2008

The promotion of psychosocial wellbeing among pre-pubescent girls: the Wollongong feasibility trial

Haisley Morrison

University of Wollongong

Recommended Citation

Morrison, Haisley, The promotion of psychosocial wellbeing among pre-pubescent girls: the Wollongong feasibility trial, Bachelor of Education (Physical and Health Education) (Honours) thesis, Faculty of Education, University of Wollongong, 2008.

http://ro.uow.edu.au/theses/4109
NOTE
This online version of the thesis may have different page formatting and pagination from the paper copy held in the University of Wollongong Library.

UNIVERSITY OF WOLLONGONG

COPYRIGHT WARNING
You may print or download ONE copy of this document for the purpose of your own research or study. The University does not authorise you to copy, communicate or otherwise make available electronically to any other person any copyright material contained on this site. You are reminded of the following:

Copyright owners are entitled to take legal action against persons who infringe their copyright. A reproduction of material that is protected by copyright may be a copyright infringement. A court may impose penalties and award damages in relation to offences and infringements relating to copyright material. Higher penalties may apply, and higher damages may be awarded, for offences and infringements involving the conversion of material into digital or electronic form.
THE PROMOTION OF PSYCHOSOCIAL WELLBEING AMONG PRE-PUBESCENT GIRLS:

THE WOLLONGONG FEASIBILITY TRIAL

A thesis submitted in partial fulfillment of the requirements for the award of the degree

BACHELOR OF EDUCATION
(PHYSICAL AND HEALTH EDUCATION)
HONOURS

From the
University of Wollongong

By
Haisley Morrison

Faculty of Education
2008
DECLARATION

I certify that the work contained in this thesis has not been submitted for a degree in any other university or educational institution. The thesis contains entirely my own work.

Signed: 

Date: 19/12/2008
ABSTRACT

The accelerating rate of overweight and obesity among children and adolescents is a growing public health concern in Australia. Numerous factors contribute to this rising trend, with physical activity, sedentary behaviours and dietary intake regarded as the main factors. To date, the majority of childhood obesity prevention intervention programs are multifaceted, employ a 'one size fits all' approach or are set within the formal school curriculum or in highly resourced settings. A setting which has yielded promising results, but is yet to be thoroughly evaluated, is an on-school site program set in the after-school time period.

The purpose of this study was to assess the feasibility, acceptability and potential efficacy of an after-school homework club and physical activity program (The Wollongong Sport Program) on promoting psychosocial wellbeing among 8- to 11-year old girls who were overweight, obese or were perceived by teachers to have low levels of perceived competence. Specifically, the study investigated recruitment, retention and attendance, the collection of data, implementation and enjoyment of sessions. The primary outcomes were perceived competence and quality of life, while the secondary outcomes were BMI, BMI z Score (overweight and obese participants only), waist circumference and percentage body fat.

The Wollongong Sport Program was a 14-week program that comprised three components: after-school homework club, healthy snacks and physical activities. The physical activity component provided participants with the opportunity to engage in a variety of game-based activities that were fun, challenging, individualised, promoted success, encouraged positive social interaction and the building of collaborative relationships between participants, facilitators and families.
The *Wollongong Sport Program* was found to be highly feasible, acceptable and potentially efficacious. Feasibility was shown by recruitment of the desired number of participants, retaining almost all participants from baseline to follow up and the successful collection of all outcome data at baseline and follow up. Acceptability was demonstrated by the implementation of all planned sessions (n=26), the high mean attendance (90%) and the high enjoyment ratings of each session (average 4.2 on a 5-point scale).

Potential efficacy was demonstrated by the improvement in perceived competence and quality of life and the reduction of BMI, BMI z Score (overweight and obese participants only), waist circumference and percent body fat. Dependent-sample *t*-tests were used to analyse perceived competence, quality of life, BMI, BMI z Scores, waist circumference and percentage body fat. Two analyses were completed: the first for the entire sample and the second for participants who were overweight or obese. While the sample size for this study was not adequately powered to detect statistically significant differences, a number of results were statistically significant.

Perceived competence improved in all six domains for the entire sample with four domains demonstrating statistical significance. Within the overweight and obese group an increase in five of the six perceived competence domains was observed.

For the entire sample the Child Reported Quality of Life results revealed statistically significant improvements in all dimensions. For the overweight and obese group small improvements in all four dimensions were revealed. Statistically significant results were shown in the Parent Report Quality of Life data for both the entire sample and those who were overweight or obese.
All anthropometric measures; BMI, BMI z Score (overweight and obese participants only), waist circumference and percentage body fat, revealed a decrease from baseline to follow up in both the entire sample and among those who were overweight and obese.

Overall, the Wollongong Sport Program was feasible, acceptable and potentially efficacious. We demonstrated it was possible to improve perceived competence, quality of life and reduce unhealthy weight gain using a stealth intervention which focused on the promotion of psychosocial wellbeing in 8- to 11-year-old girls who were overweight, obese or were perceived by teachers as having low levels of perceived competence. This study will provide information for the design and modelling of future after-school programs in the prevention of childhood overweight and obesity.
DEDICATION

I am very proud to dedicate this thesis to the three most important people in my life.

To my Mum, Robyn, for your continual love, support and for always believing that I could achieve anything. Your thirst for knowledge and your bravery in always trying something new, no matter how challenging, is truly inspiring.

To my Dad, Peter, for your continual love and support and for all the late nights and weekends spent proof reading my work. Thank you for being a source of encouragement throughout my life and for your dedication to my studies.

To my partner, Luke, for your continual patience, humour, understanding and love. Thank you for lifting my spirits through the many tears, for believing in me when I did not believe in myself and for reminding me that even the largest task can be accomplished if it is done one step at a time.
ACKNOWLEDGMENTS

I would like to acknowledge and thank the following people for their significant contributions to this thesis:

Dr Rachel Jones, my supervisor for this study. Thank you for your endless time and your continual dedication, advice, support, encouragement, feedback and friendship in assisting me to complete this study. Thank you also for your gentle prodding when laziness got the best of me.

Dr Tony Okely, my co-supervisor for this study. Thank you for your time, knowledge and encouragement in assisting me to complete this study.

Jacque Kelly, my co-researcher for this study. Thank you for your friendship and assistance in the development and implementation of the Wollongong Sport Program.

Kea Hancox, for your friendship, warm manner, expert knowledge and assistance in helping to facilitate the Wollongong Sport Program.

The Illawarra Primary School, the site of the program, for your endless cooperation, participation and support of the Wollongong Sport Program.

The Participants and their Families, for your cooperation, participation and support in this study.
The Child Obesity Research Centre, for your continual support and encouragement throughout this study.

Sanitarium and NSW Health for your financial assistance and support of the Wollongong Sport Program.

The Faculty of Education and the Alumni Association for your financial support.
PREFACE

This thesis is entirely my own work; however, it did form part of a larger combined project with another Education Honours student. This student also assessed the feasibility and acceptability of the Wollongong Sport Program, as well as the potential efficacy in relation to cardiorespiratory fitness and objectively measured physical activity.

The Wollongong Sport Program was designed and implemented by my fellow researcher (Jacque Kelly) and myself. Consequently, sections of the Methodology, Results and Discussion chapters as well as the Appendices are similar to those reported in the thesis by Jacque Kelly.

The reference for the mentioned thesis is:

TABLE OF CONTENTS

ABSTRACT ........................................................................................................... iii
PREFACE ........................................................................................................... ix
LIST OF TABLES ................................................................................................. xv
LIST OF FIGURES ............................................................................................... xvi

CHAPTER I: INTRODUCTION ........................................................................... 1

1.1 BACKGROUND AND SIGNIFICANCE OF THE STUDY ...................... 1
1.2 AIM OF THE STUDY .................................................................................. 3
1.3 OVERVIEW OF METHODOLOGY ......................................................... 4
1.4 STUDY LIMITATIONS .............................................................................. 5
1.5 DELIMINATIONS ....................................................................................... 6
1.6 DEFINITION OF TERMS ........................................................................... 6

CHAPTER II: REVIEW OF THE LITERATURE ............................................... 9

2.1 PREVALENCE AND TREND OF OVERWEIGHT AND OBESITY IN
AUSTRALIAN CHILDREN ............................................................................... 9
2.2 HEALTH CONSEQUENCES OF CHILDHOOD OVERWEIGHT AND
OBESITY ........................................................................................................ 10

2.2.1 PHYSIOLOGICAL CONSEQUENCES ................................................. 11
2.2.1.1 CARDIOVASCULAR CONCERNS ............................................. 11
2.2.1.2 PULMONARY COMPLICATIONS ............................................ 12
2.2.1.3 MUSCULOSKELETAL COMPLICATIONS .................................. 12
2.2.1.4 GASTROINTESTINAL AND RENAL COMPLICATIONS .......... 13
2.2.1.5 ENDOCRINE COMPLICATIONS ............................................. 13
2.2.2 PSYCHOSOCIAL CONSEQUENCES ................................................. 14
APPENDIX A: WOLLONGONG SPORT PROGRAM INFORMATION SHEET/CONSENT FORM ................................................................. 98

APPENDIX B: SELF-PERCEPTION PROFILE FOR CHILDREN ............... 100

APPENDIX C: GUIDE TO THE ADMINISTRATION OF THE SELF-
PERCEPTION PROFILE FOR CHILDREN ......................................................... 105

APPENDIX D: SELF-PERCEPTION PROFILE FOR CHILDREN SCORING
KEY .......................................................................................................................... 107

APPENDIX E: PEDSQL PEDIATRIC QUALITY OF LIFE INVENTORY CHILD
REPORT (AGES 8-12), VERSION 4 ........................................................................ 109

APPENDIX F: PEDSQL PEDIATRIC QUALITY OF LIFE INVENTORY
PARENT REPORT FOR CHILDREN (AGES 8-12), VERSION 4 ...................... 112

APPENDIX G: INSTRUCTIONS FOR PARENTS TO COMPLETE PEDSQL
PEDIATRIC QUALITY OF LIFE INVENTORY PARENT REPORT FOR
CHILDREN .................................................................................................................. 115

APPENDIX H: ANTHROPOMETRIC MEASUREMENT SHEET .................. 117

APPENDIX I: PARTICIPANT ENJOYMENT SCALES ............................... 119

APPENDIX J: SAMPLE FACILITATOR REFLECTION ............................... 121

APPENDIX K: UNIVERSITY OF WOLLONGONG HUMAN RESEARCH
ETHICS ..................................................................................................................... 125

APPENDIX L: NSW DEPARTMENT OF EDUCATION APPROVAL ................ 127

APPENDIX M: SAMPLE OF HOMEWORK .................................................. 130

APPENDIX N: SAMPLE SESSION PLAN ...................................................... 135

APPENDIX O: ENCOURAGEMENT AWARDS AND PARTICIPATION
GIFTS ....................................................................................................................... 142

APPENDIX P: CERTIFICATE OF PARTICIPATION ...................................... 144

APPENDIX Q: WOLLONGONG SPORT PROGRAM T-SHIRTS ................ 146

REFERENCE LIST .................................................................................................. 148
LIST OF TABLES

Table 1:
SUMMARY OF THE TEN MOST RELEVANT PUBLISHED STUDIES TO THE WOLLONGONG SPORT PROGRAM ........................................ 30

Table 2:
SUMMARY OF THE VARIABLES MEASURED AND INSTRUMENTS USED ....................................................................................................................... 52

Table 3:
TIME ALLOCATED SCHEDULE FOR EACH SESSION OF THE WOLLONGONG SPORT PROGRAM ........................................................................ 54

Table 4:
2008 WOLLONGONG SPORT PROGRAM PLANNED ACTIVITIES .............. 57

Table 5:
BASELINE CHARACTERISTICS OF PARTICIPANTS OF THE WOLLONGONG SPORT PROGRAM ........................................................................ 60

Table 6:
PROPORTION OF WOLLONGONG SPORT PARTICIPANTS CLASSIFIED AS OVERWEIGHT OR OBESE AT BASELINE ......................... 61

Table 7:
SESSION ATTENDANCE FROM THE WOLLONGONG SPORT PROGRAM ............................................................................................................ 64

Table 8:
MEAN ENJOYMENT SCORES FOR EACH SESSION AND FOR THE OVERALL WOLLONGONG SPORT PROGRAM .............................................. 66

Table 9:
PARTICIPANT ENJOYMENT SCORES FOR EACH ‘SPORT CATEGORY’ OF THE WOLLONGONG SPORT PROGRAM .............................................. 67

Table 10:
CHANGES IN OUTCOMES FOR ENTIRE SAMPLE ........................................ 69

Table 11:
CHANGES IN OUTCOMES FOR OVERWEIGHT AND OBESE PARTICIPANTS ................................................................................................. 71

Table 12:
A SUMMARY OF RESULTS ........................................................................................................ 73
LIST OF FIGURES

Figure 1:
TRIADIC RECIPROCALITY MODEL ................................................................. 36

Figure 2:
AN EXAMPLE OF AN ITEM FROM THE SELF-PERCEPTION
PROFILE FOR CHILDREN ............................................................................. 43

Figure 3:
AN EXAMPLE ITEM AND SCORING FROM THE SELF-PERCEPTION
PROFILE FOR CHILDREN ............................................................................. 44

Figure 4:
EXAMPLE ITEMS FROM PEDSQL PEDIATRIC QUALITY
OF LIFE INVENTORY CHILD REPORT (AGES 8-12) .................................. 45

Figure 5:
ENJOYMENT SCALES AND CORRESPONDING NUMERICAL VALUES
.................................................................................................................. 52
CHAPTER I: INTRODUCTION

1.1 BACKGROUND AND SIGNIFICANCE OF THE STUDY

Overweight and obesity affects one in four children in Australia, (Booth et al., 2006) with this number having more than doubled over the past 20 years (Booth, Dobbins, Denny-Wilson, Hardy & Okely, 2007). Although the prevalence is high among both boys and girls, and among all socio-economic groups, it does seem to disproportionately affect primary school girls (Trost et al., 2002) and those from low socio-economic backgrounds, where up to one in three may be overweight or obese (Booth et al., 2007).

Overweight and obese children suffer health consequences which are both numerous and substantial (Waters & Baur, 2003) and include physical consequences such as cardiovascular concerns, pulmonary complications, musculoskeletal problems, gastrointestinal, renal, and endocrine complications (Batch & Baur, 2005). The most immediate and damaging consequences of obesity in children however are psychosocial and include depression, social isolation and stigmatisation, poor self-esteem, body image and eating disorders (Baur, 2002; Ebbeling, Pawlak & Ludwig, 2002). It is the psychosocial consequences of childhood obesity that are particularly pertinent for this study.

The three main predictors of childhood overweight are participation in physical activity, time spent in sedentary behaviours and dietary intake (Davidson & Birch, 2001). These three factors are common intervention points in treating and
preventing unhealthy weight gain in children, however are likely to also be influenced by broader child, parent and community characteristics (Davidson & Birch, 2001).

Interventions designed to prevent and manage overweight and obesity among children have shown some success, however, they have been limited by their design. Most are multifaceted, employ a 'one size fits all' model and are often delivered in highly resourced settings, limiting long term sustainability and generalisability (Warren et al., 2007). It is still unknown whether multifaceted intervention programs or those with a single focus such as increasing physical activity are more effective. Additionally, a 'one size fits all' model (i.e. identical programs implemented for all children, independent of gender, age, etc) is not highly conducive for participation in physical activity. Kyles and Lounsbery (2004) suggested that females in particular were often intimidated and self-conscious when participating in co-educational physical activities and often chose not to participate.

The success of an intervention may be influenced by the setting in which the intervention is implemented. A variety of settings have been employed (e.g. community centres, hospitals, day camps), however interventions implemented in the after-school period have shown promising results, specifically in relation to improving participation in physical activity and reducing BMI (Kelder et al., 2004; Robinson et al., 2003; Weintraub et al., 2008; Yin et al., 2005). This after-school time period forms part of the 'critical window' (from 3-5pm) where many children spend excessive time in sedentary behaviours and eating unhealthy snacks. A physical activity intervention that is set in this after-school period can directly displace opportunity for spending time in sedentary behaviours by engaging children in physical activity.
To address many of the shortcomings in the current literature, the *Wollongong Sport Program* was designed, implemented and evaluated. The *Wollongong Sport Program* is a 14-week after-school homework club and physical activity program set on school site. It employed a targeted approach and focused primarily on promoting physical activity. The *Wollongong Sport Program* is underpinned by the theoretical framework of the Social Cognitive Theory (Bandura, 1986) which has successfully guided after-school, behaviour interventions focusing on increasing physical activity (Rinderknecht, & Smith, 2004). The model encourages behaviour change through the interaction of personal, behavioural and environmental factors.

### 1.2 AIM OF THE STUDY

The aim of the study was to determine the feasibility, acceptability and potential efficacy of an after-school homework club and physical activity program on promoting psychosocial wellbeing among on 8- to 11-year old girls who were overweight, obese or perceived by teachers to have low levels of perceived competence.

The first research question addressed whether the *Wollongong Sport Program*, an after-school homework club and physical activity program, would be *feasible*? It was hypothesised that:

- **H1.** 15 participants would be recruited.
- **H2.** 90% of participants recruited would be retained.
- **H3.** All baseline and follow up outcome data would be successfully collected.
The second research question addressed whether the *Wollongong Sport Program*, an after-school homework club and physical activity program, would be acceptable? It was hypothesised that:

- **H4.** All sessions (26) would be implemented.
- **H5.** An overall mean attendance rate of 80% would be achieved.
- **H6.** Participants would demonstrate a high level of enjoyment and satisfaction with the program, providing a minimum rating of three on a five-point scale.

The third research question addressed whether the *Wollongong Sport Program*, an after-school homework club and physical activity program, would be potentially efficacious? It was hypothesised that:

- **H7.** An increase in perceived competence would be achieved.
- **H8.** An improvement in health related quality of life would be achieved.
- **H9.** A decrease or stability in BMI, BMI z Score (overweight and obese participants only), waist circumference and percent body fat would be achieved.

### 1.3 OVERVIEW OF METHODOLOGY

This study used a single group, pre-test (baseline) post-test (follow up) design with data collected from 15, 8- to 11-year old girls, six of whom were overweight or obese (Cole, Bellizzi, Flegal & Dietz, 2000).

The effect of the independent variable (the *Wollongong Sport Program*) on the dependant variables (perceived competence, quality of life, BMI, BMI z Score, waist circumference and percentage body fat) in association with process
evaluations (facilitator reflections, participant enjoyment ratings and attendance) were used to determine the feasibility, acceptability and potential efficacy of the Wollongong Sport Program.

1.4 STUDY LIMITATIONS

The following factors may have limited the results of the study;

1. This study was a single group feasibility study and as such, no control group was used. This limited the ability to control any history and maturation threats to internal validity (Mertens, 2005). Therefore, the effects of the Wollongong Sport Program on participants' perceived competence and quality of life may not be solely due to the program.

2. The 15 participants involved were a convenience sample. As they volunteered they may have already possessed greater behaviour change motivation and may have had highly supportive and encouraging family networks.

3. The study was not adequately powered to detect statistically significant differences between baseline and follow up.

4. Self-reported measures required both participants and parents to respond to questionnaires honestly. Additionally at follow up, there may have been a social desirability bias operating as participants and parents may have felt that because of their involvement in the Wollongong Sport Program they should have improved in target measures (Stevens, Taber, Murray & Ward, 2007).
1.5 DELIMITATIONS

This study was delimited in the following ways:

1. Participants were female and aged between 8- and 11-years old. They were a convenience sample from one Illawarra Government Primary School.

2. Participants who were overweight or obese were classified using established international BMI cut-points (Cole et al., 2000).

3. Perceived competence was measured using the Self-Perception Profile for Children (Harter, 1985). This measure was identified as a dependant variable.

4. Quality of life was measured using the parent and child versions of the PedsQL Pediatric Quality of Life Inventory Report, Version 4 (Varni, 1998). This measure was identified as a dependant variable.

5. Anthropometry was measured via BMI, BMI z Scores (scales (weight) and stadiometers (height)), waist circumference (non-extendable tape measures) and body fat percentage (body fat monitor).

6. This study was completed as part of a Bachelor of Education Honours Thesis at the University of Wollongong.

1.6 DEFINITION OF TERMS

Terms used in the context of this study are defined as follows:

**Physical Activity**: Bodily movements that are produced by contraction of the skeletal muscle and that substantially increases energy expenditure, which can be categorised in different ways (U.S. Department of Health and Human Services, 1996).
**Psychosocial Health:** A complex interaction of the mental, emotional, social and spiritual dimensions of health (Donatelle, 2006).

**Perceived Competence:** The whole complex of beliefs about one's own competencies (University of Groningen, 1992). Including scholastic, social, athletic, physical and behavioural (Harter, 1985).

**Health Related Quality of Life:** A multidimensional health outcome measure, which considers a person's physical, psychological and social dimensions of health (Varni, Limbers & Burwinkle, 2007a).

**Self-Esteem:** Refers to an individual's sense of self-respect, self-confidence or self-worth (Donatelle, 2006).

**Body Mass Index (BMI):** A measure of a person's weight relative to their height, it can assess and indicate the extent of their weight; underweight, healthy weight, overweight and obese (Australian Institute of Health and Welfare, 2005).

**BMI z Score:** A measure of relative weight that is adjusted for a child's age, gender and growth which corresponds to growth chart percentiles. In order to calculate a child's BMI z Score their age, gender, BMI and an appropriate reference standard is required. It is based upon an external reference (national or international) not an internal reference (Must & Anderson, 2006).

**Overweight:** Internationally recognised cut points, adjusted for both age and gender, which link to having a Body Mass Index equal to or greater than 25 kg/m² and less than or equal to 30kg/m² at 18 years of age (Cole et al., 2000).
**Obese:** Internationally recognised cut points, adjusted for both age and gender, which link to having a Body Mass Index equal to or greater than 30kg/m$^2$ at 18 years of age (Cole et al., 2000).

**After-School Program:** A program designed for children and occurs immediately following the end of the school day.

**Primary School:** An educational setting in New South Wales, which caters for the educational needs of children, aged 5- to 12-years from Kindergarten to Year Six. During these school years the focus is on numeracy and literacy (NSW Department of Education and Training, 2007).
CHAPTER II: REVIEW OF THE LITERATURE

2.1 PREVALENCE AND TREND OF OVERWEIGHT AND OBESITY IN AUSTRALIAN CHILDREN

The prevalence of overweight and obesity among young Australians is high and increasing, and is a major public health concern (Magarey, Daniels & Boult, 2001; World Health Organisation, 2003). According to recent data, one in four children and adolescents are now classified as overweight or obese with rates increasing by approximately one percentage point per year (Booth et al., 2007). In addition, the proportion of overweight and obese girls is significantly higher than that of boys (Sanigorski, Bell, Kremer & Swinburn, 2007) peaking in girls 7-11 years of age (Magarey et al., 2001). Overweight and obesity seems to disproportionately affect those from disadvantaged and Non English Speaking backgrounds, with children from these backgrounds appearing to be at greater risk of overweight or obesity (Booth et al., 2007; Sanigorski et al., 2007; Booth et al., 2001).

Interestingly, while girls may be more likely to be overweight or obese, the rate of increase for girls appears to be decelerating (Booth et al., 2007). Data indicate that during 1985 to 1997 the prevalence of overweight and obesity in Australian children doubled, however no increases in prevalence in girls between 1997 and 2004 were statistically significant. Boys however showed a steady rate of increase from 1985 to 2004 with the exception of those aged 8-10, where the average annual rate of increase in the prevalence of overweight and obesity was around 30% (Booth et al., 2007).
Prior to 1985, an increase in prevalence of overweight and obesity in children was noted, however, no increase in the period from 1969 was found to be statistically significant (Booth et al., 2003).

2.2 HEALTH CONSEQUENCES OF CHILDHOOD OVERWEIGHT AND OBESITY

Childhood obesity is a chronic paediatric disease (Batch & Baur, 2005), the health consequences of which are both numerous and substantial (Waters & Baur, 2003). The range of short- and long-term physiological and psychological conditions associated with childhood overweight and obesity are serious health problems that involve many body systems. The physical consequences include cardiovascular concerns, pulmonary complications, musculoskeletal problems, gastrointestinal, renal, and endocrine complications (Batch & Baur, 2005). The most immediate consequences of obesity in children however are those related to psychological and psychosocial dysfunctions (Baur, 2002), namely depression, social isolation and stigmatisation, poor self esteem, body image disorder and eating disorders (Ebbeling et al., 2002). It is the psychosocial consequences of childhood obesity that are particularly pertinent for this study.

Overweight and obesity in childhood is strongly correlated with obesity in adulthood (Gillison, Standage & Skevington, 2006). Hence, obesity in itself should be considered a long term health consequence (Baur, 2002). An estimated 50% of obese adolescents become obese adults (Pearson et al., 2003), and that after six years of age, the probability of an obese child becoming an obese adult is greater than 50% compared to a 10% probability for children in a healthy weight range.
(Whitaker, Wright, Pepe & Dietz, 1997). More specific to girls, overweight girls are up to 30 times more likely to become obese adults than children of a healthy weight (Thompson et al., 2007). Consequently as obesity tracks into adulthood, many physical and psychosocial health consequences of childhood obesity also carry into adult life. Thus, the increased morbidity and mortality associated with health consequences stemming from childhood overweight and obesity provide a major public health concern (Hardy, Harrell & Bell, 2004).

2.2.1 PHYSIOLOGICAL CONSEQUENCES

2.2.1.1 CARDIOVASCULAR CONCERNS

Obesity and cardiovascular risk factors track from childhood to adulthood (Hardy et al., 2004). Risk factors of cardiovascular disease include, in part, hypertension (elevated blood pressure), triglycerides, fasting insulin and dyslipidaemia (abnormal concentration of lipids or lipoproteins in the blood) (Thompson et al., 2007).

Approximately 30% of obese children suffer from hypertension (Figueroa-Colon, Franklin, Lee, Aldridge & Alexander, 1997). In addition, one study revealed that 56% of adolescents with persistent elevated blood pressure were also significantly overweight (Rames, Clarke, Connor, Reiter & Lauer, 1978). The best predictor for adult dyslipidaemia is childhood low-density lipoprotein (LDL) levels (Lobstein, Baur & Uauy, 2004). A strong correlation exists between childhood and adulthood LDL levels (r=.4-.6, P<.001) with more than 40% of individuals with elevated levels of LDL continuing to have elevated levels 15 years later (Bao, Srinivasan, Wattigney, Bao & Berenson, 1996).
2.2.1.2 PULMONARY COMPLICATIONS

Pulmonary complications associated with overweight and obesity include: sleep disordered breathing (heavy snoring, reduction in airflow (hypopnoea) and cessation of breathing (apnoea)), asthma and exercise intolerance (Batch & Baur, 2005; Lobstein et al., 2004; Rhodes et al., 1995). In a study by Mallory, Fiser and Jackson (1989), one-third of subjects who presented with symptoms consistent with sleep apnoea suffered from severe obesity, and 5% had severe obstructive sleep apnoea. Another study found abnormal sleep patterns in 94% of obese children (Silvestri et al., 1993).

An association between overweight and obese children and asthma has been reported in several cross-sectional studies (Lobstein et al., 2004; Rodriguez, Winkleby, Ahn, Sundquist & Kraemer, 2002). In a representative survey of US children aged 2 months to 18 years, overweight was linked to increased asthma prevalence, independent of age, sex and ethnicity (Rodriguez et al., 2002).

2.2.1.3 MUSCULOSKELETAL COMPLICATIONS

Overweight and obesity has a negative impact on the osteoarticular health of children by promoting biomechanical changes in the lumbar spine and lower extremities (Sa’ Pinto, Barros-Holanda, Radu, Villares, & Lima, 2006). Obese children tend to: display a greater extent of bone deformities such as Blount disease and slipped capital femoral epiphysis (a hip condition where the thigh bone slips from the ball of the hip joint); and higher frequency of postural bone changes including lumbar hyperlordosis (curvature/arching of the lower back); genu valgum (knock-knees) and, genu recurvatum (hyperextension of the knee, the lower extremity having a forward curvature) (Sa’ Pinto et al., 2006).
2.2.1.4 GASTROINTESTINAL AND RENAL COMPLICATIONS

Gastrointestinal and renal complications are also common in overweight and obese children and predominantly include gallstones (solid cholesterol masses that form in the gall bladder), gastro-oesophageal reflux (the gastric content of the stomach returns to the oesophagus), non-alcoholic fatty liver disorder and glomerulosclerosis (scarring of the blood vessels in the kidneys) (Batch & Baur, 2005). Non-alcoholic liver disease is the most common of all of these with up to 53% of obese children affected (Rashid & Roberts, 2000).

2.2.1.5 ENDOCRINE COMPLICATIONS

The most common endocrine complications affecting overweight and obese children are insulin resistance, glucose intolerance, type 2 diabetes and precocious puberty. Further, females may also suffer from menstrual problems, early menarche and polycystic ovary syndrome (Batch & Baur, 2005).

The emergence of insulin resistance and type 2 diabetes in youth is particularly alarming: both of which have been said to cause an estimated 50% of newly diagnosed diabetes in children (Goran, Ball & Cruz, 2003). Further, over 90% of adolescents with type 2 diabetes are found to have excessive body weight (Scott, Smith, Cradock, & Pihoker, 1997). While other factors are associated with type 2 diabetes in children, the most important risk factor is obesity (Lobstein et al., 2004).

Menstrual problems (e.g. irregular menstrual cycling) and early menarche represent part of the endocrine response to excess body weight in females (Rich-Edwards et al., 1994, cited in Lobstein et al., 2004; Anderson, Dallal, & Must, 2003). Early menarche is an established risk factor for breast cancer and has been linked to other cancers of the female reproductive system (Marshall et al., 1998, cited in Lobstein et
Further, it has been proposed as a risk factor for common psychiatric problems experienced by adolescent girls namely depression, disordered eating and substance abuse (Stice, Presnell, & Bearman, 2001).

2.2.2 PSYCHOSOCIAL CONSEQUENCES

2.2.2.1 STIGMATISATION

Obesity correlates highly with a rise in peer victimisation, depression, social isolation, poor self esteem, body image disorder, eating disorders and lower perceived physical and cognitive ability (Davison & Birch, 2001; Ebbeling et al., 2002; Latner & Stunkard, 2003), all of which dramatically reduce quality of life and contribute to impaired psychosocial functioning (Storch et al., 2007).

Negative attitudes toward overweight and obesity may begin in children as young as three (Cramer & Steinwert, 1998). At the age of six and seven, children, particularly girls, have expressed concerns about weight, body dissatisfactions and a value for thinness (Flannery-Schroeder & Chrisler, 1996; Lucero, Hill & Ferraro, 1999). Increase in age suggests a steady rise in stigmatisation of obesity with 50% of children 8- to 13-years of age wishing to be thinner (Schur, Sanders & Steiner, 2000).

Stigmatisation of obesity in children appears to have increased over the last 40 years (Latner & Stunkard, 2003). In a study by Richardson, Goodman, Hastorf and Dornbusch (1961), 10 -to 11-year old students were given six pictures of children and asked to rank them according to how well they liked each child. One drawing featured a healthy child, four featured children with various disabilities and disfigurements and one featured an obese child. The obese child was ranked last.
This study was replicated in 2001, where the same aversion to overweight children existed, however the difference between the ranking of the healthy child, ranked first, and the obese child, ranked last, was 40.8% greater in 2001 than in 1961 (Latner & Stunkard, 2003), thus illustrating a significant increase in stigmatisation of obese children.

2.2.2.2 WEIGHT RELATED TEASING

Children are bias against overweight and obesity, with peer victimisation and teasing subsequent consequences (Storch et al., 2007). Specifically, overweight youth appear to be at higher risk for experiencing peer victimisation than their non-overweight peers (Janssen, Craig, Boyce & Pickett, 2004). Peer victimisation is positively related to child-reported depression, anxiety, social physique anxiety and loneliness (Juvonen, Graham, & Schuster, 2003). Additionally, those overweight children experiencing high levels of peer victimisation may internalise the content of peer attacks, resulting in negative self-attributions, decreased self-esteem and increased depressive symptoms (Storch, Masia-Warner, Crisp & Klein, 2005).

2.2.2.3 DEPRESSION AND SELF ESTEEM

Depression and self esteem are highly interrelated, both conceptually and clinically (Strauss, 2000). Changes in self esteem among obese and non obese 9- and 10-year old children indicate a decrease in self esteem in obese children over a four-year period, which was associated with increased depressive symptoms such as feelings of sadness and loneliness (Strauss, 2000). Overweight children who are depressed may also present as likely targets for future peer victimisation because they lack acceptance and positive contacts within their peer group (Janicke et al., 2007). In a population-based sample of 4703 Swedish adolescents, BMI was associated with
depressive symptoms and adolescents suffering from major depression belonged to the group with the highest BMI (obese group) (Sjoberg, Nilsson & Leppert, 2005).

It has been hypothesised that preadolescent girls develop more risk factors for depression than boys and that these risk factors lead to depression in early adolescence (Barlow & Dietz, 1998). Erickson, Robinson, Haydel and Killen (2000) found that of 868 third grade students, overweight girls, but not overweight boys, manifest more depressive symptoms than their normal-weight peers.

2.2.2.4 HIGH RISK BEHAVIOURS

Overweight children struggling with depressive symptoms may be more likely to engage in high risk behaviours such as smoking, tobacco use and alcohol consumption (Abernathy, Massad & Romano-Dwyer, 1995; Jackson, 1997; Phinhas-Hamiel et al., 2006; Strauss, 2000). A study by Strauss (2000) indicated that 57% of obese, 9- to 10-year old children, with decreasing levels of self esteem, reported smoking and alcohol consumption. Research by Jackson (1997) supports the association between obesity, low self esteem and alcohol consumption but further reports that low levels of self esteem are correlated with initiation of tobacco use among 4th to 6th grade students.

Additionally, disordered eating is another high risk behaviour that overweight children with poor psychosocial wellbeing suffer (Dietz, 1998; Jackson, Grilo & Masheb, 2000; Lunner et al., 2000; Neumark-Sztainer et al., 2002). A cross-sectional study of 7- to 13-year old children demonstrated that almost 50% of children were concerned about their weight, more than one third had already tried to lose weight, and almost 10% manifested responses consistent with anorexia nervosa (Maloney, McGuire, Daniels & Specker, 1989). As expected, more girls than boys
were preoccupied with weight, and concerns about weight increase with age (Dietz, 1998). In a study of almost 2000 adolescent high school students, 11% of girls were classified as emotional eaters (a precursor for disordered eating), with bingeing and feeling out of control about food the principal abnormalities (Kagan & Squires, 1984).

Possibly the most concerning high risk behaviour, is the suicidal ideation and attempts by overweight adolescents. Suicide ideation and attempts are two to three times as high among those who were victims of weight-based teasing compared with those not teased (Eisenberg, Neumark-Sztainer, & Story, 2003). A study by Eisenberg et al. (2003) indicated that more than 50% of adolescent girls teased about their weight by both peers and family report thinking about suicide, and almost one quarter of those reported attempting suicide.

2.2.2.5 HEALTH RELATED QUALITY OF LIFE

Health related quality of life is directly associated with obesity and peer victimisation (Hassan, Joshi, Madhavan and Amonkar, 2003). Quality of life is an important subjective measure of overall functioning and encompasses physical ability, psychological wellbeing, social interactions and school or work performance (Phinhas-Hamiel et al., 2006). Numerous studies have documented the negative impact of overweight status on children’s quality of life using both child self-report and parent-proxy report (Hughes, Farewell, Harris & Reilly, 2007; Ravens-Sieberer, Redegeld & Bullinger, 2001; Schwimmer, Burwinkle and Varni, 2003; Swallen, Reither, Haas & Meier, 2005; Williams, Wake, Hesketh, Maher & Waters, 2005). Schwimmer et al. (2003) showed that the health related quality of life of obese children was adversely correlated with the degree of obesity and was found to be similar to the quality of life of children diagnosed with cancer. In this study, obese
children and adolescents reported significant impairment not only in overall quality of life, but also in individual domains; physical, psychosocial, emotional, social, and school functioning. In concurrence, Williams et al. (2005) through their study of 1456 children found decreases in physical and social functioning for obese children compared with non-overweight children. Further Hassan et al. (2003) indicated that scores in health related quality of life domains of physical, mental and activity limitations deteriorated with increasing BMI.

2.2.2.6 SELF-PERCEPTION

Obesity impacts the self-perception of children entering adolescence, especially in girls (Walker, Gately, Bewick & Hill, 2003). Obese children are at particular risk of low perceived competence in sports, physical appearance, and peer engagement. A study by Franklin, Denyer, Steinbeck, Caterson and Hill (2006) of 2813 Australian children revealed that obese girls and boys have lower perceived athletic competence, physical appearance, and global self-worth. The impact on perceived self-competence in obese girls was profound, with lower scores in four domains and a significant reduction in social acceptance. In terms of risk, obese 11 year old children were between two and four times more likely than their normal weight peers to have low global self-worth. Thus even by the age of 11, obesity has a clear and measurable impact on self-perception and self-esteem (Franklin et al., 2006).

2.2.2.7 SUMMARY

The most immediate health consequences of obesity are psychosocial in nature and have been found to have significant effects on young girls in particular (Baur, 2002). The psychosocial effects of obesity contribute to impaired psychosocial functioning and considerably reduce quality of life, thus they are of momentous concern (Baur, 2002; Storch et al., 2007). Further, overweight girls are up to 30 times more likely to
remain overweight in adulthood, with psychosocial consequences tracking into adulthood (Thompson et al., 2007). Therefore, there is an imperative need for the implementation of preventative measures with specific focus on young girls and the promotion of psychosocial wellbeing.

2.3 FACTORS THAT INFLUENCE UNHEALTHY WEIGHT GAIN IN CHILDREN

The development of childhood overweight involves the interaction of many different factors from multiple contexts. The three main predictors of childhood overweight are physical activity, dietary intake and sedentary behaviours. However, broader child (age and gender), familial (e.g. parenting practices and parental monitoring of television viewing) and societal/community (e.g. access to recreational facilities) characteristics also need to be considered (Davidson & Birch, 2001). The Ecological Systems Theory is one such framework that can be used to examine the relationship between these behaviours and the associated contexts (Davidson & Birch, 2001).

2.3.1 PHYSICAL ACTIVITY

Low levels of physical activity among children are associated with higher BMI, greater skin fold thickness (Obarzanek et al., 1994) and greater fat mass (Goran, Hunter, Nagy & Johnson, 1997). The physical activity patterns of children are formed by a combination of child characteristics, parents and peer activity patterns and broader contextual factors such as access to facilities, school physical education programs and social economic status.
Child characteristics such as age and gender have bearing on physical activity participation levels (Davison & Birch, 2001). That is, physical activity and sport participation declines with development from childhood to adolescence (Goran, Gower, Nagy & Johnson, 1998; Sallis, 2000). This decline is true for both boys and girls, however, is more significant in girls (Sallis, Prochaska & Taylor, 2000; Goran et al., 1998).

The family context is in part responsible for shaping the activity patterns and preferences of children (Davison, Cutting & Birch, 2003). Positive associations between parent participation in activity and child participation are evident (Vilhjalmsson & Thorlindsson, 1998). Parents who participate in and enjoy physical activity are more likely to create an environment in which their child is supported and encouraged to lead a physically active life (Sallis, Alcaraz, McKenzie & Hovell, 1999).

Community and societal characteristics, in particular the school setting, are also a factor in determining the level of physical activity of children. Schools provide a rich opportunity to expose children to a variety of physical activities. However, in the last decade, physical activity opportunities within schools have decreased (Hill & Peters, 1998), possibly contributing to the rise in overweight and obesity among young children.

Other community factors associated with physical activity levels of children are access to recreational facilities and the availability of safe activity areas (Davison & Birch, 2001). Due to urban sprawl and greater distances of facilities from the home, access to walking and bicycling paths, parks and other recreational facilities has decreased (Ball, Timperio & Crawford, 2006). Lower levels of physical activity
have consistently been observed among children particularly from disadvantaged, European or Middle-Eastern backgrounds, which place these children at greater risk of being overweight or obese (Booth et al., 2007; Sanigorski et al., 2007; Booth et al., 2001).

2.3.2 DIETARY HABITS
Throughout the last two decades, there have been significant changes in food and nutrient intake, shifting towards foods high in fat, sugar and carbohydrates (Crowe, LaFontaine, Gibbons, Cameron-Smith & Swinburn, 2004). The increase in consumption of sugary soft drinks and juices is especially concerning, particularly in children aged 5-12 years, as energy intake derived from these fluids often occurs without compensatory down-regulation of energy intake from food (Crowe et al., 2004). Additionally, children in this age group are consuming significantly more non-core foods (42%) than any other age group (Bell, Kremer, Magarey & Swinburn, 2005).

Child characteristics (e.g. growth and gender) moderate the relationship between dietary patterns and weight status, that is: children’s energy needs differ with age and rate of growth (Davison & Birch, 2001).

Within the context of the family, children’s dietary patterns evolve and similarities between child and parent patterns of dietary intake have been observed (Westenhoefer, 2004). Parent nutrition knowledge, the types of foods parents make available to their children, parental modelling of particular eating behaviours and parent child-feeding practices all influence the dietary practices of the child (Brown & Ogden, 2004; Campbell & Crawford, 2001; Davison & Birch, 2001; Golley et al., 2005). Additionally parental weight status is related to their children’s weight
Overweight parents typically adapt unhealthy dietary practices and in turn place their child at risk of overweight (Wardle et al., 2001).

Parent and child dietary intake patterns are likely to reflect environmental factors such as work demands, ethnicity, social economic status and the availability of convenience foods. Major shifts in dietary practices have occurred due to a decrease in time available for food preparation and an increase in food portions for low cost (Nicklas & Hayes, 2008). Furthermore, children from Middle Eastern backgrounds consume more sweetened beverages and have higher fat intakes than children of other ethnic groups (Booth et al., 2006; Johnson, Guthrie, Smiciklas-Wright & Wang, 1994). Additionally, children from lower socio economic status groups have less diverse diets and higher fat intake than children from upper socio economic status groups (Booth et al., 2006; Wolfe & Campbell, 1993). Thus environmental factors are significant contributors to a child's weight status.

2.3.3 SEDENTARY BEHAVIOUR

Time spent participating in sedentary behaviours correlate highly with weight status (Booth et al., 2006; Davison & Birch, 2001; Doak, Visscher, Renders & Seidell, 2006). Among children, a greater number of hours spent in sedentary pursuits (e.g. watching television, playing computer games) have been associated with higher prevalence of overweight (Hernández et al., 1999), higher BMI (Berkey et al., 2000) and greater skin fold thickness (Hardy et al., 2004; Robinson, Dina & Borzekowski, 2006). Of all sedentary pursuits, television viewing, more specifically viewing of food advertisements, is the most significant sedentary behaviour contributor to overweight (Robinson et al., 2006; Lewis & Hill, 1998). Television viewing of more
than one hour per day has been associated with high consumption of foods high in fat and sugar and low consumption of fruits and vegetables (Muller, Koertringer, Mast, Languix & Frunch, 1999).

As parents have the ability to control and guide children’s small screen viewing they are very influential in shaping children’s sedentary behaviours (Valerio et al., 1997). However, the business of life may be, in part, responsible for high rates of sedentary activity, with longer working hours, parents are not home to monitor small screen viewing and may use television as an electronic babysitter (Davison & Birch, 2001). While there is limited research surrounding the influence of parents behaviours on children’s sedentary behaviours, studies have found that children will often adopt the behaviour of their parents thus parents own sedentary behaviours are likely to be emulated by their child (Baughcum, Burlow, Deeks, Powers & Whitaker, 1998).

Finally, children's sedentary behaviours may also be affected by community (e.g. socio economic status) and environmental (safety of neighbourhoods) characteristics (Davison & Birch, 2001). Higher levels of sedentary behaviours and weight status have been observed among those with lower socio economic status (Gordon-Larsen, McMurray & Popkin, 2000) and unsafe neighbourhoods (Burdette et al., 2005).

2.3.4 SUMMARY
The development of childhood overweight involves a complex set of factors from multiple contexts. Physical activity, dietary intake and sedentary behaviours are possibly the most prominent factors, but are influenced by child, familial and environmental contexts (Davison & Birch, 2001). The *Wollongong Sport Program* addressed these prominent factors, in the context of the broader child, parental and
community characteristics. That is, participants engaged in an age- and gender-appropriate (child characteristics) physical activity program. The program was implemented in a safe environment at their school site (community characteristics) and the after-school setting meant that parents did not have to leave work early to transport their children to the program (parental characteristics).

2.4 PROGRAMS TO PREVENT AND TREAT CHILDHOOD OBESITY

In the treatment and prevention of childhood overweight and obesity, programs have varied considerably in setting, design, inclusion and exclusion criteria, sample size, attrition rates, intervention components and duration of both the intervention and follow up phases. As a result, the most appropriate program to treat and prevent childhood overweight and obesity is unknown (Livingstone, McCaffrey & Rennie, 2006). However, multifaceted programs, focusing on the promotion of physical activity, nutritional education, dietary patterns and decreasing sedentary activities, is a popular approach.

To date, a vast number of studies employing this multifaceted approach have been published. An expansive review of these studies was beyond the scope of this thesis, thus only ten of the most relevant studies will be reviewed. These studies were deemed most relevant as they involved children, focused in part or entirely on physical activity and were implemented in a variety of settings.

Two school based intervention programs which focus on increasing physical activity in attempt to prevent and manage overweight and obesity are SPARK (Sallis et al., 1993) and Dance for Health (Flores, 1995). SPARK was a two year, randomised
controlled study involving seven elementary schools, and aimed to promote physical activity outside of school and maintain activity habits post intervention. Participants were randomised to a specialist-led intervention, a teacher-led intervention or a control group. The SPARK intervention consisted of curricular and teacher in-service programs. The curriculum program involved two components, physical education and self-management. The in-service training program was provided for classroom teachers in the teacher-led condition. Children participated in their respective intervention or control conditions during the fourth and fifth grades. At follow up both boys and girls from the intervention groups demonstrated a significantly higher physical activity and lower BMI than children in the control group (Sallis et al., 1993).

Flores (1995) *Dance for Health* three month program involved 81, 10-13 year old, African American and Hispanic school children. The program investigated whether using dance classes as a medium for physical activity promotion had a significant effect on improving aerobic capacity, helping students maintain or decrease weight, and improving attitudes toward physical activity and physical fitness (Flores, 1995). The intervention consisted of health education twice a week and dance-oriented physical education three times a week. At follow up significant decreases in BMI and heart rate and favourable changes in attitudes about physical activity were evident for both female and male participants (Flores, 1995).

*Project Destiny* was a five-week physical activity intervention for non-athletic, pre-teen females (Kyles & Lounsbery, 2004). Participants met three times a week as part of a day camp from 9.30am till 4.30pm and participated in health and wellness workshops, leadership and cooperative games which promoted physical activity. Results indicated an increase in self perceived competence, a greater interest in sport
and high levels of enjoyment. Furthermore, the single sex setting of the program was well supported by all participants and was a significant factor in participant program satisfaction.

Similarly, Baranowski et al. (2003) used summer day camps to promote physical activity among girls. Thirty-eight girls (mean age 8yrs), from middle income families were recruited and randomised into a 12-week intervention or control program. The intervention components focused on healthy eating, drinking water and improving physical activity. The intervention was implemented face-to-face for the first four weeks (summer day camps) and then via the internet for the following eight weeks. Results exhibited a trend, although not significant, toward lower BMI (\(P=0.08\)) and increased physical activity in the intervention group compared to the control group (Baranowski et al., 2003).

Beech (2003) implemented a community-centre physical activity intervention (Memphis GEMS Pilot Study) for young girls. Sixty girls from low-income homes were randomised to either a child only group (\(n = 21\)), a parent only group (\(n = 21\)) or a control group (\(n = 18\)). The child and parent only groups ran weekly in parallel 90 minute sessions at a local community centre. The intervention focused on improving nutrition and physical activity. Compared to girls in the control group, girls in both the child-only and parent-only groups demonstrated reduced (although not significant) BMI and waist circumference; reduced consumption of sweetened beverages; increased levels of moderate-to-vigorous physical activity and increased water consumption (Beech 2003).
The *Healthy Eating and Lifestyle through Positive Parenting (HELPP)* Program was an Australian-based randomised controlled trial involving 111 overweight and obese children, 6- to 9-years of age and was implemented at a hospital (The Flinders Medical Centre, and the Women's and Children's Hospital) (Golley et al., 2007). It incorporated three study arms: a parent-led child weight management program utilising parenting skills training and intensive lifestyle (diet and activity) education, a parent-led child weight management program utilising parenting skills training alone, and a control group (families wait-listed for a program at 12 months). *HELPP* was a 6-month intervention, with tapered frequency (initially weekly, then fortnightly), of 11 (90-120 min) group and 7 telephone sessions (Golley et al., 2007).

Outcomes assessed included in part, BMI *z* Score, waist circumference *z* Score, parent proxy- and self-reported health related quality of life and body dissatisfaction. Follow up measurements were taken at 6- 12- and 18-months. After 12-months, the BMI *z* Score was reduced by 10% for the parenting skills training plus intensive lifestyle education versus 5% with parenting-skills training alone or wait-listed groups. Additionally, waist circumference *z* Score decreased in both intervention groups but not in the control group (Golley et al., 2007).

*The Medical College of Georgia (MCG) FitKid Project* was a three year intervention that aimed to increase physical activity participation and consumption of healthy foods, and facilitate academic growth through the provision of homework assistance (Yin et al., 2005). This randomised controlled trial involved 18 schools and 617, 2nd and 3rd grade children. The intervention was implemented five afternoons per week. Outcomes were numerous and include in part, percent body fat, cardiovascular fitness, BMI, proxy-reported dietary intake and physical activity,
physical activity enjoyment and motivation. Results demonstrated a decrease in percentage body fat (P=0.027) and a decrease in heart response rate (P=0.025). BMI (P=0.18) and waist circumference (P=0.32) along with other outcomes showed non-significant trends in favor of the intervention group (Yin et al., 2005).

The *CATCH Kids Club* was an after-school physical activity and nutrition program that was adapted from the *Coordinated Approach to Child Health Program* (Kelder et al., 2004). This program was pilot tested and formatively evaluated in 16 after-school sites (eight intervention groups and eight control groups) involving participants of a mean age of nine years. The *CATCH Kids Club* comprised five educational sessions, which focused on goal setting and healthy eating; physical activity and snacks. The physical activity component involved students in at least 30 minutes of moderate-to-vigorous intensity, daily physical activity and provided an opportunity for students to participate and practice skills in physical activities that could be carried over into other times of the day. The snack component involved students in the preparation of healthy snacks, discussion of food composition and sensory taste and evaluation. Results of the study were encouraging, with participants responding positively to the physical activity and snack components. An increase in the consumption of fruit and vegetables and an increase in moderate-to-vigorous physical activity were also seen at follow up (Kelder et al., 2004).

The *Stanford Girls Health Enrichment Multi-Site Studies (GEMS)* was an after-school program, which targeted 8- to 10-year old, African-American girls (Robinson et al., 2003). It was a 12-week randomised controlled trial involving 61 female participants who were overweight or had a family history of overweight. The intervention consisted of culturally specific dance sessions, offered five days a week, homework assistance, information sessions focusing on reducing small screen
viewing, an educational program that promoted healthy eating and physical activity participation and the START (Sisters Taking Action to Reduce Television) program which involved a female intervention expert attending the homes of each participant and budgeting television hours with the participant and their family. Results were positive; participants from the intervention group displayed trends toward lower BMI and waist circumference, increased physical activity, reduction in small screen viewing and a more positive body image (Robinson et al., 2003).

The Stanford SPORT Study aimed to reduce weight gain among children from a low socio economic background (Weintraub et al., 2008). It was a 6-month randomised controlled trial and involved 21 participants (mean age 9.9 yrs, BMI above the 85th percentile). The intervention involved physical activity sessions focusing on soccer initially three days per week, however at the request of participants and parents, this was extended to four days. The control group received 25 information based nutrition and health education sessions. The intervention group showed improvements in BMI z Score, self-esteem, time spent in moderate-to-vigorous physical activity and reduction in time spent in small screen recreation (Weintraub et al., 2008).

A summary of the above studies is provided in Table 1.
<table>
<thead>
<tr>
<th>Study</th>
<th>Design</th>
<th>Setting</th>
<th>Duration</th>
<th>Participant Details</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SPARK</strong> <em>(Sallis et al., 1993)</em></td>
<td>Single Faceted One size fits all</td>
<td>School-based 7 schools</td>
<td>2 years</td>
<td>n=244(Girls), n=305(Boys), Any weight, Mean age: 9.25</td>
<td>Decrease in BMI for the Intervention group, Increase in components of fitness</td>
</tr>
<tr>
<td><strong>Dance for Health</strong> <em>(Flores, 1995)</em></td>
<td>Single Faceted One size fits all</td>
<td>School-based</td>
<td>3 months</td>
<td>n=81 Boys and Girls, Any weight, Age: 10-13</td>
<td>Decreases in BMI and heart rate, Favourable changes in attitudes about physical activity</td>
</tr>
<tr>
<td><strong>Project Destiny</strong> <em>(Kyles &amp; Lounsbury, 2004)</em></td>
<td>Multifaceted</td>
<td>Community-based Camp</td>
<td>5 weeks</td>
<td>n=15(Girls) Non-athletic Age: 11-14</td>
<td>Increase in self perceived competence, Increased interest in sport, High level of enjoyment, Single sex setting well supported</td>
</tr>
<tr>
<td>Baranowski et al.,(2003)</td>
<td>Multifaceted Community-based Camp Internet</td>
<td>4 week camp 8 week internet intervention</td>
<td>8 week</td>
<td>n=38(Girls) African-American &gt;50th percentile BMI Mean Age: 8</td>
<td>Decrease in BMI for intervention group, No differences between control and intervention groups found for other outcomes</td>
</tr>
<tr>
<td>Beech et al., (2003)</td>
<td>Multifaceted Community-based Community centres</td>
<td>12 weeks</td>
<td>n= 60 (Girls) African-American &gt;25th percentile BMI Parents willing to be involved</td>
<td>Decreased BMI and waist circumference, Reduced consumption of sweetened beverages, Increased level of moderate-to-vigorous activity, Increased serving of water</td>
<td></td>
</tr>
<tr>
<td>Study</td>
<td>Interventions</td>
<td>Setting</td>
<td>Duration</td>
<td>Sample Size</td>
<td>Outcomes</td>
</tr>
<tr>
<td>-------------------------------------------</td>
<td>--------------------------</td>
<td>----------------------------------</td>
<td>---------------</td>
<td>-------------</td>
<td>--------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>HELPP</strong> <em>(Golley, 2005)</em></td>
<td>Multifaceted</td>
<td>Community-based</td>
<td>18 months</td>
<td>n=71 (Girls), n=40 (Boys), Age: 6-9</td>
<td>After 12 months: Reduction in BMI z Score and Waist circumference z Score in both intervention groups. Greater reduction in BMI and waist-circumference z Score in boys compared with girls.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Flinders Medical Centre &amp; Women's &amp; Children’s Hospital</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>FitKid Project</strong> <em>(Yin et al., 2005)</em></td>
<td>Multifaceted</td>
<td>After-school based</td>
<td>3 years</td>
<td>n=313 (Girls), n=288 (Boys), Mean Age: 8.7</td>
<td>After 12 months: A negative linear trend between level of attendance and change in % body fat and fat mass and Cardiovascular fitness.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>18 schools</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>CATCH Kids Club</strong> <em>(Kelder et al., 2004)</em></td>
<td>Multifaceted</td>
<td>After-school based</td>
<td>3 years</td>
<td>n=157</td>
<td>Positive responses to the physical activity and snack component of the program. Increased consumption of fruits and vegetables. Increased participation physical activity.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>16 schools</td>
<td></td>
<td>Boys and Girls, Mean Age: 9</td>
<td></td>
</tr>
<tr>
<td><strong>Stanford GEMS Pilot Study</strong> <em>(Robinson et al., 2003)</em></td>
<td>Multifaceted</td>
<td>After-school based</td>
<td>12 weeks</td>
<td>n=61 (Girls)</td>
<td>High satisfaction ratings Decreases in BMI and waist circumference Increases in physical activity Reduction in small screen viewing Positive body image</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 community centres</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Stanford SPORT Study</strong> <em>(Weintraub et al., 2008)</em></td>
<td>Single Faceted</td>
<td>After-school based</td>
<td>6 months</td>
<td>n=21</td>
<td>Reduced BMI z Scores Increase in participation in moderate-to-vigorous activity Decrease in small screen recreation Improvements in self esteem</td>
</tr>
</tbody>
</table>
While a number of the studies reviewed above report positive results, there are many limitations to these popular designs which may have potentially masked their results and therefore need to be addressed in future studies. Some of these limitations include: multifaceted designs (Baranowski et al., 2003; Beech et al., 2003; Golley et al., 2005; Kelder et al., 2004; Kyles & Lounsbery, 2004; Yin et al., 2005); 'one size fits all' interventions (Flores, 1995; Kelder et al., 2004; Sallis et al., 1993; Yin et al., 2005) and; highly resourced settings (Golley et al., 2005).

A variety of research into the prevention of childhood obesity necessitates multifaceted health promotion interventions that are more inclusive and diverse in their range of outcome indicators of effectiveness, generalisability and sustainability (Livingstone et al., 2006). However, there is controversy as to whether multifaceted interventions are in fact more effective than single faceted interventions in preventing and managing overweight and obesity. While it is evident that a combination of factors act together to place a child at risk of overweight (Davison & Birch, 2001), an intervention program concentrating on more than one predictor of obesity may in fact provide a less intense focus, thereby minimising the effect of the intervention. Furthermore, when one factor is the main focus of an intervention, it is common that other factors will be indirectly targeted, for example increasing physical activity may consequently reduce sedentary behaviours.

The National Health and Medical Research Council (NHMRC) recommend that prevention and intervention programs should incorporate a variety of settings (2003). Schools are the most common setting for prevention interventions (Cale & Harris, 2006), possibly due to the fact that students spend most of their time at school (Biddle,
Sallis and Cavil, 1998, cited in Mota et al., 2005). However most programs set within the school setting employ a 'one size fits all' model (i.e. identical programs are implemented for all students, independent of gender, age, perceived competence, fitness and weight status). Kyles and Lounsbery (2004) suggest that females in particular are intimidated and self-conscious when participating in co-educational physical activities and often chose not to participate. Furthermore, Storch et al. (2007) suggest that overweight and obese children, or those that have low physical perceived competence and fitness, are less comfortable about participating in physical activities with non-overweight children or with those whom have higher fitness. A targeted approach (i.e. targeting participants with low perceived or actual competence) may be a viable alternative.

Finally, obesity management and prevention programs set in highly resourced settings (e.g. hospitals (Golley et al., 2005) and clinics) are no doubt enhanced by the availability of facilities and experts facilitators (e.g. health professionals). However, these elements may compromise the generalisability and sustainability of such programs. Furthermore, highly resourced settings are generally busy places, often making it difficult and inconvenient for parents and their children to regularly attend such programs.

To address these limitations the Wollongong Sport Program was developed. The Wollongong Sport Program is a single-faceted physical activity and homework after-school program. The primary focus was physical activity, although by implementing the program in the 'critical window' immediately after-school, dietary intake and sedentary behaviours were indirectly addressed, as it is within this 'critical window' that
children commonly spend excessive time in sedentary behaviours and eating unhealthy
snacks (Naughton et al., 2005). Healthy snacks were also offered to participants prior to
participation in physical activity. Additionally, it employed a targeted approach,
involving girls 8- to 11-years of age, who were perceived by teachers to have low levels
of perceived, low levels of enjoyment of physical activity, or who were overweight and
obese.

The program was implemented at a school, which removed many of the parental
barriers to participation, such as transportation and needing to finish work early. The
program was also attractive to parents as it provided homework assistance and healthy
snacks. Additionally, the program was inexpensive to run utilising resources available
at the school. Such characteristics make the Wollongong Sport Program potentially
generalisable and sustainable.

Lastly, the Wollongong Sport Program involved a number of critical elements,
suggested by Robinson and Borzekowski (2006) needed in the creation of a successful
intervention for children. Within the Wollongong Sport Program, participants were
involved in fun, game-based activities and team sports that while challenging,
facilitated successful outcomes and enhanced participant development, enjoyment,
team-work, social interaction and sense of achievement. Participants were also given
choice and control within the program, with participants suggesting different activities
for the sessions. This provided participants with ownership over the program and
enhanced a sense of connectedness. Finally, participants were given small material
rewards to promote positive reinforcement, encourage team-work and effort and
manage behaviour (Robinson & Borzekowski, 2006).
Therefore the aim of this study was to test the feasibility, acceptability and potential efficacy of an after-school homework club and physical activity program (*Wollongong Sport Program*) on promoting psychosocial wellbeing among 8- to 11-year old girls who were overweight, obese or were perceived by teachers to have low levels of perceived physical competence.

### 2.5 THEORETICAL FRAMEWORK

A number of theoretical paradigms formulate the foundations for interventions which target obesity prevention in children and adolescence. Social Cognitive Theory (Bandura, 1986) is the central framework for this study as the model is well grounded in experimental research, provides directives for the production of behaviour change interventions, and has successfully guided after-school, behaviour interventions which focus on increasing physical activity as a method for obesity management (Rinderknecht & Smith, 2004).

Social Cognitive Theory (Bandura, 1986) is the most cited theoretical framework in weight management programs (Budd & Volpe, 2006). The theory provides a framework for understanding, predicting, and changing human behaviour. Bandura (1986) identifies human behaviour as an interaction of personal, behavioural and environmental factors. The triadic reciprocality model (Figure 1) illustrates this interaction.
The interaction between the personal and behavioural factors involves the influences of a person's thoughts and actions. The interaction between the personal and the environmental factors involves human beliefs and cognitive competencies that are developed and modified by social influences and structures within the environment. The third interaction, between the environmental and behavioural factors, involves a person's behaviour, determining the aspects of their environment and in turn how their behaviour is modified by that environment (Bandura, 1986).

Determinants identified within Social Cognitive Theory that have been found to be positively associated with physical activity among children and youth include self-efficacy (Bungum & Vincent, 1997), parental and peer influences (Trost, Kerr, Ward, & Pate, 2001), perceived benefits and barriers (Bungum & Vincent, 1997; Trost et al., 2001) and physical and environmental influences (Zakarian, Hovell, Hofstetter, Sallis & Keating, 1994). This framework suggests that an individual can summon self-efficacy, thoughtful motivation, planning, and action to simulate behaviour change. In conjunction with the psychological mechanism, environmental factors such as cultural,
social and community factors act to exert strong influences on self efficacy and affect behaviour change. Consequently, self efficacy is enhanced when congruency occurs between the individual and the social setting in which behaviour changes are sought (Kumanyika, 2004).

The Wollongong Sport Program promoted the personal-behavioural relationship by increasing fun, physical activity opportunities, providing healthy snack options and indirectly reducing sedentary behaviours through face-to-face physical activity sessions set in the ‘critical window’ of the after-school period.

The environmental and personal relationship was addressed through the observational learning of peers within the Wollongong Sport group and researchers from the University of Wollongong (UOW) who modelled physical activity and healthy lifestyles, by participating in physical activity sessions (Robinson & Borzekowski, 2006).

Finally, the Wollongong Sport Program encouraged the behavioural and environmental relationship in a multitude of ways. The program created opportunities for decision-making, problem solving and enjoyment through student-centred group physical activities, social interaction and group cohesion. It also encouraged parental support through showcase performances afternoons, and provided participants with support, recognition, achievement and encouragement from facilitators. These factors combined promoted behaviour change and self efficacy.
In summary, the Social Cognitive Theory is helpful for understanding and predicting both individual and group behaviour and identifying methods in which behaviour can be modified or changed. The theoretical underpinnings of the Social Cognitive Theory should act as an important scaffold in the design and implementation of prevention and intervention obesity programs.
CHAPTER III: METHODOLOGY

3.1 RESEARCH DESIGN

The promotion of psychosocial wellbeing among pre-pubescent girls: The Wollongong Sport Feasibility Trial was a single group, pre-test (baseline) post-test (follow up) design of experimental research.

The single group, pre-test post-test design was implemented to assess the feasibility, acceptability, and potential efficacy of an after-school homework club and physical activity program on promoting psychosocial wellbeing among 8- to 11-year old girls who were overweight, obese or perceived by teachers to have low levels of perceived physical competence. Data were collected before the commencement and at the completion of the 14-week program on the following variables: perceived competence, health related quality of life, Body Mass Index (BMI), BMI z Score waist circumference, and percent body fat. Process evaluations were also collected throughout the program and included participant enjoyment ratings for each session, facilitator reflections and attendance records. Other data collected in this study included cardiorespiratory fitness (20 meter shuttle run) and objectively measured physical activity (accelerometers), however, this data was not the focus of this thesis and therefore will not be reported, here, however is reported in the thesis entitled Preventing Unhealthy Weight Gain Through Physical Activity: The Second Feasibility Trial of the Wollongong Sport Program, an After-school Homework and Physical Activity Program for Pre-Pubescent Girls (Kelly, 2008).
3.2 SAMPLE SELECTION

3.2.1 SELECTION OF THE SCHOOL SITE

One primary government school in the Illawarra region of New South Wales was selected as the site of the program, as it's student population was large enough to draw the required number of participants. Additionally, it draws students from disadvantaged or Non-English Speaking backgrounds, which research suggests are at higher risk of overweight or obesity (Booth et al., 2007; Sanigorski et al., 2007; Booth et al., 2001) and the indoor and outdoor facilities satisfied the requirements of the program. The school was approached in late 2007, following successful implementation of a smaller feasibility trial earlier that year. Discussion with key stake holders about modifications to the program took place which drew conclusions based around extending the duration of the program, increasing the number of participants, including a wider variety of activities and developing independent homework activities. The school was then briefed on the amended program and accepted to host the Wollongong Sport Program again in 2008.

3.2.2 SELECTION OF THE PARTICIPANTS

Participants for the Wollongong Sport Program were 8- to-11 year old, female students who attended the host school. Through professional judgment of executive school staff, participants were identified based on having low levels of perceived competence, limited involvement in sporting or physical activities and on the belief of which students the program would be most effective and beneficial. Fifteen students were identified and information sheets and consent forms were sent to their parents (Appendix A).
Two pilot sessions were conducted prior to the commencement of the program to provide participants with an understanding of the nature of the program. Parental consent and student assent was attained from all 15 participants. In the first week of the program, one participant discontinued with the program due to a time clash with outside school sport. The remaining 14 participants completed the program.

3.3 INSTRUMENTATION/DATA COLLECTION AND ANALYSIS

The primary outcomes were perceived competence and health related quality of life. The secondary outcomes were: BMI; BMI z Score; waist circumference; and percentage body fat.

Baseline testing was performed on the 4/2/08 and the 6/2/08, and follow up testing was performed on the 19/5/08. Data for process evaluations were collected during every session from the 4/2/08 to 21/5/08.

The instrumentation used to measure the variables were:

- Self-Perception Profile for Children (Harter, 1985)
- Scales (weight and percentage body fat), stadiometers (height), non-extendable tape measures (waist circumference), body fat monitor (percentage body fat).
- Process Evaluations: facilitator reflections, participant enjoyment ratings and attendance records.

3.3.1 SELF-PERCEPTION PROFILE FOR CHILDREN

The Self-Perception Profile for Children (Harter, 1985) measures self-concept and perceived competence (Appendix B). This 36-item questionnaire is devised around six domains, each with six items (Harter, 1985):

- Scholastic competence: abilities within the realm of scholastic performance.
- Social acceptance: degree to which a child feels popular and accepted.
- Athletic competence: capabilities in sport and outdoor games.
- Physical appearance: degree to which someone feels about the way they look.
- Behavioural Conduct: degree to which someone likes the way they behave.
- Global Self Worth: extent to which someone likes oneself, it signifies a global judgement of one's worth as a person.

3.3.1.1 VALIDITY AND RELIABILITY OF THE SELF PERCEPTION PROFILE FOR CHILDREN

The Self-Perception Profile for Children is a widely used questionnaire for assessing self-esteem in youth (Muris, Meesters & Fijen, 2003). The validity of the Self-Perception Profile for Children has been established. The reliability, internal consistency, test re-test stability and validity of the Self-Perception Profile for Children has been reported (Muris et al., 2003). The internal consistency was acceptable with Cronbach's α ranging between 0.73 and 0.81 and the test re-test stability was good with correlation coefficients 0.84 or higher (Muris et al., 2003).
3.3.1.2 DATA COLLECTION

Participants were initially led through the first three items with the researcher who provided a step-by-step guide to answering the items to ensure participants understood the procedure. Firstly, the item was read aloud and respondents were asked to circle which child they were more like from the two options provided. Respondents then indicated whether the statement was ‘really true’ for them or only ‘sort of true’ for them and placed a cross in the corresponding box. Instructions for the administration of the Self-Perception Profile for Children were given to the facilitators to guide their proceedings (Appendix C). An example of an item from the Self-Perception Profile for Children is provided in Figure 2.

![Figure 2. An Example of an Item from the Self-Perception Profile for Children](image)

3.3.1.3 SCORING FOR THE SELF-PERCEPTION PROFILE FOR CHILDREN

Each item was scored using the Self-Perception Profile for Children scoring sheet. The scoring sheet corresponds each item in the questionnaire with a score from ‘1’ to ‘4’ (Appendix D). A score of ‘1’ indicated low perception of the participant’s competence, while a score of ‘4’ represented a high perception. An example of this scoring system is provided in Figure 3.
A mean score for each domain was determined by summing the scores in each domain and dividing by the number of items. An increase in scores from baseline to follow up indicated a positive result.

3.3.2 PEDSQL PEDIATRIC QUALITY OF LIFE INVENTORY

Measurements of participants health related quality of life were conducted using the PedsQL Pediatric Quality of Life Inventory Child Report (Ages 8-12), Version 4 (Appendix E) and the PedsQL Pediatric Quality of Life Inventory Parent Report for Children (Ages 8-12), Version 4 (Appendix F). Data were collected from participants (self-report) and their parents (proxy-parent report) to strengthen the reliability of the results (see section 3.3.1.1). Participants were asked to consider their own health related quality of life and the parents were asked consider their daughters health related quality of life.

Both the self-report and proxy-parent report questionnaires consist of 23-items that measure principal domains of health and were completed at baseline and follow up. The four domains on which questions are based include:
- Physical Functioning (PF)
- Emotional Functioning (EF)
- Social Functioning (SF)
- School Functioning (ScF)

Participants and parents were required to consider items, which may pose a problem for themselves or their daughters, respectively. For each item, respondents indicated the extent to which the situation described may have occurred, by circling, on a scale zero through to four: zero indicating never a problem and four indicating the item was almost always a problem. Figure 4 provides two example items from the PedsQL Child Report (Ages 8-12).

<table>
<thead>
<tr>
<th>How I get along with others (problems with...</th>
<th>Never</th>
<th>Almost Never</th>
<th>Sometimes</th>
<th>Often</th>
<th>Almost Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Other kids don’t want to be my friend</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>3. Other kids tease me</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

Figure 4. Example Items from PedsQL Pediatric Quality of Life Inventory Child Report (Ages 8-12) (Adapted from Varni, 1998)

3.3.2.1 VALIDITY AND RELIABILITY OF PedsQL

Health related quality of life has been acknowledged as an essential health outcome measure (Varni et al., 2007a). As delineated by the World Health Organisation (1948, cited in Varni et al., 2007a) instruments used to measure health related quality of life must be multidimensional, consisting of physical, psychological (including emotional and cognitive), and social health dimensions. Furthermore, parent and child health related quality of life instruments should measure the same constructs with parallel
items in order to make comparisons between self-and proxy-report more meaningful, with demonstrated feasibility, reliability and validity (Varni, Limbers & Burwinkle, 2007b). Parent-proxy and child-self report versions of the questionnaire are almost identical, and published US population normative data indicate high levels of internal consistency for both the self-report and parent-proxy report (Varni, Burwinkle, Seid & Skarr, 2003). The PedsQL child-report and parent-proxy report satisfies this criterion, thus it is a valid measure of health related quality of life.

The PedsQL report has also proven to be a reliable instrument with Varni et al. (2007b) reporting the majority of the child self-report scales across the age subgroups, including children as young as 5 years, exceeded the minimum internal consistency reliability standard of 0.70 required for group comparisons. Further the Total Scale Scores across the age subgroups approached or exceeded the reliability criterion of 0.90 recommended for analysing individual participant scale scores. Therefore it has been concluded that children as young as the 5 year old age subgroup can reliably and validly self-report their health related quality of life when given the opportunity to do so with an age-appropriate instrument (Varni et al., 2007b).

### 3.3.2.2 DATA COLLECTION

Immediately prior to data collection, an explanation of the questionnaire (emphasising that items were about how participants felt and what they thought about their own health) was given to participants. It was made clear that the questionnaire would remain confidential and that it was not a test and therefore there were correct answers.
Facilitators guided participants through the first three items and checked for understanding. Once facilitators felt participants understood how to answer the questionnaire, participants continued to read and respond to each item individually. Participants were aware that if they did not understand an item they could raise their hand and a facilitator would assist them.

At the conclusion of the baseline and follow up sessions, participants were given a copy of the PedsQL Pediatric Quality of Life Inventory Parent Report for Children, Version 4 to take home for their parents to complete. A letter explaining the purpose of the questionnaire, instructions on how to complete it and when it needed to be returned was also sent home with participants (Appendix G).

3.3.2.3 SCORING FOR THE PEDSQL

Items were reversed scored to a 0-100 scale: (0=100, 1=75, 2=50, 3=25, 4=0) then collated into four domains. To score each domain, the related items were tallied together (i.e. Physical Functioning (PF) – items 1-8 were tallied, Emotional Functioning (EF), Social Functioning (SF) and School Functioning (ScF) – items 9-13, 14-18, 19-23 were tallied, respectively).

The transformed score for each item in the respective domains were summed and then divided by the number of items answered in that domain. This provided a domain mean score out of 100. Two summary scores were also determined; a psychological health summary score (sum of the items divided by the number of items completed in the Emotional, Social and School Functioning domains) and a physical health score (sum of items divided by the number of items completed in the Physical Functioning
domain). Finally, a total summary score was determined by summing all items and dividing by the total number of items (n=23). A higher total score suggested a higher health related quality of life.

3.3.3 ANTHROPOMETRY

Anthropometric measures were conducted using the International Society for Advancement of Kinanthropometry (ISAK) procedures (ISAK, 2001). BMI was determined by measuring the height and weight of each participant. Weight was measured using Tanita BF-681 electronic bathroom scales (Tanita Corporation of America Inc, Illinois, USA) that had been calibrated prior to testing. Two weight readings were taken and recorded to the nearest 0.1kg. The height of each participant was measured, by two facilitators, using portable stadiometers (Mentone Educational Centre, Victoria, Australia) and the stretch stature method. Two readings were taken and recorded to the nearest 0.1cm. The average height and weight measurements were then used to calculate participants’ BMI using the following equation:

\[
\text{Body Mass Index (BMI)} = \frac{\text{Weight (kg)}}{\text{Height}^2 \text{ (m)}}
\]

Waist circumference was also collected as a measure of regional body fat distribution. Waist circumference was measured using steel tape measures at the mid point between the lower costal border and the iliac crest. Participants were asked to stand on a chair and face away from the facilitator, to ensure measurements were taken at the correct position. The tape measure was positioned under participants’ t-shirt in a horizontal position. The measurement was recorded when participants’ exhaled.
Percent body fat was measured using a Tantia Body Fat Monitor (Tanita Corporation of America Inc, Illinois, USA), which sends a low, safe electrical current through the body to assess body composition. The current passes freely through fluids contained in the muscle tissue but encounters resistance when passing through fat tissue. This resistance of the fat tissue to the current is termed ‘bioelectrical independence’ and when set against a person’s height and weight, the Body Fat Monitor can then compute a body fat percentage (Tantia Corporation, 1999).

All anthropometric measures were measured in a separate area away from other participants for privacy. Measurements were recorded on a anthropometric measurement sheet issued to each participant (Appendix H). Participants were asked to remove their shoes and socks and any heavy clothing prior to being measured. To enhance reliability of the data, facilitators measured the same variables at baseline and follow up. For example, facilitators measuring height at baseline also measured height at follow up.

3.3.4 PROCESS EVALUATION

Process evaluation data were collected throughout the Wollongong Sport Program. These consisted of participant enjoyment ratings, facilitator reflections and attendance records.
3.3.4.1 PARTICIPANT ENJOYMENT SCALES

At the conclusion of each session participants were required to evaluate the physical activities they had participated in by completing the enjoyment scale (Appendix I). These scales represented the extent to which participants enjoyed or did not enjoy the activities. Additional space was provided for participants to write comments and/or activity suggestions.

3.3.4.1.1 SCORING FOR PARTICIPANT ENJOYMENT SCALES

To score the enjoyment scales each option corresponded to a numerical value. 'Really Disliked' was given the value of '1' and 'Really Liked' was given a value of '4'. An example of the enjoyment scale and corresponding values is provided in Figure 5. Scores were tallied and averaged to ascertain activity and session enjoyment ratings. Further, scores for sessions with the same sport focus (for example volleyball) were collated and for each sport category a mean score was determined, providing information on the extent each sport category was enjoyed by participants.

<table>
<thead>
<tr>
<th>Really disliked</th>
<th>Disliked a little</th>
<th>Neither liked nor disliked</th>
<th>Liked a little</th>
<th>Really liked</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

Figure 5. Enjoyment Scales and Corresponding Numerical Values
3.3.4.2 FACILITATOR REFLECTIONS

At the completion of each session facilitators wrote a reflection of the session (Appendix J). These reflections include information on which participants were absent, description of homework and physical activities, feelings about what was successful, what was not successful and reasons why, thoughts on what could be improved, notes on the suitability and benefits of games, perceptions of enjoyment, reports of any adverse incidences that occurred, comments on participants behaviour and interaction and participant quotes.

3.3.4.2.1 CODING FOR FACILITATOR REFLECTIONS

These reflections were discussed between the researchers and their supervisors and were maintained as records to enable regular formative evaluation.

3.3.4.3 ATTENDANCE RECORDS

At the beginning of each session attendance was noted by a facilitator, in order to monitor intervention dose.

3.3.4.3.1 SCORING FOR ATTENDANCE RECORDS

At the completion of the program, average percent attendance for each participant was calculated, to determine whether the a priori criteria of 80% overall attendance, indicating acceptability, was met.
### 3.4 SUMMARY OF INSTRUMENTATION METHODS

A summary of the variables measured and instrumentation used is provided in Table 2.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Instrument</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived Competence</td>
<td>- Self Perception Profile for Children (Harter, 1985)</td>
</tr>
<tr>
<td>Health Related Quality of Life</td>
<td>- PedsQL Pediatric Quality of Life Inventory Child Report, Version 4 (Varri, 1998)</td>
</tr>
<tr>
<td></td>
<td>- PedsQL Pediatric Quality of Life Inventory Parent Report, Version 4 (Varri, 1998)</td>
</tr>
<tr>
<td>Anthropometry</td>
<td>- Height (Stadiometers)</td>
</tr>
<tr>
<td></td>
<td>- Weight (Tantia BF-681 scales)</td>
</tr>
<tr>
<td></td>
<td>- Waist Circumference (steel tape measure)</td>
</tr>
<tr>
<td></td>
<td>- Percent body fat (Tantia Body Fat Monitor)</td>
</tr>
<tr>
<td>Process Evaluations</td>
<td>- Participant Evaluation Ratings</td>
</tr>
<tr>
<td></td>
<td>- Facilitator Reflections</td>
</tr>
<tr>
<td></td>
<td>- Attendance Records</td>
</tr>
</tbody>
</table>
3.5 PROCEDURES

3.5.1 AUTHORISATION

Authorisation of this study was required from the following sources:

- The University of Wollongong Human Research Ethics Committee
- The New South Wales Department of Education and Training
- The participants and parents involved in the *Wollongong Sport Program*

3.5.1.1 UNIVERSITY OF WOLLONGONG HUMAN RESEARCH ETHICS COMMITTEE

Approval from the University of Wollongong Human Research Ethics Committee was sought to undertake research with primary school aged girls. The requirements established by this committee were satisfied and consequently approval was granted prior to the commencement of data collection (Appendix K).

3.5.1.2 NEW SOUTH WALES DEPARTMENT OF EDUCATION AND TRAINING

Approval for this study was also granted by the New South Wales Department of Education and Training (Appendix L). All requirements were satisfied prior to initial data collection.

3.5.1.3 PARTICIPANTS AND PARENTS

Active consent and assent was sought from parents and participants, respectively. Confidentiality of all data collected and any outcomes of the program were ensured to both participants and their parents. Information sheets and consent forms are shown in Appendix A as previously discussed in section 3.2.2.
3.5.2 INTERVENTION

The Wollongong Sport Program ran for 14 weeks over a two term period at the host school. Sessions were on Monday and Wednesday afternoon and ran for 1 hour and 45 minutes from 3.15-5.00pm. A schedule of a Wollongong Sport Program session is provided in Table 3.

Table 3. *Time Allocated Schedule for Each Session of the Wollongong Sport Program*

<table>
<thead>
<tr>
<th>Time Allocation</th>
<th>What was Achieved</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.45 - 3.15pm</td>
<td>- Facilitators arrived at the venue, prepared afternoon tea, filled participants drink bottles and began set up</td>
</tr>
</tbody>
</table>
| 3.15 - 3.30pm   | - Participants finished school and arrived at the meeting place
|                  | - Participants changed into *Wollongong Sport* t-shirt
|                  | - Attendance was collected
|                  | - Participants had an afternoon snack of fruit, vegetables and water and socialised with each other |
| 3.30 - 3.55pm   | - Completion of assigned homework with the assistance of facilitators |
| 3.55 - 4.55pm   | - Participation in physical activity |
| 4.55- 5.00pm    | - Participants complete session evaluations
|                 | - Parents collect their daughters |
3.5.2.1 THE WOLLONGONG SPORT PROGRAM

The Wollongong Sport Program was an after-school homework club and physical activity program aimed at facilitating inclusiveness, enjoyment and the building of self-esteem through participation in a range of different physical and team building activities. The program intended to promote physical activity and lifelong participation in physical activity, increase psychosocial wellbeing and provide academic support, healthy snacks were also provided. It comprised three components: a homework club, snack and physical activities: The homework club and physical activities are further detailed below.

3.5.2.1.1 HOMEWORK CLUB

Participants completed their prescribed homework or activities supplied by the facilitators. The activities supplied by facilitators included find-a-words and crosswords focusing on building caring relationships, positive body image and the benefits of physical activity; healthy food activities incorporating Information Communication Technology; various Sun Safe worksheets; problem solving activities; literacy and math worksheets and colouring in activities. An example of the homework is shown in Appendix M. Facilitators supplied some homework activities, because in 2007 (the preceding smaller feasibility study) many participants did not have homework and often ended up distracting those that did have homework. Each participant was provided with a folder in which they kept the homework they had completed.

3.5.2.1.2 PHYSICAL ACTIVITIES

Physical activities for the Wollongong Sport Program were game-based, challenging and facilitated successful outcomes. The main goal of each session was to involve
participants in moderate-to-vigorous intensity physical activity for the majority of the session. While many activities were competitive in nature (competition was between teams, never individual), a motivating factor for participants, no focus was placed on winning and loosing. Instead it was emphasised that competition created a challenging environment which enhanced participants’ development, enjoyment and team-work abilities.

Additionally, activities were conducted in an environment that promoted and encouraged social interaction and cooperation. While activities were not seemingly skill based, nor was focus placed on skills, most activities incorporated skill development. This was not an objective of the program, however, the development of skills and techniques was significant in breaking down barriers for participation. By providing a safe, encouraging environment where skills and techniques were developed through fun games and constructive feedback from facilitators, participants gained confidence in their abilities with the hope that they would be more inclined to be involved in sport and physical activity following completion of the program.

The 2008 Wollongong Sport Program focused on six different sport categories (compared to two in 2007). This not only maintained participant interest and motivation, but it exposed participants to a wide range of games and sports. Session plans were prepared for all sessions however these were slightly modified during the actual sessions to cater for the participants needs (Appendix N). Participants also shared some physical games they enjoyed playing in school. These games were taught to the facilitators who then incorporated them into the sessions. The planned activities of the 2008 Wollongong Sport Program are provided in Table 4.
<table>
<thead>
<tr>
<th>Week</th>
<th>Monday</th>
<th>Wednesday</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Team Building</td>
<td>Team Building</td>
</tr>
<tr>
<td>2</td>
<td>Orienteering</td>
<td>Orienteering</td>
</tr>
<tr>
<td>3</td>
<td>Invasion Games- Soccer</td>
<td>Invasion Games- Soccer</td>
</tr>
<tr>
<td>4</td>
<td>Invasion Games- Soccer</td>
<td>Invasion Games- Soccer</td>
</tr>
<tr>
<td>5</td>
<td>Invasion Games- Basketball</td>
<td>Invasion Games- Basketball</td>
</tr>
<tr>
<td>6</td>
<td>Invasion Games- Basketball</td>
<td>Invasion Games- Netball</td>
</tr>
<tr>
<td>7</td>
<td>Invasion Games- Netball</td>
<td>Invasion Games- Netball</td>
</tr>
<tr>
<td>8</td>
<td>Net/Court Game- Volleyball</td>
<td>Net/Court Games- Volleyball</td>
</tr>
<tr>
<td>9</td>
<td>Net/Court Games- Badminton</td>
<td>Net/Court Games- Badminton</td>
</tr>
<tr>
<td>10</td>
<td>Striking/Fielding- Cricket</td>
<td>Striking/Fielding- Tee ball</td>
</tr>
<tr>
<td>11</td>
<td>Striking/Fielding –Softball</td>
<td>Striking/Fielding - Softball</td>
</tr>
<tr>
<td>12</td>
<td>Dance</td>
<td>Dance</td>
</tr>
<tr>
<td>13</td>
<td>Dance</td>
<td>Dance</td>
</tr>
<tr>
<td>14</td>
<td>Dance</td>
<td>Dance</td>
</tr>
</tbody>
</table>
All activities were student directed, in particular the dance activities. In 2007 the dance section of the program involved a hip hop dance teacher, teaching participants a hip hop routine. This teacher-directed method only catered for participants with prior dance ability and as a result received the lowest score on the participant enjoyment ratings of all activities. In 2008, the approach was modified to be more student-directed. Facilitators taught participants basic steps and then passed over the creativity to participants to formulate their own dance. This method facilitated success for the following reasons: (1) participants were responsible for their own work and took pride in what they had accomplished and (2) participants created the movement and therefore were more than capable of performing it.

To promote positive reinforcement, encourage team-work and effort and manage behaviour, an award system was implemented. Each session, facilitators awarded three participants with a raffle ticket for good behaviour, excellent effort, team-work, and cooperation (see section 3.5.2.1.1). Raffle tickets were kept in participants’ folders and recorded by facilitators. Once participants received three raffle tickets they were offered a small prize (most of which promoted physical activity) such as skipping ropes, frisbees, elastics and balls etc (Appendix O). At the conclusion of the program, all participants were presented with a gift (Appendix O) and a certificate of participation in appreciation of their contribution to the study (Appendix P).

3.5.2.1.3 FACILITATORS OF THE WOLLONGONG SPORT PROGRAM

The two chief facilitators of the Wollongong Sport Program were the researchers involved in this study. Both were pre-service teachers in their fourth year of a Bachelor of Education (Physical and Health Education) and were responsible for the design,
development and implementation of the *Wollongong Sport Program*. A third facilitator was a fellow pre-service teacher completing a Bachelor of Education (Physical and Health Education). Their expertise assisted in the implementation of the program.

### 3.5.3 DATA ENTRY

Quantitative data (perceived competence, health related quality of life, anthropometry, enjoyment ratings and attendance) were entered into Microsoft Excel (version 11). Separate spreadsheets were created for baseline and follow up data. Confidentiality was ensured by assigning a study code to each participant prior to the entry of the collected data. Data were then transferred into SPSS Version 16 for data analysis.

### 3.6 STATISTICAL ANALYSIS

Descriptive statistics (mean, standard deviation) were calculated for all study variables. Dependent sample t-tests were calculated for all dependent variables (perceived competence, quality of life, BMI, BMI z Score, waist circumference and percent body fat) from baseline to follow up. Statistical significance was set at \( p < 0.05 \). All analyses were conducted using SPSS version 16.0 statistical software package.
CHAPTER IV: RESULTS

This study was conducted to determine the feasibility, acceptability and potential efficacy of an after-school homework club and physical activity program on promoting psychosocial wellbeing among 8- to 11-year old girls who were overweight, obese or perceived by teachers to have low levels of perceived competence. Results from data collected are reported in relation to the research questions that guided this investigation.

4.1 SAMPLE

The sample for this study consisted of 15 primary school girls aged between 8 and 11 years. Participants were identified by their school as having low levels of perceived physical competence, enjoyment of physical activity, or who were overweight and obese. Participants were selected by teachers as those for which the Wollongong Sport Program would hold the most benefit. All but one participant completed the 14 week program.

Table 5. Baseline Characteristics of Participants of the Wollongong Sport Program

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean (Standard Deviation)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>9.96 (0.6)</td>
</tr>
<tr>
<td>Height (cm)</td>
<td>138.73 (7.31)</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>40.07 (13.99)</td>
</tr>
<tr>
<td>BMI</td>
<td>20.57 (5.23)</td>
</tr>
<tr>
<td>BMI z Score</td>
<td>1.02 (1.41)</td>
</tr>
<tr>
<td>Waist Circumference (cm)</td>
<td>65.53 (12.97)</td>
</tr>
<tr>
<td>Percent Body Fat</td>
<td>27.08 (9.31)</td>
</tr>
</tbody>
</table>
Table 6 reports the proportion of the sample who were overweight or obese according to international BMI cut points (Cole et al., 2000).

Table 6. Proportion of Wollongong Sport Participants Classified as Overweight or Obese at Baseline

<table>
<thead>
<tr>
<th>Proportion</th>
<th>Number</th>
<th>% of Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overweight*</td>
<td>2</td>
<td>13</td>
</tr>
<tr>
<td>Obese*</td>
<td>4</td>
<td>27</td>
</tr>
<tr>
<td>Overweight/Obese*</td>
<td>6</td>
<td>40</td>
</tr>
</tbody>
</table>

(* Classified according to Cole et al., 2000)

4.2 RESEARCH QUESTIONS

Three research questions were the focus of the study:

1. Will the Wollongong Sport Program, after-school homework club and physical activity program be feasible?

2. Will the Wollongong Sport Program, after-school homework club and physical activity program be acceptable?

3. Will the Wollongong Sport Program after-school homework club and physical activity program be potentially efficacious?
4.3 RESEARCH QUESTION ONE

The first research question examined the feasibility of the Wollongong Sport Program. The criteria used to determine feasibility were recruitment, retention and the collection of outcome data (perceived competence, quality of life, BMI, BMI z Score (overweight and obese participants only), waist circumference and percentage body fat).

The first criterion was recruitment, with the objective to recruit 15 primary school girls from the one primary school. Through professional judgment by executive staff of the selected Illawarra Primary School, 15 students were identified, invited to participate, and were successfully recruited into the Wollongong Sport Program.

The second aspect of this research question considered the retention of participants in the program. The objective was to retain 90% of participants from baseline to follow up. Immediately after baseline testing and prior to the commencement of the program, one participant chose not to continue with the program due to conflicting afternoon programs. Consequently, all but one participant (93%) completed the 14-week program and follow up assessments. Therefore the objective of retaining 90% of participants was achieved successfully.

The third component of this research question focused on the collection of outcome data, with the aim being to collect all data from each participant at baseline and follow up. At baseline testing all participants were in attendance and completed all aspects of the data collection. Parent Pediatric Quality of Life questionnaires were successfully completed and returned during the following sessions. Similarly, for follow up testing,
all participants were again in attendance and completed all measurements. Parent Pediatric Quality of Life questionnaires were successfully completed and returned the following session. Therefore all baseline and follow up outcome data were successfully collected.

In summary, the Wollongong Sport Program successfully achieved all three criterions for establishing feasibility. Thus, the after-school homework club and physical activity program was deemed feasible.

4.4 RESEARCH QUESTION TWO

The second research question investigated the acceptability of the Wollongong Sport Program. To determine it’s acceptability, three criteria were established and examined: Implementation; attendance and enjoyment.

We suggested that we would be able to implement 100% of the intended sessions. Initially 28 sessions were planned, however one session fell on a public holiday and another on a staff development day, and thus students would not be attending school on those days. Consequently the number of sessions was reduced to 26. All 26 sessions were implemented as planned.

The second component of this research question focused on attendance with the aim to have an overall mean attendance rate of 80%. Twenty-two of the 26 sessions had an attendance rate above 80%. The lowest attendance rate for a session was 71%. The
rational for low attendance, can be attributed predominantly to participant illness, however, other reasons included, zone athletics carnival, zone cross country carnival, conflicting after-school programs (one participant was absent every second Wednesday due to netball training). Thus, reasons for participant absence were justifiable and bore no reflection upon the program, its activities or the facilitators. Regardless of these absences, the average attendance rate for the Wollongong Sport Program was 90%.

Attendance rates are shown in Table 7.

Table 7. Session Attendance from the Wollongong Sport Program

<table>
<thead>
<tr>
<th>Week</th>
<th>Attendance (%)</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Monday</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>86</td>
<td></td>
<td>100</td>
</tr>
<tr>
<td>2</td>
<td>93</td>
<td></td>
<td>86</td>
</tr>
<tr>
<td>3</td>
<td>93</td>
<td></td>
<td>79</td>
</tr>
<tr>
<td>4</td>
<td>93</td>
<td></td>
<td>100</td>
</tr>
<tr>
<td>5</td>
<td>100</td>
<td></td>
<td>86</td>
</tr>
<tr>
<td>6</td>
<td>100</td>
<td></td>
<td>86</td>
</tr>
<tr>
<td>7</td>
<td>100</td>
<td></td>
<td>93</td>
</tr>
<tr>
<td>8</td>
<td>Public Holiday</td>
<td></td>
<td>86</td>
</tr>
<tr>
<td>9</td>
<td>93</td>
<td></td>
<td>71</td>
</tr>
<tr>
<td>10</td>
<td>86</td>
<td></td>
<td>71</td>
</tr>
<tr>
<td>11</td>
<td>Staff Development Day</td>
<td>79</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>93</td>
<td></td>
<td>100</td>
</tr>
<tr>
<td>13</td>
<td>93</td>
<td></td>
<td>86</td>
</tr>
<tr>
<td>14</td>
<td>100</td>
<td></td>
<td>100</td>
</tr>
<tr>
<td>Mean Attendance</td>
<td>90</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The third aspect to this research question was concerned with participant enjoyment, with the objective being to receive a minimum average of three on a five-point scale. The average score for the entire *Wollongong Sport Program* was 4.2, suggesting that participants enjoyed the program. The mean enjoyment scores for each session and for the entire *Wollongong Sport Program* are presented in Table 8.
Table 8. *Mean Enjoyment Scores for Each Session and for the Overall Wollongong Sport Program*

<table>
<thead>
<tr>
<th>Day</th>
<th>Sport Category</th>
<th>No of 1 &amp; 2</th>
<th>No. of 3</th>
<th>No. of 4 &amp; 5</th>
<th>Mean Enjoyment Rating</th>
<th>% of 4 &amp; 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wed 6/2</td>
<td>Team Building</td>
<td>0</td>
<td>0</td>
<td>15</td>
<td>4.7</td>
<td>100</td>
</tr>
<tr>
<td>Mon 11/2</td>
<td>Team Building</td>
<td>6</td>
<td>7</td>
<td>31</td>
<td>4</td>
<td>70</td>
</tr>
<tr>
<td>Wed 13/2</td>
<td>Soccer</td>
<td>16</td>
<td>5</td>
<td>22</td>
<td>3.3</td>
<td>51</td>
</tr>
<tr>
<td>Mon 18/12</td>
<td>Dance</td>
<td>3</td>
<td>1</td>
<td>38</td>
<td>4.4</td>
<td>90</td>
</tr>
<tr>
<td>Wed 20/2</td>
<td>Dance</td>
<td>4</td>
<td>3</td>
<td>36</td>
<td>4.3</td>
<td>84</td>
</tr>
<tr>
<td>Mon 25/2</td>
<td>Dance</td>
<td>4</td>
<td>4</td>
<td>32</td>
<td>4.3</td>
<td>80</td>
</tr>
<tr>
<td>Wed 27/2</td>
<td>Dance</td>
<td>2</td>
<td>1</td>
<td>25</td>
<td>4.4</td>
<td>89</td>
</tr>
<tr>
<td>Mon 3/3</td>
<td>Dance</td>
<td>4</td>
<td>6</td>
<td>42</td>
<td>4.3</td>
<td>81</td>
</tr>
<tr>
<td>Wed 5/3</td>
<td>Dance</td>
<td>1</td>
<td>3</td>
<td>20</td>
<td>4.3</td>
<td>83</td>
</tr>
<tr>
<td>Mon 10/3</td>
<td>Dance</td>
<td>1</td>
<td>1</td>
<td>24</td>
<td>4.5</td>
<td>92</td>
</tr>
<tr>
<td>Wed 12/3</td>
<td>Dance</td>
<td>0</td>
<td>0</td>
<td>11</td>
<td>4.8</td>
<td>100</td>
</tr>
<tr>
<td>Mon 17/3</td>
<td>Soccer</td>
<td>15</td>
<td>6</td>
<td>49</td>
<td>3.8</td>
<td>70</td>
</tr>
<tr>
<td>Wed 19/3</td>
<td>Soccer</td>
<td>4</td>
<td>4</td>
<td>52</td>
<td>4.5</td>
<td>87</td>
</tr>
<tr>
<td>Wed 26/3</td>
<td>Basketball/Netball</td>
<td>5</td>
<td>11</td>
<td>32</td>
<td>4</td>
<td>67</td>
</tr>
<tr>
<td>Mon 31/3</td>
<td>Basketball/Netball</td>
<td>7</td>
<td>2</td>
<td>17</td>
<td>3.7</td>
<td>65</td>
</tr>
<tr>
<td>Wed 2/4</td>
<td>Basketball/Netball</td>
<td>4</td>
<td>1</td>
<td>35</td>
<td>4.4</td>
<td>88</td>
</tr>
<tr>
<td>Mon 7/4</td>
<td>Basketball/Netball</td>
<td>2</td>
<td>0</td>
<td>46</td>
<td>4.7</td>
<td>96</td>
</tr>
<tr>
<td>Wed 9/4</td>
<td>Basketball/Netball</td>
<td>0</td>
<td>0</td>
<td>40</td>
<td>4.9</td>
<td>100</td>
</tr>
<tr>
<td>Wed 30/4</td>
<td>Soccer</td>
<td>1</td>
<td>2</td>
<td>37</td>
<td>4.7</td>
<td>93</td>
</tr>
<tr>
<td>Mon 5/5</td>
<td>Volleyball</td>
<td>2</td>
<td>0</td>
<td>46</td>
<td>4.7</td>
<td>96</td>
</tr>
<tr>
<td>Wed 7/5</td>
<td>Volleyball</td>
<td>4</td>
<td>7</td>
<td>43</td>
<td>4.3</td>
<td>80</td>
</tr>
<tr>
<td>Mon 12/5</td>
<td>Volleyball</td>
<td>0</td>
<td>5</td>
<td>47</td>
<td>4.6</td>
<td>90</td>
</tr>
<tr>
<td>Wed 14/5</td>
<td>Volleyball</td>
<td>2</td>
<td>1</td>
<td>35</td>
<td>4.4</td>
<td>88</td>
</tr>
</tbody>
</table>

Program Mean 4.2

(1= really disliked, 2= disliked a little, 3= neither disliked or liked, 4= liked a little, 5= really liked)
Data from session evaluations allowed scores for each ‘sport’ category to be compiled with assumptions made about which ‘sport’ participants enjoyed the most. Data revealed a preference for Volleyball with a mean score rating of 4.5. The least enjoyed ‘sport’ was soccer, although still with a high rating of 4.1. With only 0.4 being the difference between the most and least enjoyed ‘sport’ it can be concluded that participants enjoyed all sport categories. The mean enjoyment scores for each sport category are detailed in Table 9.

<table>
<thead>
<tr>
<th>Sport Category</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Team Building/Orienteering</td>
<td>4.4</td>
</tr>
<tr>
<td>Dance</td>
<td>4.4</td>
</tr>
<tr>
<td>Soccer</td>
<td>4.1</td>
</tr>
<tr>
<td>Basketball/Netball</td>
<td>4.2</td>
</tr>
<tr>
<td>Volleyball</td>
<td>4.5</td>
</tr>
</tbody>
</table>

In summary, the *Wollongong Sport Program* was acceptable as all three criterions were met. One hundred percent of the intended sessions were implemented, average attendance rates were 10% above the minimum requirement of 80% and participant enjoyment scores averaged 4.2 exceeding the minimum requirement of three.
4.5 RESEARCH QUESTION THREE

The third research question investigated the potential efficacy of the *Wollongong Sport Program*. It was hypothesised that participants would demonstrate: (1) an increase in perceived competence; (2) an improvement in health related quality of life; and (3) a decrease or stability in BMI (all participants), BMI z Score (overweight and obese participants only), waist circumference and percent body fat.

This study, being a feasibility trial, was not adequately powered to detect statistically significant differences. Results however are impressive regardless of this small sample. Data analysis involved both primary and secondary analysis. Primary analysis was completed using data from all participants, while, the secondary analysis focused on data from participants classified as overweight or obese according to international cut-points (Cole et al., 2000).

4.5.1 PRIMARY ANALYSIS

Results for the entire sample were highly promising and indicated improvements in perceived competence from baseline to follow up, in all six domains, with four domains statistically significant (Table 10). The Child Reported Quality of Life results revealed statistically significant improvements in all four dimensions. These results were also found in the Parent Reported Quality of Life data and indicate improved participant quality of life from baseline to follow up following participation in the *Wollongong Sport Program*. All anthropometric outcomes decreased from baseline to follow up (Table 10).
Table 10. *Changes in perceived competence, quality of life, BMI, waist circumference and percent body fat for participants involved in the Wollongong Sport Program from baseline to follow up, and differences in outcomes (means ± standard deviation, t-value and \( P \) value)*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Baseline* (SD)</th>
<th>14 week Follow Up* (SD)</th>
<th>F/Up–B/L Difference</th>
<th>95% CI of Diff Lower</th>
<th>95% CI of Diff Upper</th>
<th>t Value</th>
<th>( P ) Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Perceived Competence</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Scholastic Competence</td>
<td>3.16 (0.72)</td>
<td>3.48 (0.71)</td>
<td>0.32</td>
<td>0.04</td>
<td>0.61</td>
<td>2.43</td>
<td>0.03</td>
</tr>
<tr>
<td>- Social Acceptance</td>
<td>3.37 (0.73)</td>
<td>3.55 (0.58)</td>
<td>0.18</td>
<td>-0.08</td>
<td>0.44</td>
<td>1.48</td>
<td>0.16</td>
</tr>
<tr>
<td>- Athletic Competence</td>
<td>3.43 (0.63)</td>
<td>3.77 (0.44)</td>
<td>0.35</td>
<td>0.05</td>
<td>0.64</td>
<td>2.50</td>
<td>0.03</td>
</tr>
<tr>
<td>- Physical Appearance</td>
<td>2.69 (1.17)</td>
<td>3.00 (0.95)</td>
<td>0.31</td>
<td>0.05</td>
<td>0.57</td>
<td>2.56</td>
<td>0.02</td>
</tr>
<tr>
<td>- Behavioural Conduct</td>
<td>3.29 (0.91)</td>
<td>3.49 (0.73)</td>
<td>0.20</td>
<td>-0.01</td>
<td>0.42</td>
<td>2.04</td>
<td>0.06</td>
</tr>
<tr>
<td>- Global Self Worth</td>
<td>3.13 (1.01)</td>
<td>3.43 (0.69)</td>
<td>0.30</td>
<td>0.06</td>
<td>0.57</td>
<td>2.66</td>
<td>0.02</td>
</tr>
<tr>
<td><strong>Quality of Life (Child)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Physical functioning</td>
<td>89.51 (7.41)</td>
<td>94.20 (5.60)</td>
<td>4.69</td>
<td>2.26</td>
<td>7.11</td>
<td>4.17</td>
<td>0.00</td>
</tr>
<tr>
<td>- Emotional Functioning</td>
<td>72.50 (18.79)</td>
<td>79.29 (15.55)</td>
<td>6.79</td>
<td>1.52</td>
<td>12.05</td>
<td>2.79</td>
<td>0.02</td>
</tr>
<tr>
<td>- Social Functioning</td>
<td>83.21 (17.05)</td>
<td>87.50 (13.69)</td>
<td>4.29</td>
<td>0.55</td>
<td>8.02</td>
<td>2.48</td>
<td>0.03</td>
</tr>
<tr>
<td>- School Functioning</td>
<td>77.50 (12.21)</td>
<td>87.14 (8.25)</td>
<td>9.64</td>
<td>3.71</td>
<td>15.58</td>
<td>3.51</td>
<td>0.00</td>
</tr>
<tr>
<td><strong>Quality of Life (Parent)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Physical functioning</td>
<td>74.33 (22.14)</td>
<td>91.74 (10.44)</td>
<td>17.41</td>
<td>7.48</td>
<td>27.34</td>
<td>3.79</td>
<td>0.00</td>
</tr>
<tr>
<td>- Emotional Functioning</td>
<td>73.93 (14.17)</td>
<td>84.29 (13.99)</td>
<td>10.36</td>
<td>3.52</td>
<td>17.19</td>
<td>3.27</td>
<td>0.01</td>
</tr>
<tr>
<td>- Social Functioning</td>
<td>78.57 (22.31)</td>
<td>89.64 (12.48)</td>
<td>11.07</td>
<td>3.21</td>
<td>18.93</td>
<td>3.04</td>
<td>0.01</td>
</tr>
<tr>
<td>- School Functioning</td>
<td>72.86 (24.47)</td>
<td>86.79 (13.81)</td>
<td>13.93</td>
<td>4.44</td>
<td>23.41</td>
<td>3.17</td>
<td>0.01</td>
</tr>
<tr>
<td><strong>BMI (kg/m^2)</strong></td>
<td>20.57 (5.23)</td>
<td>20.44 (4.96)</td>
<td>-0.14</td>
<td>-0.55</td>
<td>0.27</td>
<td>0.72</td>
<td>0.48</td>
</tr>
<tr>
<td><strong>Waist Circumference (cm)</strong></td>
<td>65.53 (12.97)</td>
<td>64.21 (11.54)</td>
<td>-1.32</td>
<td>-2.74</td>
<td>0.10</td>
<td>2.02</td>
<td>0.07</td>
</tr>
<tr>
<td><strong>Percentage Body fat</strong></td>
<td>27.08 (9.31)</td>
<td>26.83 (9.19)</td>
<td>-0.25</td>
<td>-1.09</td>
<td>0.60</td>
<td>0.63</td>
<td>0.54</td>
</tr>
</tbody>
</table>

*Baseline results for 15 participants, 14 week follow up results for 14 participants*
4.5.2 SECONDARY ANALYSIS

Results for the overweight and obese participants are reported in Table 11. Increases were found in all domains except for social acceptance, the largest being global self worth (mean improvement 0.36 units [95% CI, -0.01 to 0.73]). The Child Reported Quality of Life results revealed small improvements in all four dimensions whilst the Parent Reported Quality of Life results showed statistically significant improvements in all four dimensions (Table 11). Anthropometric results for the overweight and obese participants revealed a small decrease in BMI, BMI z Score, waist circumference and percent body fat from baseline to follow up (Table 11).
Table 11. Changes in perceived competence, quality of life, BMI, BMI z Score, waist circumference and percent body fat for overweight and obese participants involved in the Wollongong Sport Program from baseline to follow up, and differences in outcomes (means ± standard deviation, t-value and P value)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Baseline* (SD)</th>
<th>14 week Follow Up* (SD)</th>
<th>F/Up-B/L Difference</th>
<th>95% CI of Diff</th>
<th>t Value</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived Competence</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Scholastic Competence</td>
<td>3.11 (0.54)</td>
<td>3.44 (0.64)</td>
<td>0.33</td>
<td>-0.39</td>
<td>1.06</td>
<td>1.18</td>
</tr>
<tr>
<td>- Social Acceptance</td>
<td>3.53 (0.65)</td>
<td>3.39 (0.62)</td>
<td>-0.14</td>
<td>-0.42</td>
<td>0.14</td>
<td>1.27</td>
</tr>
<tr>
<td>- Athletic Competence</td>
<td>3.39 (0.68)</td>
<td>3.56 (0.63)</td>
<td>0.17</td>
<td>-0.18</td>
<td>0.52</td>
<td>1.23</td>
</tr>
<tr>
<td>- Physical Appearance</td>
<td>2.39 (1.05)</td>
<td>2.69 (0.95)</td>
<td>0.31</td>
<td>-0.19</td>
<td>0.81</td>
<td>1.57</td>
</tr>
<tr>
<td>- Behavioural Conduct</td>
<td>3.36 (0.51)</td>
<td>3.47 (0.53)</td>
<td>0.11</td>
<td>-0.28</td>
<td>0.50</td>
<td>0.73</td>
</tr>
<tr>
<td>- Global Self Worth</td>
<td>2.78 (1.08)</td>
<td>3.14 (0.86)</td>
<td>0.36</td>
<td>-0.01</td>
<td>0.73</td>
<td>2.48</td>
</tr>
<tr>
<td>Quality of Life (Child)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Physical functioning</td>
<td>91.15 (7.76)</td>
<td>93.75 (5.23)</td>
<td>2.60</td>
<td>-2.22</td>
<td>7.43</td>
<td>1.39</td>
</tr>
<tr>
<td>- Emotional functioning</td>
<td>80.00 (8.94)</td>
<td>80.83 (13.20)</td>
<td>0.83</td>
<td>-6.14</td>
<td>7.81</td>
<td>0.31</td>
</tr>
<tr>
<td>- Social functioning</td>
<td>84.17 (22.45)</td>
<td>86.67 (17.22)</td>
<td>2.50</td>
<td>-4.73</td>
<td>9.73</td>
<td>0.90</td>
</tr>
<tr>
<td>- School functioning</td>
<td>85.00 (8.37)</td>
<td>89.17 (4.92)</td>
<td>4.17</td>
<td>-0.99</td>
<td>9.33</td>
<td>2.08</td>
</tr>
<tr>
<td>Quality of Life (Parent)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Physical functioning</td>
<td>67.71 (27.93)</td>
<td>91.67 (10.94)</td>
<td>23.96</td>
<td>4.54</td>
<td>43.38</td>
<td>3.17</td>
</tr>
<tr>
<td>- Emotional functioning</td>
<td>76.67 (12.52)</td>
<td>91.67 (7.53)</td>
<td>15.00</td>
<td>2.58</td>
<td>27.42</td>
<td>3.11</td>
</tr>
<tr>
<td>- Social functioning</td>
<td>71.67 (27.33)</td>
<td>88.33 (16.93)</td>
<td>16.67</td>
<td>1.58</td>
<td>31.75</td>
<td>2.84</td>
</tr>
<tr>
<td>- School functioning</td>
<td>66.67 (31.89)</td>
<td>88.33 (16.93)</td>
<td>21.67</td>
<td>1.30</td>
<td>42.03</td>
<td>2.74</td>
</tr>
<tr>
<td>BMI (kg/m²)</td>
<td>25.72 (3.74)</td>
<td>25.50 (2.85)</td>
<td>-0.21</td>
<td>-1.24</td>
<td>0.81</td>
<td>0.54</td>
</tr>
<tr>
<td>BMI z Score</td>
<td>2.47 (0.56)</td>
<td>2.41 (0.45)</td>
<td>-0.07</td>
<td>-0.21</td>
<td>0.08</td>
<td>1.19</td>
</tr>
<tr>
<td>Waist Circumference</td>
<td>77.92 (9.57)</td>
<td>75.8 (7.1)</td>
<td>-2.12</td>
<td>-5.32</td>
<td>1.09</td>
<td>1.69</td>
</tr>
<tr>
<td>Percentage Body Fat</td>
<td>36.49 (5.38)</td>
<td>36.24 (3.97)</td>
<td>-0.25</td>
<td>-1.80</td>
<td>1.30</td>
<td>0.41</td>
</tr>
</tbody>
</table>

*Baseline results for 15 participants, 14 week follow up results for 14 participants
In summary, these results are encouraging considering the small sample size. The study was not adequately powered to produce statistically significant differences, however, many of the results relating to perceived competence and quality of life were statistically significant. All hypotheses were fulfilled with promising results establishing the potential efficacy of the after-school homework club and physical activity program.

4.6 SUMMARY

This study aimed to determine the feasibility, acceptability and potential efficacy of an after-school homework club and physical activity program in promoting psychosocial wellbeing among 8- to 11- year old girls who were overweight, obese or perceived by teachers as having low levels of perceived physical competence. Results obtained are summarised in Table 12.
Table 12. A Summary of Results

<table>
<thead>
<tr>
<th>Research Question</th>
<th>Results</th>
</tr>
</thead>
</table>
| (1) Will the after-school homework club and physical activity program be feasible? | - Recruitment: 15 participants were successfully recruited.  
- Retention: 14 participants were retained from baseline to follow up.  
- Collection of outcome data: All data, including parent-proxy report quality of life, were collected at baseline and follow up |
| (2) Will the after-school homework club and physical activity program be acceptable? | - Implementation: All 26 intended sessions  
- Attendance: Average attendance rate of 90% achieved.  
- Enjoyment: Average enjoyment rating for sessions was of 4.2. |
| (3) Will the after-school homework club and physical activity program be potentially efficacious? (Primary Analysis) | - Perceived Competence: An increase in all six domains, four of which are statistically significant.  
- Quality of Life (Child-Reported): Statistically significant improvements in all four dimensions.  
- Quality of Life (Parent-Reported): Statistically significant improvements in all four dimensions.  
- BMI: Small reduction achieved.  
- Waist Circumference: Small reduction achieved.  
- Percent body fat: Small reduction achieved. |
(3) Will the after-school homework club and physical activity program be *potentially* efficacious? (Secondary Analysis)

- Perceived Competence: Slight increases in five of six domains. A slight decrease occurred in social acceptance.

- Quality of Life (Child Reported): Small improvements in all four dimensions.

- Quality of Life (Parent Reported): Statistically significant improvements in all four dimensions.

- BMI: Small reduction achieved.

- BMI z Score: Small reduction achieved.

- Waist Circumference: Small reduction achieved.

- Percent Body Fat: Small reduction achieved.
CHAPTER V: DISCUSSION

The outcomes of this study provide results pertaining to the feasibility, acceptability and potential efficacy of an after-school homework club and physical activity program among 8- to 11-year old girls who are overweight, obese or perceived by teachers to have low levels of perceived competence. This chapter will summarise the main findings of the study, make comparisons where possible with similar studies (i.e. after-school programs), explain the findings against the backdrop of current literature and provide recommendations for future after-school-based programs. As throughout this thesis, the discussion will follow the structured format outlined in the CONSORT Statement (Altman et al., 2001).

5.1 RESEARCH QUESTIONS AND HYPOTHESES

The first research question addressed whether the Wollongong Sport Program, an after-school homework club and physical activity program, would be feasible? It was hypothesised that:

**H1.** 15 participants would be recruited to the Wollongong Sport Program.

**H2.** 90% of participants recruited would be retained.

**H3.** All baseline and follow up data would be successfully collected.

The second research question addressed whether the Wollongong Sport Program, an after-school homework club and physical activity program, would be acceptable? It was hypothesised that:

**H4.** All sessions (26) would be implemented.

**H5.** An overall mean attendance rate of 80% would be achieved.
H6. Participants would demonstrate a high level of enjoyment and satisfaction with the program.

The third research question addressed whether the Wollongong Sport Program, an after-school homework club and physical activity program, would be potentially efficacious? It was hypothesised that:

H7. An increase in perceived competence would be achieved.
H8. An improvement in health related quality of life would be achieved.
H9. A decrease or stability in BMI, BMI z Score (overweight and obese participants only), waist circumference and percent body fat would be achieved.

5.1.1 RESEARCH QUESTION ONE

5.1.1.1 KEY FINDINGS

Fifteen participants were successfully screened and recruited. Almost all participants (14/15) who started the program completed the program (93% retention). All outcome data were successfully collected at baseline and follow up.

5.1.1.2 COMPARISONS WITH OTHER STUDIES

Few health behaviour intervention studies report recruitment and retention rates and the percentage of data collected (Borelli et al., 2005). This type of data is invaluable in informing the design, development and implementation of larger scale studies.

Recruitment and Retention

Two studies that report recruitment and retention rates were identified. Stanford SPORT was an after-school study that aimed to reduce weight gain among children from low socio-economic backgrounds (Weintraub et al., 2008) (see section 2.4).
They recruited 21 overweight and obese children and implemented the program at a school site. They employed a number of recruitment strategies, including flyers and physician referrals. Similar to the *Wollongong Sport Program*, recruitment was largely a result of school referrals. Both *Stanford SPORT* and the *Wollongong Sport Program* had over 90% retention at follow up. These high retention rates could be attributed to the intervention being held on school site and implementation of programs that provided opportunities for social interactions and success, which fosters individuals' perceived physical competence.

Similarly, *Stanford GEMS*, an after-school program for 8- to 10-year old African-American girls (see section 2.4), reported exceeding recruitment goals and high retention rates from baseline to follow up with only a 1.6% loss of participants (Robinson et al., 2003). The suggested reasons for these successes were the formative research and piloting processes in the districts where participants were recruited from. This provided researchers with a greater understanding of participants and their families, and what factors would encourage and motivate participation (Robinson et al., 2003). Similarly, *Wollongong SPORT* (Ryan, 2007) was piloted as a feasibility trial in 2007, thus researchers were also familiar with the environment, which may have contributed to high recruitment and retention rates.

**Collection of Data**

No studies implemented in the after-school time period have reported the amount of data collected. Sallis et al. (1993) reported some aspects of data collection (i.e. missing data) in their school-based study *SPARK* (see section 2.4). *SPARK* was a two-year randomised controlled study aimed at promoting physical activity. Height, weight and skin fold measures were collected on 740 children at baseline but only 549 at follow up (74%). Sallis et al. (1993) do not provide reason for missing data.
One study that did address issues regarding data collection was the *APPLE Project* (Taylor et al., 2006). The *APPLE Project* was a community-based randomised controlled trial that aimed to engage and expose 5- to 12-year old children to lifestyle-based activities and non-traditional sports in extra-curricular time during school, after-school and during vacations. Baseline data were collected for 513 children, however follow up data were collected from only 384 children. From baseline to follow up (380 days) three children withdrew from the study, 17 moved away and the remainder left primary school to attend high school. In comparison to *SPARK* (Sallis et al., 1993) and the *APPLE Project* (Taylor et al., 2006), 100% of data were collected in the *Wollongong Sport Program*. This may be attributable to participants remaining at the host school and in the program and the short duration of the program (14-weeks). Further, follow up measurements were taken during the last session of the *Wollongong Sport Program*, which meant participants were not required to attend additional assessment sessions.

5.1.1.3 MECHANISMS AND EXPLANATIONS

Recruitment

The successful recruitment for the *Wollongong Sport Program* may be the result of a number of factors. First, the program was appealing to parents as it was conducted on school site immediately after the conclusion of school. This removed the need for parents to finish work early or organise transport for their child. The program was also attractive to parents as it provided homework assistance and healthy snacks. Second, the two pilot sessions conducted prior to the commencement of the *Wollongong Sport Program* provided participants with an opportunity to experience the program and the activities in the program. Lastly, the program had a positive reputation within the school and was well promoted among executive staff due to
the success of a smaller feasibility trial conducted in 2007 (Ryan, 2007). As a result, staff were enthusiastic to support and recruit their students into the *Wollongong Sport Program* in 2008.

*Retention*

Similarly a number of factors possibly contributed to the high retention rates. The *Wollongong Sport Program* gave participants choice and input into the program. At the conclusion of each session participants were asked to evaluate the session and suggest activities or games they would like to play in the following sessions (see sections 2.5.2.1.2 & 3.3.5.1). Facilitators reviewed these evaluations and where appropriate modified session programs to include these activities. This not only ensured participants enjoyed the program but provided them with some input and ownership of the program (Robinson & Borzekowski, 2006). Additionally, all activities were game-based and focused on enjoyment of physical activity rather than the development of skills. Participants commented that they wanted the program to be on every afternoon, instead of just the two designated afternoons, suggesting that they were happy to attend the program.

"How come this is only on Mondays and Wednesday, I want it to be everyday" (*Wollongong Sport Program* Participant A, 2008).

High retention rates may also be attributable to the safe physical activity environment created throughout the program. This fostered social interaction through the use of fun, team-building activities and games. The use of a targeted approach (i.e. all participants were female, overweight or obese or had low perceived competence, (see section 3.2.3)) possibly also contributed to this safe environment. Employing a targeted approach meant that teasing and peer
victimisation from normal weight and male peers was eliminated, thus fostering participation, enjoyment and retention (Kyles & Lounsbery, 2004; Storch et al., 2006)

Collection of Data

Facilitators were responsible for collection of baseline and follow up data, as well as facilitating the weekly program. Limited time was allocated for the data collection, which meant that facilitators needed to be highly organised before the assessment session. To ensure that all data were collected, facilitators were trained in data collection procedures and nominated what data each facilitator would collect prior to the assessment sessions. Additionally, data collection sheets and a running schedule were developed.

Throughout the assessment sessions, data were collected in a sensitive manner (i.e. measurements were taken away from other participants), thereby ensuring privacy and reducing participants' measurement apprehension. Participants may have been more willing to complete the measurements, as they knew that their peers could not see their data. Additionally, the rapport that facilitators had with participants throughout the program may have eased their apprehension towards the measurements and therefore they were happy to complete all measurements.

Finally, data was collected in the allocated afternoon sessions. This meant that parents were not inconvenienced and it was easy for them to return the Parent-Proxy Report Health Related Quality of Life questionnaire.
5.1.2 RESEARCH QUESTION TWO

5.1.2.1 KEY FINDINGS

One hundred percent of the planned sessions were implemented. Mean attendance was 90% with an overall enjoyment rating of 4.2 out of 5.

5.1.2.2 COMPARISONS WITH OTHER STUDIES

Fidelity data, such as implementation and attendance rates and enjoyment ratings are a valuable adjunct to main outcome data and provide information about quality and quantity of a delivered intervention, the reach and external factors to the program that may compete with the program effect (McGraw et al., 1996; Steckler & Linnan, 2002).

Implementation

To the best of our knowledge, no other after-school study has reported implementation rates as we have in this study. Although, implementation rates were not reported, two studies, (CATCH Kids Club and FitKid) that commented on aspects affecting implementation were identified. In CATCH Kids Club, implementation of sessions was adversely affected by staff turn-over and staff absenteeism (Kelder et al., 2004). The CATCH Kids Club was an after-school physical activity and nutrition program implemented by CATCH Kids Club-trained program facilitators and after-school program staff (Kelder et al., 2004) (see section 2.4). High staff turn-over (35%) and absenteeism due to the additional workload associated with the program was reported. The high turn-over and the absence of staff directly affected the implementation of the program. In comparison, all sessions were implemented in the Wollongong Sport Program. The length of the
program (i.e. 14 weeks) and the fact that facilitators attended all sessions ensured implementation. Further, an additional third facilitator was employed to assist with facilitation.

The Medical College of Georgia FitKid Project was a three-year after-school randomised controlled trial which aimed to increase time spent in physical activity and the consumption of healthy foods (Yin et al., 2005) (see section 2.4). This study did not report implementation rates, nor comment on specific factors affecting implementation, however, Yin et al. (2005) notes that the FitKid Project ensured facilitators remained interested in the program by reducing the time commitment, requiring only two facilitators per session, consequently ensuring successful implementation was achieved.

Attendance

Attendance rates were reported for two after-school programs: Stanford GEMS (Robinson et al., 2003) and the FitKid (Yin et al., 2005). Similar to the Wollongong Sport Program, Stanford GEMS ran twice a week at one school site. However, unlike the Wollongong Sport Program, participants were from several schools and required transportation to the study school, which significantly impacted their attendance rates. A 70% attendance rate was achieved when transport was provided and a 30% attendance rate when there was no transportation (Robinson et al., 2003).

The FitKid Project (Yin et al., 2005) was conducted five afternoons per week for eight months and had a mean attendance rating of 49%. This was significantly less than that reported for the Wollongong Sport Program. The frequency (i.e. five times a week) and length (i.e. eight months) of the Fitkid Project were approximately double that of the Wollongong Sport Program. Maintaining high attendance for
longer and more intense programs is likely to be more difficult. Perhaps the length and intensity of the *Wollongong Sport Program* is appropriate to maintain high attendance rates.

**Enjoyment**

Enjoyment is a major motive for pre-teen girls to participate in physical activity (Kyles & Lounsbery, 2004). *Project Destiny* and *Stanford GEMS* were two studies that reported enjoyment ratings. *Project Destiny* (Kyles & Lounsbery, 2004) (see section 2.4), was a five-week physical activity intervention for non-athletic, pre-teen females. Participants reported high levels of enjoyment and satisfaction (no numerical data reported), which were attributed to the single sex group and the diversity of the games (Kyles & Lounsbery, 2004). Similarly, for the *Wollongong Sport Program*, the single sex group and the implementation of fun games and physical activities were likely to be factors influencing enjoyment and satisfaction ratings. *Stanford GEMS* also reported high enjoyment and satisfaction ratings (Robinson et al., 2003). Like *Project Destiny*, no quantitative data were reported for the enjoyment ratings for *Stanford GEMS*. Robinson et al. (2003) attributed the high enjoyment ratings to the dance-based activities. Participants were also given the opportunity to choose some of the activities for the program which may have contributed to high enjoyment ratings. This may have also been true for the *Wollongong Sport Program* (see section 3.5.2.1.2).

**5.1.2.3 MECHANISMS AND EXPLANATIONS**

**Implementation**

The ability to implement all 26 sessions is predominantly attributed to the indoor and outdoor facilities of the school site. These facilities enabled all sessions to be conducted regardless of weather. However, high implementation rates may also be
attributable to the fact that the length and intensity of the *Wollongong Sport Program* were not as arduous as other studies and the dedication and professionalism of facilitators, who were able to improvise activities to accommodate adverse weather.

*Attendance*

A number of factors were identified that may have contributed to the high attendance rates. First, as the program was run at a school site, attendance was not dependant on the availability and willingness of parents to transport their children to and from the study site. Second, participants only had to commit to two afternoons per week which meant that they could still partake in other co-curricular activities on the remaining three afternoons. Third, participants belonged to a 'group' or 'community' where they could participate in physical activity without being ridiculed or bullied by peers. At the beginning of the program participants were given two *Wollongong Sport* t-shirts (Appendix Q), a hat and drink bottle to encourage the sense of community and belonging. Participants and facilitators wore the t-shirts and hats at each session. A sense of community and a feeling of belonging no doubt enhanced attendance.

On occasions attendance was lower than expected, however external factors, as previously mentioned (see section 4.4) such as illness and school carnivals were reasons given by participants to explain their absence. These were outside of facilitators' control, justifiable and bore no reflection upon the program, its activities or the facilitators.
Enjoyment

To ensure participant enjoyment, activities within the *Wollongong Sport Program* were age-appropriate, fun, engaging and student-directed (Robinson & Borzekowski, 2006). Additionally, as previously discussed (see section 5.1.1.3) participants were given choice of activities. The dance component demonstrates this: facilitators taught basic dances steps to all participants. Participants, in groups of four choreographed a dance routine (i.e. choice). Each group then taught their own routine to other participants (i.e. student-directed). Each routine was then combined to make a complete dance routine. Participants were responsible for their own work, took pride in their dance routines and at the end of the program performed the dance for their families. As a result, dance had an average enjoyment rating of 4.4 (out of 5).

Additionally, the variety of activities in the program may have contributed to the enjoyment ratings. The *Wollongong Sport Program* focused on six different sport categories, which exposed participants to a wide range of games or sports, thereby maintaining participant interest, engagement and motivation. Furthermore, the use of innovative equipment (e.g. beach balls, balloons, water bombs and foam treasure hunt letters) and visual stimulants may have also contributed to participants' enjoyment and increase the appeal of the activities.

5.1.3 RESEARCH QUESTION THREE

5.1.3.1 KEY FINDINGS

For the entire sample (i.e. primary analysis) results indicated a trend toward improved perceived competence with improvements in all six domains and statistically significant improvements in all four dimensions of quality of life (both
parent- and child-reported). Similarly, for the overweight and obese sub-sample (secondary analysis) results demonstrated an increase in five of the six perceived competence domains and improvements in all four dimensions of quality of life (both parent- and child-reported).

BMI, BMI z Score (overweight and obese participants only), waist circumference and percent body fat decreased from baseline to follow up for both the entire sample and the sub-sample (i.e. primary and secondary analyses, respectively).

5.1.3.2 COMPARISONS WITH OTHER STUDIES

Perceived Competence

One after-school program was identified that reported changes in perceived competence using the Self-Perception Profile for Children (Harter, 1985) (see section 3.3.2). SHARK, (Skills, Honing and Active Recreation for Kids) was a 10-week community-based physical activity motor development after-school program for overweight and obese children (Cliff, Wilson, Okely, Mickle & Steele, 2007). Similar to the Wollongong Sport Program, results showed improvements in perceived competence in all domains with statistically significant results for athletic competence (P=0.05) and global self esteem (P=0.046).

Two other studies that also reported perceived competence using Self-Perception Profile for Children (Harter, 1985) were identified. Perceived competence was measured by Sahota et al. (2007) in a school-based intervention involving 634, 7- to 11-year old children from 10 primary schools. They reported a small increase in global self-worth for obese children in the intervention schools (P= 0.32). Similarly, in a six-week weight loss summer camp for overweight and obese children (mean age 13.9 years) global self worth improved from baseline to follow up (Gately,
Cooke, Barth, Bewick, Radley & Hill, 2005). In comparison, the *Wollongong Sport Program* saw improvements in all domains of perceived competence for all participants and the overweight and obese participants.

**Quality of Life**

To the best of our knowledge, only one weight prevention study targeting children, report changes in quality of life. Fullerton, Tyler, Johnston, Vincent, Harris and Foreyt (2007) aimed to evaluate quality of life in overweight or at risk of overweight children after a six-month weight management intervention. Participants were randomised into an instructor-led intervention or a self-help group. The instructor-led intervention included daily participation for 12 weeks in a school-based program comprising nutrition education, physical activity, and behaviour modification, followed by ongoing monthly maintenance (Fullerton et al., 2007). The self-help group were given instructions to follow a self-help manual which mimicked components of instructor-led intervention.

Quality of life was assessed at baseline and 6 months using an identical instrument to that used in the *Wollongong Sport Program*: PedsQL Pediatric Quality of Life Inventory Child Report (Varni, 1998). Results indicated that children in the instructor-led intervention reported significantly greater quality of life in the physical functioning domain than those in the self-help condition at 6 months ($P=0.05$). Similar trends were observed for emotional functioning, social functioning and school functioning, however these improvements were not of statistical significance (Fullerton et al., 2007). These findings are comparable with the *Wollongong Sport Program* (i.e. improvements in all four domains). The *Wollongong Sport Program* however also included the PedsQL Pediatric Quality of Life Inventory Parent Report for Children (Varni, 1998) to enhance the reliability and validity of measures.
Anthropometric Measurements

Most weight management and obesity prevention interventions for children report changes in anthropometric measurements, particularly BMI. Similar to the Wollongong Sport Program, a decrease in BMI has been reported for many single- and multi-faceted programs (Beech et al., 2003; Baranowski et al., 2003; Flores, 1995; Robinson et al., 2003; Sallis et al., 1993). However, three other studies which may be more comparable to the Wollongong Sport Program are the HELPP study (Golley et al., 2005) (see section 2.4), a study by Beech (2003) (see section 2.4) and a study by Gately et al. (2005) as they report more than one anthropometric outcome.

The HELPP program was a 6 month, randomised controlled trial involving 111 overweight and obese children, 6- to 9-years of age and was implemented in a highly resourced setting (The Flinders Medical Centre, and the Women's and Children's Hospital) (Golley et al., 2007). Participants were randomised to a parent-led child weight management program, utilising parenting skills training and intensive lifestyle (diet and activity) education; a parent-led child weight management program utilising parenting skills training alone; and a control group (families wait-listed for a program at 12 months). At 12 month follow up, reduced BMI, BMI z Score and waist circumference z Score for both intervention groups (i.e. parenting skills and lifestyle education and parenting skill alone) were reported (Golley et al., 2007).

Beech (2003) details similar results in the community-centre physical activity intervention (Memphis GEMS Pilot Study) for young girls. Participants were randomised to a child only group, a parent only group or a control group. Compared with girls in the control group, girls in both intervention groups (i.e. child only and
parent only groups) demonstrated reduced (although not significant) BMI and waist circumference (Beech, 2003). Similarly the *Wollongong Sport Program* demonstrated decreases in BMI, BMI z Score (overweight and obese participants only), and waist circumference at follow up (14-weeks).

Gately et al. (2005) reports all four anthropometric measurements reported in the *Wollongong Sport Program*: BMI, BMI z Score (overweight and obese participants only), waist circumference and percentage body fat. Results from the six week weight loss summer camp for overweight and obese children indicated that campers who stayed for a mean of 29 days had an average BMI reduction of 2.4 units, an average reduction in BMI z Scores by 0.28, had a significant decrease in percentage body fat and a decrease, although not significant, in waist circumference (Gately et al., 2005). While the *Wollongong Sport Program* saw reductions in all these outcomes, none were of statistical significance. However the *Wollongong Sport Program*, in contrast to Gately et al. (2005) study involving 263 children, was not adequately powered to yield statistically significant results.

### 5.1.3.3 MECHANISMS AND EXPLANATIONS

*Perceived Competence*

An increase in perceived competence may have occurred due to a number of factors. First, the single sex group (see section 5.1.2.3) likely encouraged healthy development, positive networks and a fun, pressure-free atmosphere which possibly provided the greatest potential to improve perceived competence (Kyles & Lounsbery, 2004). Second, the small group may have also been a contributing factor, with Finn (2002) noting that a group size of less than 20 participants optimised participants feeling of support and membership within the group.
Third, all activities implemented within sessions of the *Wollongong Sport Program* were tailored to the specific needs and interests of participants. Participants were exposed to a wide variety of sports and physical activities and often identified an activity they were skilled in or enjoyed that they were not aware of prior to involvement in the *Wollongong Sport Program*. It was observed by facilitators (though not formally measured) that some participants who claimed they had never participated in an activity/sport found themselves thoroughly enjoying the activity and taking on a leadership role within the group, thereby possibly influencing their perceived competence. This greater level of perceived competence amongst participants was evident as all girls were active participants in the school athletics and cross-country carnivals, where in previous years many were not.

Fourth, an increase in skill level may have contributed to an increase in perceived competence. Although not measured, facilitators noted many participants skill level improved. Though the *Wollongong Sport Program* did not focus on skill development, correct techniques were demonstrated to participants and practiced within modified games. It is plausible to suggest that perceived competence improved as participants' improved their skill development, without the pressure of practicing correct technique in drills.

Finally, the high ratio of facilitators to participants meant that all participants received considerable individual attention, assistance and encouragement throughout the program. This high ratio also ensured that rapport was formed between participants and facilitators, which resulted in facilitators attending to individual needs and understanding participant's interests and backgrounds. This in turn, allowed facilitators to identify strategies to build individual self-confidence and competence.
Quality of Life

Participants were encouraged to support each other and work together in team building activities and games. This potentially fostered positive relationships within the group, which may have in turn influenced participants' quality of life, in particular social functioning. Further, although not measured, anecdotal comments suggested that adverse stigmatisation was not associated with the Wollongong Sport Program. Participants reported talking to their peers about the Wollongong Sport Program and teaching activities performed within the program to their friends at lunch-times.

"Did you know me and .......... did the dance today at lunch. We showed everybody. It was so cool!” (Wollongong Sport Program Participant B, 2008).

It would seem that they were proud to be involved in the Wollongong Sport Program. This is encouraging considering overweight children are often perceived by their peers as being undesirable playmates (Penny & Haddock, 2006).

Improved physical functioning and consequently improved quality of life may have possibly been a result of participation in the physical activity component of the Wollongong Sport Program. Activity sessions were designed so all participants could be actively involved and experience success. Activities and games were fun, challenging, motivating and facilitated positive social interaction and team-work.

The Wollongong Sport Program also contained a homework component whereby participants brought their class allocated homework to sessions and completed it with the assistance of facilitators. This may have impacted upon and influenced the improvements in the scholastic competence and consequently the quality of life of
participants. In support, Yin et al. (2005) suggests that providing academic assistance within programs is beneficial for both the health and academic needs of children. Another possible reason for improvements in scholastic competence may be due to an increase in physical activity participation: Increased participation in physical activity has been found to have positive correlations with increased academic achievement (Castelli, Hillman, Buck & Erwin, 2007).

*Anthropometric Measurements*

The primary factor influencing positive changes in BMI, BMI z Score (overweight and obese participants only), waist circumference and percentage body fat is likely to be the increased participation in regular physical activity. Participants engaged in an additional 1.25 hours of moderate-to-vigorous intensity physical activity, twice a week for 14 weeks. Furthermore, increasing time spent in physical activity directly decreases time spent in sedentary behaviours thereby also contributing to positive changes in anthropometry. The reduction in the measures was impressive considering participants were still growing and only a stabilisation of BMI, BMI z Score (overweight and obese participants only), waist circumference and body fat percentage were expected. A larger scale study would be needed to confirm these results.

### 5.2 LIMITATIONS

Limitations within the study are as follows:

1. In terms of investigating efficacy of the *Wollongong Sport Program* the small sample size meant that the study was not adequately powered to detect changes of statistical significance. Measurements that yielded statistically significant results must be tested on a larger scale to ensure outcome validity.
2. The frequency, intensity and duration of the program (1 hr 45 min sessions twice a week for 14 weeks) are likely to be too short to produce significant changes in anthropometry. Longer programs or longer follow up periods may be needed although it is likely that this will affect other factors such as attendance and implementation.

3. The facilitator to participant ratio (approximately 1:5), while beneficial within the *Wollongong Sport Program*, is potentially not sustainable or generalisable in large scale effectiveness studies.

4. This study did not have a control group, therefore, the true efficacy of the program is unknown.

5. Data collection within this study was limited to perceived competence, quality of life and anthropometric measurements (BMI, BMI z Score (overweight and obese participants only), waist circumference and body fat percentage).

### 5.3 STUDY STRENGTHS

Strengths within the study are as follows:

1. While reported as a limitation, the small sample size can also be seen as a strength as it facilitated collaborative relationships between participants, their families and *Wollongong Sport Program* facilitators.

2. Although possibly not sustainable (as mentioned in 5.3) the ratio of facilitators to participants ensured that the program was conducted efficiently and that participants' needs were addressed. The high ratio of facilitators worked well for the *Wollongong Sport Program*: one facilitator provided instruction to participants while another set up equipment and the third assisted individual participants.
3. Facilitators of the *Wollongong Sport Program* all had a background in education specifically Physical and Health Education and thus had experience working with and delivering physical activity sessions to children with a range of interests and abilities.

4. Valid and reliable instruments were used. Further, data were collected by trained assessors, which ensured consistency, reliability and internal validity.

5. Activities within the *Wollongong Sport Program* catered to the interests of participants and were age- and ability-appropriate. Additionally participants were given a voice within the program and were provided with choice which consequently increased participant enjoyment and satisfaction with the program.

6. The *Wollongong Sport Program* was implemented in the 'critical window' (i.e. the period directly after-school). It is the time that children often spend in sedentary activities and eating unhealthy snacks, therefore the program indirectly targeted sedentary behaviours and dietary intake.

7. Being held on school site, the *Wollongong Sport Program* utilised the school facilities (indoor and outdoor) and therefore was cost effective and generalisable to other school sites. Furthermore, detailed session plans were developed which would allow the program to be delivered at any school site.

8. The *Wollongong Sport Program* maintained strong collaborations with the host school. This strengthened the rapport between school staff and researchers and built on positive affiliations developed throughout the smaller feasibility trial the year before (Ryan, 2007). As a result, the host school is likely to continue working with researchers in future larger scale studies.
5.4 RECOMMENDATIONS/ FUTURE DIRECTIONS

The completion of the *Wollongong Sport Program* and results obtained permit the following recommendations to be made:

1. Future studies should include a control group, for example a wait-list control group to allow the true potential efficacy to be determined.

2. A longer study should be implemented to investigate the longer-term effects of an after-school homework club and physical activity program on participants' physiological, behavioural and psychological health.

3. A larger sample size would enable the study to be adequately powered to detect statistical significant differences.

4. Future physical activity interventions targeting childhood overweight and obesity should continue to employ a targeted approach therefore involving overweight and obese participants or those with low levels of perceived competence. The development of targeted programs may produce greater positive effects on perceived competence by reducing anxiety experienced by overweight and obese children when partaking in physical activity with normal weight peers.

5. The *Wollongong Sport Program* should be tested at more than one school site to establish generalisability.
5.5 CONCLUSIONS

Analysis of the data collected enabled the following conclusions to be made relating to each of the three research questions that guided this study:

(1) Will the *Wollongong Sport Program*, an after-school homework club and physical activity program be *feasible*?
- Primary school girls can be successfully recruited into an after-school homework club and physical activity program through the assistance of executive school staff.
- Participation can be maintained by creating an environment that is fun, motivating, challenging, individualised and that allows participants to be successful and have a voice within the program.
- Outcome data can be collected in allocated sessions if facilitators are organised prior to the assessment sessions and establish a rapport with participants.

(2) Will the *Wollongong Sport Program*, an after-school homework club and physical activity program be *acceptable*?
- All sessions can be successfully implemented in an after-school setting if both indoor and outdoor facilities are used.
- Participants will continue to attend the program if sessions are enjoyable and parental barriers of attendance are eliminated.
- Participants will enjoy the program if a safe, supportive environment is created and activities provided are fun, engaging, challenging and foster social interaction.
(3) Will the *Wollongong Sport Program*, an after-school homework club and physical activity program be *potentially efficacious*?

- Changes in perceived competence, quality of life, BMI, BMI z Score (overweight and obese participants only), waist circumference and percentage body fat can be achieved through participation in a 14 week after-school program.
APPENDIX A:

WOLLONGONG SPORT PROGRAM INFORMATION
SHEET/CONSENT FORM
Dear Parents

As indicated earlier this term, the school has an opportunity to work in partnership with the University of Wollongong in a special program to assist girls (8-10 years: Year 2-4) who may not necessarily be involved in a great deal of sporting activities and who would also benefit from one on one assistance in formal classroom tasks across one or more key learning areas.

The aim is to have approximately 20 girls in this twice a week for a 14 week program. At the end of the program, it is hoped to determine whether there has been a change in involvement in sporting or physical activities, improvement in class work, self-esteem, eating habits and fitness levels.

Program to be held: Mondays and Wednesdays
Time: 3.20pm-4.00pm afternoon tea & homework support in the senior open space (PDU)
4.00pm-5.00pm games/physical activity program using, the hall, the hard court, the playground

- Initial come and try Term 4 2007 Monday 3rd December & Thursday 6th December
- Program gets fully underway Term 1 Week 2: Monday 4th February and continues each Monday and Wednesday until Wednesday 30th May

Instructors: 3 female education students from the UOW (all of whom are studying to become physical and health education teachers)

Activities: After the afternoon tea and homework help- girls will try a range of activities that include, dance, soccer, basketball and other physical activities.

Cost: nil- only a commitment to see out the program in Terms 1 and 2

If you would like your daughter involved, please complete the following permission note and return to me by 3/12/07.

School & University Partnership Program

I hereby give permission for my daughter ............................................................ in...............
To take part in the special school and university partnership program that begins in Term 1 2008 and continues for approximately 15 weeks into Term 2. I realise that the after school activities will be on Mondays & Wednesdays and will conclude at 5.00pm.

My daughter's t-shirt size: ............... (Each girl in the program will receive a t-shirt, hat & drink bottle: all with a special monogram)

Signed........................................... Date:..................................
APPENDIX B:

SELF-PERCEPTION PROFILE FOR CHILDREN
# What I Am Like

<table>
<thead>
<tr>
<th>Name</th>
<th>Age</th>
<th>Birthday</th>
<th>Color</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**SAMPLE SENTENCE**

<table>
<thead>
<tr>
<th>Really True for me</th>
<th>Sort of True for me</th>
<th>Really True for me</th>
<th>Sort of True for me</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th></th>
<th>Really True for me</th>
<th>Sort of True for me</th>
<th>BUT</th>
<th>Other kids feel they are good enough at sports.</th>
<th>Really True for me</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Really True for me</td>
<td>Sort of True for me</td>
<td><strong>But</strong></td>
<td>Other kids don’t feel this way for me</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------------------</td>
<td>---------------------</td>
<td>---------</td>
<td>-------------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>21. Some kids feel that they are better than others their age at sports</td>
<td>BUT</td>
<td>Other kids don’t feel they can play as well.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22. Some kids wish their physical appearance (how they look) was different</td>
<td>BUT</td>
<td>Other kids like their physical appearance the way it is.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23. Some kids usually get in trouble because of things they do</td>
<td>BUT</td>
<td>Other kids usually don’t do things that get them in trouble.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24. Some kids like the kind of person they are</td>
<td>BUT</td>
<td>Other kids often wish they were someone else.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25. Some kids do very well at their classwork</td>
<td>BUT</td>
<td>Other kids don’t do very well at their classwork.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>26. Some kids wish that more people their age liked them</td>
<td>BUT</td>
<td>Other kids feel that most people their age do like them.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>27. In games and sports some kids usually watch instead of play</td>
<td>BUT</td>
<td>Other kids usually play rather than just watch.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>28. Some kids wish something about their face or hair looked different</td>
<td>BUT</td>
<td>Other kids like their face and hair the way they are.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>29. Some kids do things they know they shouldn’t do</td>
<td>BUT</td>
<td>Other kids hardly ever do things they know they shouldn’t do.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30. Some kids are very happy being the way they are</td>
<td>BUT</td>
<td>Other kids wish they were different.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>31. Some kids have trouble figuring out the answers in school</td>
<td>BUT</td>
<td>Other kids almost always can figure out the answers.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32. Some kids are popular with others their age</td>
<td>BUT</td>
<td>Other kids are not very popular.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3
33. [ ] Some kids don't do well at new outdoor games [ ] BUT Other kids are good at new games right away.

34. [ ] Some kids think that they are good looking [ ] BUT Other kids think that they are not very good looking.

35. [ ] Some kids behave themselves very well [ ] BUT Other kids often find it hard to behave themselves.

36. [ ] Some kids are not very happy with the way they do a lot of things [ ] BUT Other kids think the way they do things is fine.

Susan Harter, Ph.D., University of Denver, 1985
APPENDIX C:

INSTRUCTIONS FOR THE ADMINISTRATION OF THE
SELF-PERCEPTION PROFILE FOR CHILDREN
Administration and instructions

The scale may be administered in groups as well as individually. After filling out the information at the top of the scale, children are instructed as to how to answer the questions, given below. We have found it best to read the items aloud for 3rd and 4th graders, whereas for 5th graders and older, they can read the items for themselves, after you explain the sample item. Typically, we introduce the scale as a survey and, if time, ask the children to give examples of what a survey is. They usually generate examples involving two kinds of toothpaste, peanut butter, cereal, etc. to which you can respond that in a survey, there are no right or wrong answers, it's just what you think, your opinion.

In explaining the question format, it is essential that you make it clear that for any given item they only check one box on either side of the sentence. They do not check both sides. (Invariably there will be one or two children who will check both sides initially and thus you will want to have someone monitor each child’s sheet at the onset to make certain that they understand that they are only to check one box per item.)

**INSTRUCTIONS TO THE CHILD:**

We have some sentences here and, as you can see from the top of your sheet where it says “What I am like,” we are interested in what each of you is like, what kind of a person you are like. This is a survey, not a test. There are no right or wrong answers. Since kids are very different from one another, each of you will be putting down something different.

First let me explain how these questions work. There is a sample question at the top, marked (a). I’ll read it out loud and you follow along with me. (Examiner reads sample question.) This question talks about two kinds of kids, and we want to know which kids are most like you.

1. So, what I want you to decide first is whether you are more like the kids on the left side who would rather play outdoors, or whether you are more like the kids on the right side who would rather watch T.V. Don’t mark anything yet, but first decide which kind of kid is most like you, and go to that side of the sentence.

2. Now, the second thing I want you to think about, now that you have decided which kind of kids are most like you, is to decide whether that is only sort of true for you, or really true for you. If it’s only sort of true, then put an X in the box under sort of true; if it’s really true for you, then put an X in that box, under really true.

3. For each sentence you only check one box. Sometimes it will be on one side of the page, another time it will be on the other side of the page, but you can only check one box for each sentence. You don’t check both sides, just the one side most like you.

4. OK, that one was just for practice. Now we have some more sentences which I’m going to read out loud. For each one, just check one box, the one that goes with what is true for you, what you are most like.
APPENDIX D:

SELF-PERCEPTION PROFILE FOR CHILDREN SCORING KEY
What I Am Like

SCORING KEY

SELF-PERCEPTION PROFILE FOR CHILDREN

(Revision of the Perceived Competence Scale for Children

Susan Harter, Ph.D., University of Denver, 1985

1. 4 3 Some kids feel that they are very good at their school work
    BUT Other kids worry about whether they can do the school work assigned to them.

2. 1 2 Some kids find it hard to make friends
    BUT Other kids find it's pretty easy to make friends.

3. 4 3 Some kids do very well at all kinds of sports
    BUT Other kids don't feel that they are very good when it comes to sports.

4. 4 3 Some kids are happy with the way they look
    BUT Other kids are not happy with the way they look.

5. 1 2 Some kids often do not like the way they behave
    BUT Other kids usually like the way they behave.

6. 1 2 Some kids are often unhappy with themselves
    BUT Other kids are pretty pleased with themselves.

7. 4 3 Some kids feel like they are just as smart as other kids their age
    BUT Other kids aren't so sure and wonder if they are as smart.

8. 4 3 Some kids have a lot of friends
    BUT Other kids don't have very many friends.
APPENDIX E:

PEDIATRIC QUALITY OF LIFE INVENTORY CHILD REPORT (AGES 8-12), VERSION 4
PedsQL™
Pediatric Quality of Life Inventory
Version 4.0

CHILD REPORT (ages 8-12)

DIRECTIONS

On the following page is a list of things that might be a problem for you. Please tell us how much of a problem each one has been for you during the past ONE month by circling:

0 if it is never a problem
1 if it is almost never a problem
2 if it is sometimes a problem
3 if it is often a problem
4 if it is almost always a problem

There are no right or wrong answers.
If you do not understand a question, please ask for help.
In the past ONE month, how much of a problem has this been for you ...

### ABOUT MY HEALTH AND ACTIVITIES (problems with...)

<table>
<thead>
<tr>
<th></th>
<th>Never</th>
<th>Almost Never</th>
<th>Sometimes</th>
<th>Often</th>
<th>Almost Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. It is hard for me to walk more than one block</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>2. It is hard for me to run</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>3. It is hard for me to do sports activity or exercise</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>4. It is hard for me to lift something heavy</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>5. It is hard for me to take a bath or shower by myself</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>6. It is hard for me to do chores around the house</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>7. I hurt or ache</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>8. I have low energy</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

### ABOUT MY FEELINGS (problems with...)

<table>
<thead>
<tr>
<th></th>
<th>Never</th>
<th>Almost Never</th>
<th>Sometimes</th>
<th>Often</th>
<th>Almost Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I feel afraid or scared</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>2. I feel sad or blue</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>3. I feel angry</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>4. I have trouble sleeping</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>5. I worry about what will happen to me</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

### HOW I GET ALONG WITH OTHERS (problems with...)

<table>
<thead>
<tr>
<th></th>
<th>Never</th>
<th>Almost Never</th>
<th>Sometimes</th>
<th>Often</th>
<th>Almost Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I have trouble getting along with other kids</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>2. Other kids do not want to be my friend</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>3. Other kids tease me</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>4. I cannot do things that other kids my age can do</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>5. It is hard to keep up when I play with other kids</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

### ABOUT SCHOOL (problems with...)

<table>
<thead>
<tr>
<th></th>
<th>Never</th>
<th>Almost Never</th>
<th>Sometimes</th>
<th>Often</th>
<th>Almost Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. It is hard to pay attention in class</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>2. I forget things</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>3. I have trouble keeping up with my schoolwork</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>4. I miss school because of not feeling well</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>5. I miss school to go to the doctor or hospital</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
APPENDIX F:

PEDSQL PEDIATRIC QUALITY OF LIFE INVENTORY PARENT REPORT FOR CHILDREN (AGES 8-12), VERSION 4
PedsQL™
Pediatric Quality of Life Inventory
Version 4.0

PARENT REPORT for CHILDREN (ages 8-12)

DIRECTIONS

On the following page is a list of things that might be a problem for your child. Please tell us how much of a problem each one has been for your child during the past ONE month by circling:

0 if it is never a problem
1 if it is almost never a problem
2 if it is sometimes a problem
3 if it is often a problem
4 if it is almost always a problem

There are no right or wrong answers.
If you do not understand a question, please ask for help.
In the past ONE month, how much of a problem has your child had with ...

### PHYSICAL FUNCTIONING (problems with...)

<table>
<thead>
<tr>
<th>Problem</th>
<th>Never</th>
<th>Almost Never</th>
<th>Sometimes</th>
<th>Often</th>
<th>Almost Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Walking more than one block</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>2. Running</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>3. Participating in sports activity or exercise</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>4. Lifting something heavy</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>5. Taking a bath or shower by him or herself</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>6. Doing chores around the house</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>7. Having hurts or aches</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>8. Low energy level</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

### EMOTIONAL FUNCTIONING (problems with...)

<table>
<thead>
<tr>
<th>Feeling</th>
<th>Never</th>
<th>Almost Never</th>
<th>Sometimes</th>
<th>Often</th>
<th>Almost Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Feeling afraid or scared</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>2. Feeling sad or blue</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>3. Feeling angry</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>4. Trouble sleeping</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>5. Worrying about what will happen to him or her</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

### SOCIAL FUNCTIONING (problems with...)

<table>
<thead>
<tr>
<th>Social Function</th>
<th>Never</th>
<th>Almost Never</th>
<th>Sometimes</th>
<th>Often</th>
<th>Almost Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Getting along with other children</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>2. Other kids not wanting to be his or her friend</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>3. Getting teased by other children</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>4. Not able to do things that other children his or her age can do</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>5. Keeping up when playing with other children</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

### SCHOOL FUNCTIONING (problems with...)

<table>
<thead>
<tr>
<th>School Function</th>
<th>Never</th>
<th>Almost Never</th>
<th>Sometimes</th>
<th>Often</th>
<th>Almost Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Paying attention in class</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>2. Forgetting things</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>3. Keeping up with schoolwork</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>4. Missing school because of not feeling well</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>5. Missing school to go to the doctor or hospital</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
APPENDIX G:

INSTRUCTIONS FOR PARENTS TO COMPLETE PEDSQL
PEDIATRIC QUALITY OF LIFE INVENTORY PARENT REPORT
FOR CHILDREN
Wollongong Sport Program

Dear Parent,

The following document is a questionnaire measuring quality of life. It is part of our data collection to assess the effectiveness of the after-school program your daughter is currently involved in. Your daughter has already completed a questionnaire similar to this one. Please complete the questionnaire and return the following session. Please answer the questions honestly. All information will remain confidential.

Your participation is greatly appreciated.

Thank you

Haisley Morrison and Jacque Kelly
APPENDIX H:

ANTHROPOMETRIC MEASUREMENT SHEET
ANTHROPOMETRIC MEASUREMENTS

NAME: ____________________________

DATE: _________

AGE: _____________

DOB: ______________

ANTHROPS:

HEIGHT (CM):

1) _____________

2) _____________

WAIST CIRCUMFERENCE (CM):

1) _____________

2) _____________

WEIGHT (KG):

1) _____________

2) _____________

BIA: Activity level = 2

1) _____________

2) _____________
APPENDIX I:

PARTICIPANT ENJOYMENT SCALES
WOLLONGONG SPORT PROGRAM
ACTIVITY EVALUATION SHEET

Date:

Did you enjoy the activities that you participated in today?

Tick (5) the box which shows how you felt about the activities.

<table>
<thead>
<tr>
<th>Activities</th>
<th>Really disliked</th>
<th>Disliked a little</th>
<th>Neither liked nor disliked</th>
<th>Liked a little</th>
<th>Really liked</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Comments:
APPENDIX J:

SAMPLE FACILITATOR REFLECTION
Wednesday 05/03/08

- Attendance – 12
- Absences – 2 (xxxxx & xxxxx)

Another successful day! Most girls had their own homework and those that didn’t were given a health find-a-word or a sun safe worksheet which they seemed to enjoy. We strayed from our session plan a little today and decided to set up a small gymnastics tumbling activity with the soft gym equipment in the area. We went through with the girls the safe way to forward roll and made sure we were spotting the whole time. The girls loved this activity as they had been eager to play on this equipment for some time but we had never allowed it.

The hall was out of use today due to parent teacher interviews, so we improvised and used the learning centre area, this proved to be no problem at all, and on the contrary it was easier to manage the girls in this smaller space. The first activity we did today was to get the girls moving freely in space. The girls would move around the room and we would call things such as stretch or flick, which they would interpret in their own way. The girls seemed to really have a lot of fun with this exercise. The next activity we did was exploring different ways we can make shapes with our bodies. We explored circular, square, triangular shapes and letters. This activity progressed to making words with our bodies. In groups of four or five, girls chose a word and used their bodies to form that word. As a further progression, we explained transitions in dance and got the girls to use different transitions when
moving from one letter to another. The girls were quite enthusiastic about this and spent some time making it up and practicing to music. The groups ended up with roughly an 80-count piece, which they were keen to perform to each other. We then moved onto a hip hop dance to Humpty Dumpty. All the girls really got into this activity and had a lot of fun with it. I think they enjoyed that we turned a nursery rhyme into a funky hip hop song and dance. Before the next activity we gave the girls five minutes in which to practice their dances. After which each group would teach their sequence to the rest of the group and we would begin to put the dance together. I have noticed that some girls, particularly xxxxxxx who tend to stand back in sports such as soccer, really seem to be getting involved and having lot of input within their groups when creating movement.

The group to teach their dance today was xxxxx, xxxxx, xxxxx and xxxxx. These girls did a fantastic job teaching the rest of the group. The other girls also picked up the movement quite quickly. We have decided to change the song of the dance from Rhianna’s ‘Please Don’t Stop the Music’ to ‘Dancing in the Street’. We found that ‘Dancing in the Street’ had a slightly slower beat which the girls coped better with.

Some good feedback was given from the girls today. “Did you know me and xxxxx did the dance today at lunch. We showed everybody. It was so cool!”, “How come this is only Monday and Wednesday? I want it to be every day.” These comments illustrate that the girls are really enjoying the program and that aspects of the program are extending into the everyday lives of the participants, therefore its effects are not confined to the sessions themselves. This is really encouraging as our program is in a sense attempting to provide the necessary skills to allow the participants to make a lifestyle change and become involved in lifelong physical activity. In addition this demonstrates that no adverse affects have occurred due to
participants being part of the program. On the contrary, it seems the girls are proud to be a part of it and are confident enough to show others in the school what they have been learning.

There were no injuries today however Gabby came with her ankle strapped. She was involved in every activity. For the last activity she told me her ankle was hurting. I gave her the choice to sit down and watch or to stand in her position and just do the arms. She chose the latter and I think she forgot about it because she ended up dancing properly anyway. Raffle tickets today were awarded to xxxxx. xxxxx and xxxxx. Many of the girls now have two raffle tickets so we need to buy some prizes as it is likely we will need them for next week when someone reaches three. Overall it was another successful day, the girls seemed to really enjoy themselves and were involved in moderate to vigorous physical activity for the majority of the session.
APPENDIX K:

UNIVERSITY OF WOLLONGONG HUMAN RESEARCH ETHICS
INITIAL APPLICATION APPROVAL
In reply please quote: HE06/345
Further Enquiries Phone: 4221 4457

27 February 2007

Dr Anthony Okely
Faculty of Education
University of Wollongong

Dear Dr Okely

Thank you for your response dated 21 February 2007. I am pleased to advise that the application has been approved.

Ethics Number: HE06/345
Project Title: An after-school homework club, physical activity and sport program for primary school girls.
Researchers: Dr Anthony Okely, Ms Jess Ryan, Ms Marie-Jeanne Maessen, Ms Tessa Kars
Approval Date: 22 February 2007
Expiry Date: 21 February 2008

The University of Wollongong/SESIAHS Health and Medical HREC is constituted and functions in accordance with the NHMRC National Statement on the Ethical Conduct in Research Involving Humans. The HREC has reviewed the research proposal for compliance with the National Statement and approval of this project is conditional upon your continuing compliance with this document. As evidence of continuing compliance, the Human Research Ethics Committee requires that researchers immediately report:

- proposed changes to the protocol including changes to investigators involved
- serious or unexpected adverse effects on participants
- unforeseen events that might affect continued ethical acceptability of the project.

You are also required to complete monitoring reports annually and at the end of your project. These reports are sent out approximately 6 weeks prior to the date your ethics approval expires. The reports must be completed, signed by the appropriate Head of School, and returned to the Research Services Office prior to the expiry date.

Yours sincerely,

[Signature]
Professor Garry Hoban
Chairperson
Human Research Ethics Committee
APPENDIX L:

NSW DEPARTMENT OF EDUCATION APPROVAL
Dear Ms Ryan

I refer to your application to conduct a research project in NSW government schools entitled *An afterschool homework club, physical activity and sport program for primary school girls*. I am pleased to inform you that your application has been approved.

You may now contact the Principal of Figtree Public School to seek their participation. Your approval will remain valid until 21 February 2008. This approval covers the following researchers and research assistants to enter schools for the purposes of this research:

- Tessa Kars
- Marie-Jeanne Maessen
- Dr Tony Okely

You should include a copy of this letter with the documents you send to Figtree Public School. I draw your attention to the following requirements for all researchers in NSW government schools:

- School Principals have the right to withdraw the school from the study at any time.
- The approval of the Principal for the specific method of gathering data must also be sought.
- The privacy of the school and the students is to be protected.
- The participation of teachers and students must be voluntary and must be at the school’s convenience.
- Any proposal to publish the outcomes of the study should be discussed with the Research Approvals Officer before publication proceeds.
When your study is completed, please forward two hard copies of your report. One should be mailed me at the Illawarra and South East Regional Office PO Box 1228 Wollongong 2500 and the second to the General Manager, Planning and Innovation, Department of Education and Training, GPO Box 33, Sydney, NSW 2001.

Yours sincerely

Angela Byron
Professional Support Officer
Illawarra and South East Region
27 March 2007
APPENDIX M:

SAMPLE OF HOMEWORK
Using the Internet - Food groups

1) Access the Internet.
2) Using Google web search, type in: **Kids Health**.
3) Click on the first link (which will look like this):

   **Kids' Health - Home**
   Learn how the body works, eating a balanced diet, handling feelings and keeping safe. Play games and puzzles.

4) Now click on the topic **Your Food** (which is highlighted in the green box).
5) Pick the topic **Food - food groups** (which is 9th on the list).
6) Now scroll down the page and answer the questions on your sheet.
7) Have fun and learn lots of interesting things!

Name: _______________________
Food – Food Groups

Using the information on the web page, try to fill in as much of the worksheet as possible.

Healthy food gives our bodies the tools they need to:

★ build __________ and __________
★ repair and replace worn out __________
★ keep all __________ working
★ keep us __________.

- There are six food groups included on the Healthy Food Plate.

Bread, cereal, rice, pasta and noodles group
This is the biggest group because you need to choose most of your daily food from here.

You get:

★ ★ ★ ★ ★ ★ ★

You need __________ servings of these every day.

Vegetables and legumes
Look at the food plate and write down three foods that come from this group:

1) 2) 3)

Vegetables are very good for you, and there are lots of different ones.

You get:

★ ★ ★ ★ ★ ★ ★

You need __________ servings of these every day.
Fruit

There are heaps of different fruits, including canned and dried, so it is pretty easy to eat plenty.

You get:

You need ______ servings every day.

Write down some of your favourite fruits here:

________________  __________________  __________________  __________________

Milk, yoghurt and cheese group

This group (sometimes called dairy products) is pretty important for growing kids.

You get:

You need ______ servings every day.

Meat, poultry, fish, beans, eggs, nuts and legumes

- What types of food does poultry include? _______________________________________
- What are your favourite foods from this group? ________________________________

You get:

You need a _______________ servings from this group each day.
Fats and oils

- Fats and oils are not in the ________ food circle.
- They are down in one corner as foods that you need a bit of but not too much.
- Your body still needs them, but they can be found in other foods like ________ and ________ products.

Cakes, chips and lollies

- Of course most kids like these foods, but the truth is your body is not too keen on having lots of them.
- So you should only eat a little bit and not very often - maybe at special times like parties or once a week.

Activity:

- In the space below, write down all the foods that you ate today.
- Do you think that they represent a healthy diet? Why/ Why not?
- What could you change?
APPENDIX N:

SAMPLE SESSION PLANS
Week 2 – Monday

Title: Team Building/Fun Activities

Objectives:
- Teamwork
- Communication
- Encouragement
- Fun

Equipment Needed:
- 6 cones
- 5 hoops
- 20 bean bags
- 6 skipping ropes (long)
- 20 water bombs
- 2 tug-of-war ropes
- 8 Clue sheets
- 8 Sets of puzzle pieces
- Cones to indicate the site of the puzzle piece
- Participant Enjoyment Scales

<table>
<thead>
<tr>
<th>TIME</th>
<th>ACTIVITY</th>
<th>EQUIPMENT</th>
</tr>
</thead>
</table>
| 5 minutes | **All Aboard**  
- Students are taught various movements that correspond with commands.  
  - Captains Coming: Stand up straight and salute  
  - Climb the rigging: Simulate climbing a rope ladder  
  - Hit the deck: Drop to the floor  
  - Port: Run to the left side of the room  
  - Starboard: Run to the right side of the room  
  - Students must perform the movement when the command is called. The last student to perform the movement is out and becomes the caller.  
  - Repeat game two or three times. | - 2 cones to mark Port and Starboard |
| 10 minutes | **Rob the Nest**  
- Students are split into four teams.  
- Each team stands next to one empty hoop.  
- All the bean bags are in the middle hoop.  
- On the whistle students are to steal one bean bag at | - 5 hoops  
- 20 bean bags |
a time from the middle hoop and return it to their hoop.
- Once all bean bags are gone from the middle hoop, students may steal bean bags from others hoops.
- After a period of time, the team with the most bean bags in their hoop are the winners.
- Students may not guard their nest.
- Repeat

5 minutes

- **Skipping in Three’s**
  - In groups of three, students have one long skipping rope per group with two holding students the rope and one skipper.
  - Students perform ‘teddy bear, teddy bear’.
  - Each student has at least two turns at skipping.
  - Ensure groups are far enough apart from each other.

10 minutes

- **Cross the River**
  - In three groups students use a hoop (simulating a boat) to transport students across the river.
  - Students stand in a line at a cone.
  - To move across the river to the cone on the other side students must be inside the hoop. No student can move unless they are inside the hoop.
  - The team to transport their members across the river the fastest are the winners.

10 minutes

- **Water Bomb Throwing**
  - In pairs, students are given a water bomb that they throw between them.
  - Students begin standing a meter apart and with each catch take another step apart.
  - The aim is to see how far apart students can throw the water bomb without it breaking.
15 minutes

➢ **Treasure Hunt**

- In pairs, students are required to navigate their way around the school grounds using clues which provide information on the next location.
- Students are given a sheet with clues to all locations and may choose which order to visit each location.
- Students must collect piece of the puzzle along the way.
- At the last location, students will be given a clue to help them put together their puzzle.
- Stress safety when moving in the sports environment.
- Encourage students to work as a team.
- Ensure that students do not interfere with other teams clues and puzzle pieces.

3 minutes

➢ **Cool Down**

- In a circle students perform various stretches.

2 minutes

➢ **Evaluation**

- Students are required to complete an evaluation form on the lesson.

---

- 8 Clue sheets
- 8 Sets of puzzle pieces
- Cones to indicate the site of the puzzle piece
- Participant Enjoyment Scales
Week 5 - Wednesday

Title: Netball/Basketball

Objectives:
- Teamwork
- Communication
- Encouragement
- Fun
- Learn and practice ball handling skills including catching, throwing, shooting and dribbling
- Active movement

Equipment Needed:
- 2 Netballs
- 13 Basketballs
- 4 Hoops
- 4 Bibs
- 8 Braids
- Participant Enjoyment Scsles

<table>
<thead>
<tr>
<th>TIME</th>
<th>ACTIVITY</th>
<th>EQUIPMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 minutes</td>
<td>➢ Train Track Tag</td>
<td>- Nil</td>
</tr>
<tr>
<td>5 minutes</td>
<td>➢ Cut The Cake</td>
<td>- 2 Netballs</td>
</tr>
</tbody>
</table>

- Three students are placed on the third markings on the court, while the rest of students are down one end of the court.
- Aim of the players on the tracks is to tag other students by moving along their line horizontally.
- The other students aim to progress to the other end (like bull-rush) without being tagged.
- Different locomotor skills are called out and all students have to continue the game in the requested locomotor (hopping, side gallop, high knees).

- The class is split into two groups.
- Each group forms a circle.
- One student remains inside the circle and stands in the centre with the ball. They throw the ball to the 1st student who passes it back to them. The person in the centre throws to person 2 and then runs to the spot where person 1 stood and person 1 runs into the centre to receive the ball from person 2.
- Person 1 takes 2's place and so on until the circle has been completed, or the cake is 'cut'.
| 10 minutes | ➢ **Dribble Rush**  
- One defender is placed in each third of the court while the remainder of the class is on the base line, each with a basketball.  
- When the teacher blows the whistle the players on the base line dribble the length of the court.  
- The defenders must only move in their third while attempting to steal the ball.  
- If the ball is knocked or touched, the dribbler then takes on the defensive role.  
| - 13 Basketballsv |
| 15 minutes | ➢ **Round The World**  
- In groups of four, students one by one shoot from different positions around the key with one player catching the rebounds and passing back to the player.  
- Players rotate so all shoot from every position.  
| - 8 Basketballs |
| 20 minutes | ➢ **Shoot The Hoop**  
- In teams of eight, students aim to advance the ball towards their goal (two hoops at end of court). To score a student must bounce the ball in the hoop.  
  - No stepping  
  - Tag opponent with ball to become ‘out of play’  
  - Ball possession can be three seconds |
| 10 minutes | **Progression:**  
- Add the rule of allocated team scorers. Two players from each team are given coloured bibs enabling them to be the only scorers. Change the tag rule to obstruction/ three feet rule. |
| 3 minutes | **Progression:**  
- Add another hop at each end. |
| 2 minutes | ➢ **Cool Down**  
- In a circle students perform various stretches. |
- Evaluation
  - Students are required to complete an evaluation form on the lesson.

[Image of students engaged in an activity]

- Participant Enjoyment Scales
APPENDIX O:

ENCOURAGEMENT AWARDS AND PARTICIPATION GIFT
APPENDIX P:

CERTIFICATE OF PARTICIPATION
Congratulations!

To ____________________________

For participation in the Wollongong Sport Program
Great Effort! Well Done!

Signed

21/05/2008
APPENDIX Q:

WOLLONGONG SPORT PROGRAM T-SHIRTS
REFERENCE LIST


*International Standards for Anthropometric Assessment*. International Society for the Advancement of Kinanthropometry ISAK; 2001


