general, because of traditional norms that value exercise and a masculine appearance in men, while the females are expected to stay at home and be occupied with chores in the house. In addition, the times when the programmes were presented seem to be important because there are safety and security issues for the girls who need to travel home alone after they have participated in the programme. The type of exercise that is presented is also important since the girls, in general, wanted to have feminine

bodies and did not want to build excessive muscles. The clothing that the students wear during the physical exercise programme is also vital, since the girls feel uncomfortable to do exercises in their school uniforms (see sections 4.4.2.4 and 4.4.2.13).

- It can be concluded that, according to the students, both genders are aggressive at times, although they express their aggression differently (see section 4.4.2.5)
- When the physical exercise programmes are presented, other student spectators impact on the participants' interest in performing the exercises. Some students find it motivating when there are spectators, while other students find it intimidating. (See section 4.4.2.6.)
- It can be concluded that the programme stimulated the participants' thoughts about the many ways that they can perform physical exercises, such as hard work at home, and long vigorous walks. (See section 4.4.2.7.)
- After having participated in a physical exercise programme, the participants planned to continue with physical exercises to handle their feelings of aggression in future. This indicates that the exercises help with their well-being, and therefore seems to alleviate feelings of aggression. In addition, the students realised that they needed to do something positive instead of harbouring aggressiveness. Thus, they also planned to confide their feelings of aggression in others, to cry, to sleep or to listen to music. (See section 4.4.2.8.)
- It can be concluded that, according to the participants, the exercises improved their feelings of well-being – see section 4.4.2.9. This confirms that exercises can counteract aggression. The main benefit of the exercises seems to be on a physical level (greater fitness), on an emotional level (stress-relief and mood-improvement) and on a cognitive level (better concentration). (See section 4.4.2.10.)
- According to the participants, what did not work well with regard to the physical exercise programme was that they did not enjoy all the exercises, some of their close friends did not participate, and the exercises were done in a mixed

gender group. These are facts that need to be considered in follow-up programmes of this nature. (See section 4.4.2.11.)

- From the participants' recommendations on how the physical exercise programme may be improved, it is clear that the two genders need different kinds of programmes. For example, the boys want more strenuous exercises and also the use of better equipment and skipping ropes. The girls want less strenuous exercises, and requested that these should be presented during school hours for reasons of safety. (See section 4.4.2.12.)

5.3 RECOMMENDATIONS

5.3.1 Reducing adolescent aggression in schools

The following recommendations are made based on the results and the conclusions of the study:

- Physical exercise programmes should be implemented in secondary schools to reduce adolescent aggression and to improve the adolescents' physical, emotional and cognitive well-being. The programme used in this research (see Appendix I) serves as an example to start from. This study found that a physical exercise programme that students participated in for 40 minutes at a time, three times per week for at least 10 weeks, significantly reduced their levels of aggression. Other secondary schools with the same socioeconomic contexts are encouraged to implement the programme. However, the presenters should adapt the programme to suit their needs. If possible, the presenters should design, implement and evaluate their own programmes.
- The curriculum specialist in the Department of Education should assist to ensure that time is allowed for the students to do physical exercises during school hours, in spite of the tight syllabus and the increase in work-load. This will accommodate issues of safety and social ills.

- Physical exercises should be started at primary school level and continue until the end of grade 12. This will prevent the onset of a sedentary lifestyle, which seems to make participation in physical exercises cumbersome for some students, in particular for the girls.
- The participants in the physical exercise programme need to be taught how to do the exercises correctly. This will help to prevent/reduce body pains and injuries.
- The students should be taught to understand the physiological and psychological benefits of participation in the activities. This could facilitate their intrinsic motivation regarding their participation in physical exercises.
- Traditional patriarchal norms and values and gender stereotypes which seem to disadvantage the female adolescents from participating in physical exercises should be addressed.
- The first-aid kit of the secondary school students should be adequately stocked to enable all the students, in particular the girls, to participate in the exercises.
- A Learner Code of Conduct should be in place and the Discipline Safety and Security Committees should be effective in order to deal with cases of misconduct, such as bullying. This will help the female adolescents in particular to optimise their participation in physical activities without any fear, intimidation or gender discrimination.
- The topic of adolescent aggression should be addressed in the subject Life Orientation in particular. The students should be made aware that there are other non-organised ways of doing physical exercises, such as working

harder, walking and running. They should also be encouraged to complement physical exercises with talking to someone about their feelings, as well as alleviating their aggressiveness by crying, sleeping or playing music.

- Gender differences with regard to the exercise programmes need to be considered. For example, both mindful and non-mindful physical exercises appeal to adolescents. However, in this study, the adolescent boys mostly enjoyed the non-mindful physical exercises and the adolescent girls mostly enjoyed the mindful exercises such as yoga. Thus, there should be different programmes for the two genders, and they should participate at different times.
- The physical exercise programme should involve the parents as well. They need to understand the benefits of such programmes to motivate their children, and to allow them to participate.

5.3.2 Recommendations for further research

The following topics are suggested for further research:

- The research could be done with other racial groups (that include white, coloured and Indian students) and other cultural groups.
- This research investigation was conducted specifically in a semi-rural school. Further research on the same topic could be conducted in rural and urban schools as well.
- Gender differences in the participation and the effect of physical exercises on the levels of aggression need further investigation.

- The role of organised physical activities versus unorganised physical activities, as well as other methods that include, for example, music or talking to others to alleviate aggression, could be investigated.

5.4 LIMITATIONS OF THE RESEARCH

It is important to critically evaluate a study in order to be able to justify the conclusions and to gain perspectives regarding the implications of the results of this study.

This research involved a case study. Thus, a major limitation of the study was that the data were collected from 25 students, and thereafter from ten students who were from a restricted geographical area, namely one semi-secondary school in the KZN Province. As a result, their responses and views may not be representative of the majority of other students from other areas. In addition, the study involved participants who were all from the same cultural and racial group (i.e., black). Other studies that include participants from other racial and cultural groups may show different patterns from those described in this study.

5.5 SUMMARY

Aggression in South African schools is a major cause for concern. A review of the existing literature indicated that physical exercises contribute to people's well-being. Thus this study investigated the following main research problem, '*What is the impact of physical exercises on adolescent aggression?*' In line with this question, two specific research questions were stated and explored, namely (i) 'Will physical exercises significantly lower the participants' level of aggression?' and, (ii) 'What are the participants' views on the role of a physical exercise programme to address their aggression?'

An empirical investigation was done by means of a mixed methods case study design. A purposive sample of 25 students was chosen from grades nine to eleven. The

students completed an adapted Buss and Perry questionnaire on aggression to determine their levels of aggression. Thereafter they embarked on a 10-week physical exercise programme of three sessions per week, thus they participated in 30 exercise sessions of about 40 minutes each. After the 10 weeks, they completed the same questionnaire. The quantitative results indicated that the programme significantly alleviated their feelings of aggression. Follow-up qualitative interviews with ten of the participants that benefitted most from the exercise helped to shed more light on how they experienced the programme and its effects. Recommendations were made for similar programmes and for further research.

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APPENDIX A: ETHICAL CLEARANCE CERTIFICATE



Research Ethics Clearance Certificate

This is to certify that the application for ethical clearance submitted by

NT Mdluli [34038043]

for a M Ed study entitled

Addressing adolescent aggression by means of physical exercise: a case study

has met the ethical requirements as specified by the University of South Africa College of Education Research Ethics Committee. This certificate is valid for two years from the date of issue.



Prof KP Dzvimbo
Executive Dean : CEDU



Dr M Claassens
CEDU REC (Chairperson)
mcdtc@netactive.co.za

Reference number: 2014 JUNE /34038043/MC

19 JUNE 2014

**APPENDIX B
PERMISSION FOR RESEARCH**

PO Box 392
UNISA
0003

ATT:

Director: Knowledge management and Research
KZN Province Department of Education
Private Bag x 3197
Pietermaritzburg

Dear Madam

**REQUEST FOR PERMISSION TO CONDUCT RESEARCH AT A SCHOOL IN
KWAZULU-NATAL**

I am currently busy with my M Ed (Psychology of Education) studies at UNISA. The main purpose of my study is to determine if adolescent aggression may be addressed by means of physical exercise at secondary school. To this end, find attached a research proposal as well as the completed KZN DoE form regarding the research which I would like to conduct in a secondary school in KwaZulu Natal Province. As required on the form, all details regarding how the study will be conducted as well as the significance of the study are included in the research proposal.

There will be no risks involved and all information will be kept confidential. The students and school's name will not be revealed. Participation is voluntary and there will be no monetary rewards given. Students are free to withdraw from the study at any point without being penalised. Students are expected to indicate whether they agree to participate by completing a consent form. The parents/guardians are also expected to complete and return a consent form to give permission for their children's participation if

they are younger than 18. As required, the results of the study will be made available to the KZN DoE. The school will receive a summary of the findings on request. The findings of the research will be published in the thesis for which this study is being conducted and may be published in an academic journal or presented at a scientific meeting.

This research is conducted under the supervision of Prof Salomé Schulze at UNISA (Department of Psychology of Education). Prof Schulze can be contacted on Schuls@unisa.ac.za. Please feel free to contact me if you have any queries regarding the research or any other related matter.

Your permission and support for this research is appreciated.

Thank you

Ndabenhle Terry Mdluli

Signature: _____

Date: _____

E-mail:mdluliterry@gmail.com

Tel: 036 353 2571

Cell: 0732788780

APPENDIX C
PERMISSION FOR RESEARCH

Dear Ward Manager

REQUEST FOR PERMISSION TO CONDUCT RESEARCH AT YOUR SCHOOL

I am currently busy with my M Ed (Psychology of Education) studies at UNISA. The main purpose of my study is to determine if adolescent aggression may be addressed by means of physical exercise at secondary school. The study also draws together insights from different perspectives and sources of data which policy makers and curriculum designers need to consider, in particular, how to address adolescent aggression in secondary school. In the long term, it can contribute towards the improvement and application of strategies for addressing adolescent aggression in a manner that is cost effective and that can be easily monitored.

Your school has been selected to participate in this research which involves nine, 10 and 11 students. Participating in the research will enable these students to know their aggression levels, and how to address it or cope with it. KZN Department of Education (KZN DOE) approved my request to conduct the research (see attached proof thereof).

My intention is to use physical exercise to address adolescent aggression. Participants will participate in moderate physical exercise for 40 minutes for three days per week, over a period of approximately 10 weeks. There will also be individual interviews with the participants after the 10 weeks, to report their experiences.

There will be no risks involved and all the information will be kept confidential. The learner's and the school's name will not be revealed. Participation is voluntary and there will be no monetary rewards given. Learners are free to withdraw from the study at any point without being penalised. Learners are expected to indicate whether they agree or disagree to participate by completing an assent form. The parents/guardians are also

expected to complete and return a consent form that gives permission for their children's participation. As required, the results of the study will be made available to the KZN DOE. The school will receive a summary of the results. The findings of the research will be published in the thesis for which this study is being conducted and may be published in an academic journal or presented at a scientific meeting.

This research is conducted under the supervision of Prof Salomé Schulze at UNISA (Department of Psychology of Education). Prof Schulze can be contacted on Schuls@unisa.ac.za. Please feel free to contact me if you have any queries regarding the research or any other related matter.

Your support and willingness to allow your school to participate in this research is appreciated.

Thank you

Ndabenhle Terry Mdluli

Signature: _____

Date:

E-mail:mdluliterry@gmail.com

Tel: 036 353 2571

Cell: 073 27 88 780

APPENDIX D
PARENT/GUARDIAN CONSENT FORM

Dear Parent/Guardian

I am a student doing Masters in the Psychology of Education at UNISA. I have a special interest in finding out if physical exercise may be applied to improve the well-being of learners at secondary school. The KZN DOE has given permission for the research which involves Grade 10 and 11 learners and I would like to invite your child to participate in the research.

All learners that participate will attend 40 minutes physical exercise sessions for 10 weeks after school hours, on days and times that suit everybody, where they would be given specific physical exercises to perform. In addition there will be individual interviews conducted to record their experiences. Learners who will participate will be expected to bring suitable clothing, shoes and bathing accessories to be used after physical exercises.

Participating in the research will also help your child to know his or her aggression level and give her or him an opportunity to find out if physical exercise might help to address it. The physical exercise activities may also help to improve their general level of physical fitness.

There are no known risks involved. Your child's name and the name of the school will be kept a secret. Participation is voluntary and unpaid. Your child can stop his/her participation at any time without being punished. The results of the study may be published in a journal or presented at a meeting.

Please complete and sign the form below to indicate if you want your child to participate.

This study is conducted under the supervision of Prof Salomé Schulze at UNISA (Department of Psychology of Education). Please feel free to contact me at: mdluliterry@gmail.com or Prof Schulze at Schuls@unisa.ac.za for any questions you may have.

Thank you.

Ndabenhle Terry Mdluli

Signature: _____

Date:

E-mail: mdluliterry@gmail.com

Tel: 036 353 2571

Cell: 073 2788 780

PARENT/GUARDIAN CONSENT

I, _____ the undersigned parent/guardian of _____ who is younger than 18 years, herewith confirm that I understand the above terms and conditions of the research which have been explained to me and agree/disagree that he/she should participate in the above mentioned research/study.

Signature: _____

Date: _____

APPENDIX E
STUDENT UNDER 18 YEARS ASSENT FORM

Dear student

I am a student doing Masters in the Psychology of Education at UNISA. I am interested in finding out if physical exercise may be applied to improve adolescent emotional well-being of learners at secondary school. The KZN DOE has given permission for the research which involves Grade nine, 10 and 11 learners. I would like to invite you to participate in the research.

All learners that participate will attend 40 minutes physical exercise sessions for 10 weeks after school hours, on days and times that suit everybody, where they would be given specific activities to do. In addition there will be interviews that will be conducted to record their experiences. Learners who participate will be expected to bring suitable clothing, shoes and bathing accessories to be used after physical exercises.

Participating in the research will also help you to know your aggression level and give you an opportunity to find out if physical exercise might help to address it. The physical exercise activities may also help to improve your general level of physical fitness.

There are no known risks involved. Your name and the name of your school will be kept a secret. Participation is voluntary and unpaid. You can stop your participation at any point if you feel so. The results of the study may be published in a scientific journal or presented at a meeting.

Please discuss your involvement with your parent/guardian before completing the form below. Complete the form if you are willing to participate in the study. Kindly note that a parent/guardian will also be asked to give permission for participation on your behalf if you are younger than 18 years old, and will be given a copy of your signed form. If you want to participate, please complete and sign the form below.

This study is conducted under the supervision of Prof Salomé Schulze at UNISA (Department of Psychology of Education). Please feel free to contact me or Prof Schulze at Schuls@unisa.ac.za for any questions you may have.

Thank you.

Ndabenhle Terry Mdluli

Signature: _____

Date:

E-mail: mdluliterry@gmail.com

Tel: 036 353 2571 (w)

Cell: 073 2788 780

STUDENT CONSENT TO PARTICIPATE IN THE STUDY

I, _____ herewith confirm that I understand the above conditions of the research which have been explained to me and that I agree to participate in the above mentioned study.

Signature: _____

Date: _____

APPENDIX F

INTERVIEW SCHEDULE FOR INTERVIEWS WITH THE STUDENTS

I want to learn how you experienced the physical exercise activities of the previous 10 weeks. Please note that this interview is confidential and will not be traced back to you - your comments will remain anonymous. Please be honest. There is no correct or incorrect answer.

If you give permission, this discussion will be tape-recorded to help me to accurately reflect your views.

Questions:

1. What were the experiences of participants on the physical exercise programme?
Probe.
2. What are the feelings of participants before the physical exercise programme was implemented? Probe.
3. What are the feelings of participants after performing physical exercises? Probe.
4. Who participates greater in physical activities between males and females?
Probe.
5. What are the participants' perceptions on male and female aggression? Probe.
6. What is the contribution of other student spectators on participants' interest in performing physical exercises? Probe.
7. What are the participants' views of alternative ways of exercising other than the physical exercise programme in which they participated? Probe.
8. What are the participants' perceptions on how they plan to handle their feelings of aggression in future? Probe.
9. What are the results of the physical workout on participants' feelings of aggression in particular? Probe.
10. What are the benefits of specific forms of physical exercises? Probe.

11. What are the participants' views on what did not work well with regard to the physical exercise programme? Probe.
12. What are the participants' recommendations on how the physical exercise programme may be improved? Probe.

APPENDIX G
APPROVAL LETTER FROM THE KZN DEPARTMENT OF EDUCATION

Date:	06 May 2014
Validity of Research Approval:	20 May 2014 to 15 August 2014.
Name of Researcher:	Ndabenhle Terry Mdluli
Address of Researcher:	P.O. Box 1816
	ESCOURT
	3310
Telephone Number:	036 353 2571 / 0732788780
E-mail address:	mdluliterry@gmail.com
Research Topic:	Addressing adolescent aggression by means of physical exercise: a case study.
Number and type of schools:	One Secondary School
District/s/HO	Uthukela District

Re: Approval in Respect of Request to Conduct Research

This letter serves to indicate that approval is hereby granted to the above-mentioned researcher to proceed with research in respect of the study indicated above. The onus rests with the researcher to negotiate appropriate and relevant time schedules with the school/s and the offices involved to conduct the research. A separate copy of this letter must be presented to both the School (both Principal and SGB) and the District/Head Office Senior Manager confirming that permission has been granted for the research to be conducted.

The following conditions apply to KZN research. The researcher may proceed with the above study subject to the conditions listed below being met. Approval may be withdrawn should any of the conditions listed below be flouted:

1. *The District/Head Office is concerned must be presented with a copy of this letter that would indicate that the said researcher is has/have been granted permission from the KZN Department of Education to conduct the research study.*
2. *The District/Head Office Senior Managers must be approached separately, and in writing ,for permission to involve District/Head Office Officials in the project.*

3. *A copy of this letter must be forwarded to the school principal and the chairperson of the School Governing Body (SGB) that would indicate that the researchers have been granted permission from the KZN Department of Education to conduct the research study.*
4. *A letter **I** document that outlines the purpose of the research and the anticipated outcomes of such research must be made available to the principals, SGBs and District/Head Office Senior Managers of the schools and districts/offices concerned, respectively.*
5. *The Researcher will make every effort obtain the goodwill and co-operation of all the KZN officials, principals, and chairpersons of the SGBs, teachers and students involved. Persons who offer their co-operation will not receive additional remuneration from the Department while those that opt not to participate will not be penalised in anyway.*
6. *Research may only be conducted after school hours so that the normal school programme is not interrupted. The Principal (if at a school) and/or Director (if at a district/head office) must be consulted about an appropriate time when the researchers may carry out their research at the sites that they manage.*
7. *Research may only commence from the second week of February and must be concluded before the beginning of the last quarter of the academic year. If incomplete, an amended Research Approval letter may be requested to conduct research in the following year.*
- B. *Items 6 and 7 will not apply to any research effort being undertaken on behalf of the KZN DOE. Such research will have been commissioned and be paid for by the KZN Department of Education.*
9. *It is the researcher's responsibility to obtain written parental consent of all students that are expected to participate in the study.*
10. *The researcher is responsible for supplying and utilising his/her own research resources, such as stationery, photocopies, transport, faxes and telephones and should not depend on the goodwill of the institutions and/or the offices visited for supplying such resources.*

11. *The names of the KZN DOE officials, schools, principals, parents, teachers and students that participate in the study may not appear in the research report without the written consent of each of these individuals and/or organisations.*
12. *On completion of the study the researchers must supply the Director: Knowledge Management & Research with one Hard Cover bound and an electronic copy of the research.*
13. *There searcher may be expected to provide short presentations on the purpose, findings and recommendations of his/her research to both KZN DOE officials and the school concerned.*
14. *Should the researcher have been involved with research at a school and/or a district head office level, the Director concerned must also be supplied with a brief summary of the purpose, findings and recommendations of the research study.*

The KZN Department of Education wishes you well in this important undertaking and looks forward to examining the findings of your research study.

Kind regards

Director: Knowledge Management

DATE:...

APPENDIX H
THE QUESTIONNAIRE ON AGGRESSION

Name:

Dear Student

The purpose of the questionnaire is to measure your well-being. The information obtained with the questionnaire is helpful for investigating the relationship between physical exercise and 'well-being'. The information you provide is highly confidential. Therefore, please try to answer the questions that follow in a way that you think is right for you.

Thank you in advance for your co-operation.

Answer each item by circling a number that describes you. The numbers have the following meaning:

1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree

1. Some of my friends think I'm always angry

1.	2.	3.	4.	5.
----	----	----	----	----

2. If I have to resort to violence to protect my rights, I will.

1.	2.	3.	4.	5.
----	----	----	----	----

3. When people are especially nice to me, I wonder what they want.

1.	2.	3.	4.	5.
----	----	----	----	----

4. I tell my friends easily when I disagree with them.

1.	2.	3.	4.	5.
----	----	----	----	----

5. I became so cross that I broke things.

1.	2.	3.	4.	5.
----	----	----	----	----

6. I can't help getting into arguments when people disagree with me.

1.	2.	3.	4.	5.
----	----	----	----	----

7. Once in a while, I can't control the urge to strike another person.

1.	2.	3.	4.	5.
----	----	----	----	----

8. I often have mood swings

1.	2.	3.	4.	5.
----	----	----	----	----

9. I'm suspicious of overly friendly strangers.

1.	2.	3.	4.	5.
----	----	----	----	----

10. I have threatened people I know.

1.	2.	3.	4.	5.
----	----	----	----	----

12. I flare up quickly but I get over it quickly.

1.	2.	3.	4.	5.
----	----	----	----	----

13. Given enough reason, I may hit another person.

1.	2.	3.	4.	5.
----	----	----	----	----

14. When people annoy me, I may tell them what I think of them.

1.	2.	3.	4.	5.
----	----	----	----	----

15. I'm sometimes eaten up with jealousy.

1.	2.	3.	4.	5.
----	----	----	----	----

16. I can think of many reasons for hitting a person.

1.	2.	3.	4.	5.
----	----	----	----	----

17. At times I feel that life is unfair.

1.	2.	3.	4.	5.
----	----	----	----	----

18. I have trouble controlling my temper.

1.	2.	3.	4.	5.
----	----	----	----	----

19. When frustrated, I let my irritation show.

1.	2.	3.	4.	5.
----	----	----	----	----

20. I often find myself disagreeing with people.

1.	2.	3.	4.	5.
----	----	----	----	----

21. If somebody hits me, I hit back.

1.	2.	3.	4.	5.
----	----	----	----	----

22. I sometimes feel ready to explode.

1.	2.	3.	4.	5.
----	----	----	----	----

23. Other people are luckier than me.

1.	2.	3.	4.	5.
----	----	----	----	----

24. There are people who pushed me so far that we fought.

1.	2.	3.	4.	5.
----	----	----	----	----

25. I know that friends talk about me behind my back.

1.	2.	3.	4.	5.
----	----	----	----	----

26. My friends say that I argue a lot.

1.	2.	3.	4.	5.
----	----	----	----	----

27. Sometimes I get angry for no good reason.

1.	2.	3.	4.	5.
----	----	----	----	----

28. I get into fights a little more than others.

1.	2.	3.	4.	5.
----	----	----	----	----

29. I wonder why sometimes I feel so bitter about things.

--	--	--	--	--

APPENDIX I

THE 10 WEEKS PHYSICAL EXERCISE PROGRAMME

The physical exercise programme was designed by the researcher and approved by a registered physiotherapist. The physiotherapist provided insight into how the planned physical exercise programme should be managed. In particular, she indicated which physical exercises were safe and appropriate for the participants. The physiotherapist was also expected to give the researcher a professional opinion that would pro-actively ensure that the principle of no harm to research participants is adhered to. The physiotherapist would teach the researcher to ensure that adolescents with physical exercise problems were properly diagnosed. The physiotherapist was directly involved in the planning of the physical exercise programme and also on the first day of the physical exercise programme implementation. Moreover, the physiotherapist was always available for consultation.

The physical exercise programme took place over a 10 week period (18 August 2014 to 31 October 2014). The aim of the programme was to determine if physical exercise would lower the participants' level of aggression. A sample of 25 adolescents participated in the planned physical exercise programme. The participants were adolescents (who, according to subject teachers, classroom managers and the pre-test questionnaire scores) mostly needed support for their aggression.

The physical exercise sessions were three times a week (Tuesday, Wednesday and Thursday). Participants were encouraged to do physical exercises at home as well. This was done to obtain maximum benefits from the physical exercise programme.

The physical exercise activities lasted for 40 minutes per session. Each session comprised a five minutes warm up, followed by 25 minutes of physical exercises. This included 20 minutes of aerobic physical exercises, such as aerobic dances, and five minutes anaerobic physical exercises such as yoga. Then followed a five minutes cool down period. The warm ups are significant and reasons that explain their importance

are outlined by Kirsten's (2011) in section 4.5.2. The last five minutes were used to get comments from participants about the physical workouts of that specific day. In particular, the researcher would probe the participants to comment on certain observations he had made.

Other examples of aerobic exercises include: dance-rib slide; knees up; hip circles; cha - cha twists; jumping jack/jabs; punches (derived from boxing moves); front leg kicks; self-defence movements that develop speed and balance skills; moves that work the abdominal area such as twists, crunches and rotation movements; skipping rope and stretching exercises, particularly in the beginning and end of the 40 minutes, to enhance flexibility of the students.

If out-doors climatic conditions were bad (wind, rain and cold), the physical exercise programme would be implemented in-doors, inside the school hall. This practice is in line with the ethical consideration / principle of no harm to the participants (as discussed in section 3.8.3).

APPENDIX J

EXTRACTS OF SOME INTERVIEWS

Topic for study: Addressing adolescent aggression by means of physical exercise: a case study.

Dates: 07 October 2014 and 03 November 2014

Place: A school in KwaZulu-Natal

Notes: The name “Interviewer” and pseudonyms (in the case of the interviewees) were used instead of their real names.

1. 2. (...) denotes short pause
2. () are used for non-verbal responses
3. [] are used for personal comments

Introduction before the interviews commenced.

Interviewer: Hello Thank you for being willing to participate in an interview and for giving your assent in writing. As I told you, I’m your interviewer today. I need to conduct an interview in relation to the physical exercise activities that we have been doing for the past ten weeks. May I again request your permission to tape-record interviews? The reason for this is to use data obtained in my studies at Unisa.

We will use pseudonyms ... not your real name. Feel free to speak. You may say whatever you think is the right answer for you. My research investigation is supervised by Unisa. Unisa ensures that I conduct the research investigation in line with the research procedures, principles as well as ethics as laid down by the university. Do you still remember ethical considerations I spoke about last time, hmm? . Ehhh. They are confidentiality, anonymity, trustworthiness and honesty. So, be yourself. There are no marks to be obtained. There is no bearing to school work. If you don’t understand the question, tell me. I will be happy to rephrase it. Sometimes, I may ask you personal questions, weird questions and maybe even questions which may be perceived as ‘stupid’. (Interviewer and interviewee laughing.) If you don’t know the answer to the question, you don’t have to respond! You may just tell me: ‘I don’t know’. (Interviewer laughing and interviewee not believing what the interviewer said). [The interviewer had to repeat and motivate that). The interview will last about thirty minutes or so. You can withdraw at any point if you feel uncomfortable. (Interviewee smiled and then shouted ‘yes’! [I think he was just being funny, because his attitude looked positive]. I need your opinions, feelings, thoughts and experiences on the physical exercises which have been performed. If you make a statement, please support it with an example. There is no right or wrong answer.

[The ten student interviewees waited in the waiting room, relaxed and played computer games if they wanted to. The interviewer called each person in for the interview, one at

a time. The sequence was done randomly by means of pieces of paper from which the interviewees could select a paper. The order was according to the numbers.]

Interview 1

- Q1. **Interviewer:** How did you experience the physical exercises which were administered?
Ayanda Mhlongo: Eh. I would feel good. I would be stress free. But eee (...) I would feel bad and have fatigue when I had muscle pains. [The interviewer assumed he meant muscle pains from the previous exercise programme]. My parents would get worried when I returned home late, despite having sought permission from them.
- Q2. **Interviewer:** What were your feelings before the physical exercise programme?
Ayanda Mhlongo: Mhm. There would be bad feeling only if I was exhausted. (...) Otherwise, I always felt good!
- Q3. **Interviewer:** What were your feelings after the physical exercise programme?
Ayanda Mhlongo: Tired but relaxed at the same time. Nice feeling (showing some hesitation to speak).
- Q4. **Interviewer:** Who participates more in physical activities between the males and the females?
Ayanda Mhlongo: The boys participated more.
Interviewer: Why do you think so?
Ayanda Mhlongo: Boys have fewer responsibilities than girls. When they leave for playing, it is hardly a problem to parents compared to girls.
- Q5. **Interviewer:** Who are more aggressive between boys and girls?
Ayanda Mhlongo: Surely, **boys! Boys bully!** They like **fighting!** When you disagree with them they want to **fight** you!
- Q6. **Interviewer:** Do spectators contribute to participants' interest in performing physical activities?
Ayanda Mhlongo: Ehhhh. (...) it depends. When you do them [physical exercises] well, you don't mind spectators. But if you perform them badly, (...), eish, they [spectators] laugh at you!
- Q7. **Interviewer:** What are the alternative ways of exercising other than the physical exercise programme in which you participated?
Ayanda Mhlongo: Walking long distances. (...). yea.
- Q8. **Interviewer:** What is your perception on how to handle aggression in future?
Ayanda Mhlongo: Mhmmm. I think (...) I would do physical activities. Mhm, yeah!
- Q9. **Interviewer:** What are the results of the physical workout to participants' feelings' of aggression in particular?
Ayanda Mhlongo: It helps you to feel better.
- Q10. **Interviewer:** What are the benefits of physical exercise?
Ayanda Mhlongo: It makes me feel stronger and I know it can help in order to get strong muscles and bones.

- Q11. **Interviewer:** What are your views on what did not work well regarding the physical exercise programme that was administered?
Ayanda Mhlongo: Mhmm. All was well. (...) but I was not feeling good when I had to go home late. Bullies would sometimes throw comments and remarks on what you have been doing!
- Q12. **Interviewer:** What is your recommendation regarding how to improve the physical exercise programme?
Ayanda Mhlongo: Mhmm. (...) the physical exercise training should be done before school comes out. It must be during school hours.

Interview 2

- Q1. **Interviewer:** How did you experience the physical exercises which were administered?
Hlongwane Rasarasa: It refreshed my mind and it relaxed me. (...) I also enjoyed that it was done after school. Ehhh, so it relieved my stress.
- Q2. **Interviewer:** What were your feelings before the physical exercise programme?
Hlongwane Rasarasa: I was fine. I was always eager to start exercises.
Interviewer: Did you experience cramps or sprains? **Respondent:** Noooooo! (with certainty).
- Q3. **Interviewer:** What were your feelings after the physical exercise programme?
Hlongwane Rasarasa: I had a good feeling. Yeah, I also felt confident. My anger and stress were reduced. I even repeated the physical exercises at home.
- Q4. **Interviewer:** What is your comparison between male and female participation in the physical activities?
Hlongwane Rasarasa: (...) Did you see when females lagged behind? Eishh, [complaining] I don't like exercising with people who are soft and weak. Ey. I end up giving up. Males are stronger than females.
- Q5. **Interviewer:** Who are more aggressive between boys and girls?
Hlongwane Rasarasa: Boys. You even see them assaulting others during sports.
- Q6. **Interviewer:** Do spectators contribute to participants' interest in performing physical activities?
Hlongwane Rasarasa: Spectators are ok! They make you to be more motivated.
- Q7. **Interviewer:** What are the alternative ways of exercising other than the physical exercise programme in which you participated?
Hlongwane Rasarasa: Playing soccer works too.
- Q8. **Interviewer:** What is your perception on how to handle aggression in future?
Hlongwane Rasarasa: I will continue with physical exercise! It works for me.
- Q9. **Interviewer:** What are the results of the physical workout to your feelings' of aggression in particular?
Hlongwane Rasarasa: It dispels worries, and I forget ! I feel great! [showing great satisfaction].
- Q10. **Interviewer:** What are the benefits of physical exercise?

Hlongwane Rasarasa: Physical exercise helps me to have a strong body which can't easily get tired and you also don't get sick easily. It makes you feel better emotionally as well.

Q11. **Interviewer:** What are your views on what did not work well regarding the physical exercise programme in which you participated?

Hlongwane Rasarasa: I don't like exercising with people who are soft and weak. (...) I end up giving up. Females were not relaxed and I don't know the reason for this.

Q12. **Interviewer:** What is your recommendation regarding how to improve the physical exercise programme?

Hlongwane Rasarasa: We need physical exercise equipment. Ehhhh, like isondo (ab-wheel) for making six packs and the skipping rope too.

Interview 3

Q1. **Interviewer:** How did you experience the physical exercises which were administered?

Luntu: Yes, they are good, because they make the body to have more energy.

Q2. **Interviewer:** What were your feelings before the physical exercise programme?

Luntu: I was always eager to do it. I enjoyed that different exercises were done each day.

Q3. **Interviewer:** What were your feelings after the physical exercise programme?

Luntu: After the physical exercise, I could feel blood running and flowing. I felt energetic and different - better.

Q4. **Interviewer:** What is the comparison between male and female participation in physical activities?

Luntu: Females participate lesser. Laws (meaning the natural physical conditions) don't favour them. The laws are biased against females. Female participants exercise so that they don't become fat. (Smiling) They merely want a more attractive appearance.

Q5. **Interviewer:** Who are more aggressive between boys and girls?

Luntu: We are the same. (Showing certainty). The victimisation of women is more publicised. Females are aggressive too. [He referred to an example of a particular household he knew of wherein the woman would always bite her husband]. It is a stereotype to think that men are more aggressive. Ehhhh, ... females have more voice. Females vocally report when they are hurt.

Q6. **Interviewer:** Do spectators contribute to participants' interest in performing physical activities?

Luntu: I don't feel well when there are spectators! Other people don't come with a purpose to support you. They come to judge you. They come to criticise what you do and how you do it.

Q7. **Interviewer:** What are the alternative ways of exercising other than the physical exercise programme in which you participated?

Luntu: A long vigorous walk helps me. Ehhh, the effect is similar to the physical exercises that we do. Walks also make me feel better when I am angry.

Q8. **Interviewer:** What is your perception on how to handle aggression in future?

Luntu: Physical exercises and playing soccer help me.

- Q9. **Interviewer:** What are the results of the physical workout to participants' feelings' of aggression in particular?
Luntu: I feel fresh and stress free after exercising.
- Q10. **Interviewer:** What are the benefits of physical exercise?
Luntu: Mhmm! What will I say ? (...) I just feel good! Mmm, yeah.
- Q11. **Interviewer:** What are your views on what did not work well regarding the physical exercise programme in which you participated?
Luntu: I think, next time, the strong people [boys] should be grouped together. Females sometimes were slacking!
- Q12. **Interviewer:** What is your recommendation regarding how to improve the physical exercise programme?
Luntu: Physical exercise should be administered during the day, before the end of the school day.

Interview 4

- Q1. **Interviewer:** How did you experience the physical exercises in which you participated?
Man X: Yeah. Eish! I felt good. (...) Sometimes I was anxious in the beginning.
Interviewer: Why were you anxious?
Man X: I was anxious... Ehhhh, the idea of doing physical activity in a room! I never did that thing. And, yeah. (...)
- Q2. **Interviewer:** What were your feelings before the physical exercise programme?
Man X: I was always looking forward to it.
- Q3. **Interviewer:** What were your feelings after the physical exercise programme?
Man X: It felt good. (...) I think it improved my level of fitness for soccer.
- Q4. **Interviewer:** Who participated more in physical activities between males and females?
Man X: Males do physical exercises more often than girls. (...) There are many more physical activities meant for boys than for girls, such as soccer, cricket, rugby. There are facilities at school and also in the community. (...) Females do family chores, such as cleaning, cooking and some have babies which take a great deal of their time as well.
- Q5. **Interviewer:** Who are more aggressive between boys and girls?
Man X: Boys are obviously more aggressive. You would see boys showing it [their aggression and anger] ... Girls hardly have fighting matches. Normally, the bigger the prize, the more violent boys are likely to be.
- Q6. **Interviewer:** Do spectators contribute to participants' interest in performing physical activities?
Man X: It depends. If you are able to perform well and to the best of your abilities, it is motivating to see them watching. Their positive comments and reaction can help you to do even more. But if you are obese, and (...) your body cannot adapt to some of the exercises, they would criticize you and laugh at you. (Laughing) It would be embarrassing.
- Q7. **Interviewer:** What are the alternative ways of exercising other than the physical exercise programme in which you participated?

- Man X:** Soccer. Yeah, it keeps me fine. (...) The only disappointment is when you get injuries.
- Q8. **Interviewer:** What is your perception on how to handle aggression in future?
Man X: Other than physical activity. (...) I can sleep. Sleeping makes me forget my worries ... at least for a short period of time.
- Q9. **Interviewer:** What are the results of the physical workout to participants' feelings' of aggression in particular?
Man X: The exercises help to create a fresh body and mind ... Ahhh, yeah!
- Q10. **Interviewer:** What are the benefits of specific forms of physical exercise?
Man X: The physical exercises make the whole body strong.
- Q11. **Interviewer:** What are your views on what did not work well regarding the physical exercise programme in which you participated?
Man X: Mhmmm. (...) Nothing.
- Q12. **Interviewer:** What is your recommendation regarding how to improve the physical exercise programme?
Man X: I recommend the adding of equipment such as gym equipment.

Interview 5

- Q1. **Interviewer:** How did you experience the physical exercises which were administered?
Ayesha: It was nice.
- Q2. **Interviewer:** What were your feelings before the physical exercise programme?
Ayesha: Most of the time, I felt right. Sometimes, I would feel lazy.
- Q3. **Interviewer:** What were your feelings after the physical exercise programme?
Ayesha: Mhmm. Sometimes I would feel bad about the physical exercises (when I was in bad mood). My bad mood would be caused by fatigue and muscle pains [caused by the previous exercises]. But as I got used to it my mood improved.
- Q4. **Interviewer:** What is the comparison between male and female participation in physical activities?
Ayesha: Boys do it more. (...) The situation is bad for girls. When I started running at home during holidays, boys would bother me and demand talking to me. One boy asked me why I exercised.
- Q5. **Interviewer:** Who are more aggressive between boys and girls?
Ayesha: Males are much more aggressive in comparison to females. When there is any disagreement, males are quick to say: 'Ngizokshaya' ('I will beat you').
- Q6. **Interviewer:** Do spectators contribute to other participants' interest in performing physical activities?
Ayesha: I like exercising when other people are watching. I feel good (...) When there are no spectators, I don't feel good.
- Q7. **Interviewer:** What are the alternative ways of exercising other than the physical exercise programme in which they participated?
Ayesha: Talking to a friend and getting advice from other people.
- Q8. **Interviewer:** What is your perception on how to handle aggression in future?
Ayesha: For me its physical exercise and running.

- Q9. **Interviewer:** What are the results of the physical workout to participants' feelings' of aggression in particular?
Ayesha: Worries decrease after exercising.
- Q10. **Interviewer:** What are the benefits of specific forms of physical exercise?
Ayesha: It reduces weight. I wanted to reduce my body weight.
- Q11. **Interviewer:** What are your views on what did not work well regarding the physical exercise in which you participated?
Ayesha: Mhmmm! I don't know. Yeah. (shaking the head)
- Q12. **Interviewer:** What is your recommendation regarding how to improve the physical exercise programme?
Ayesha: Boys should not disturb me when I run. (showing dissatisfaction).