



**Title: THE PSYCHOLOGICAL DETERMINANTS OF  
HEALTHY EATING AND PHYSICAL ACTIVITY  
AMONG ADOLESCENTS IN DUBAI**

**Name: Lena Vyas**

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THE PSYCHOLOGICAL DETERMINANTS OF HEALTHY EATING  
AND PHYSICAL ACTIVITY AMONG ADOLESCENTS IN DUBAI

L. M. VYAS

Ph.D.

2014

THE PSYCHOLOGICAL DETERMINANTS OF HEALTHY EATING  
AND PHYSICAL ACTIVITY AMONG ADOLESCENTS IN DUBAI

by

Lena Maria Vyas

A thesis submitted to the University of Bedfordshire in partial fulfilment of the  
requirements for the degree of Doctor of Philosophy

August 2014

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ABSTRACT

This research examined the psychosocial factors influencing physical activity and fruit and vegetable intake behaviour, intentions and health cognitions in secondary school children in the United Arab Emirates. Study 1 examined the prediction of Theory of Planned Behaviour (Ajzen, 1991) and Prototype/Willingness Model (Gibbons and Gerrard, 1995) on behaviour, intentions and cognitions in 536 secondary school students. Findings indicated that attitudes, subjective norms, perceived behavioural control and prototype perceptions accounted for a significant proportion of behavioural intentions, after controlling for parental behaviour. Prototype variables, especially similarity, improved the predicting validity of the Theory of Planned Behaviour. Some differences between age and gender were noted. Prototype similarity appeared to be the strongest predictor of behavioural intentions out of the prototype measures. Study 2 tested the effectiveness of an action planning intervention (Gollwitzer, 1993) and image intervention (Gibbons and Gerrard, 1995) in 188 secondary school students. A longitudinal design was employed collecting data over 6 months measuring behaviour, behavioural interventions and components from the Theory of Planned Behaviour and Prototype/Willingness Model. Participants in the action-planning group were asked to form specific implementation intentions of physical activity and fruit and vegetable intake. Participants in the image group were asked to consider favourable behaviour specific prototype and describe them. Findings revealed no significant intervention effects on intentions or behaviour. Some significant effects were seen on health cognitions across time points and conditions. Study 3

explored knowledge, outcome expectations, facilitators and social modelling, drawing from Social Cognitive Theory (Bandura, 1986) by conducting 8 semi-structured focus group interviews (N=40). Emerging themes were: *'Knowledge of physical activity', 'Impact on health, wellbeing and physical appearance', 'Having fun together', 'Important role models' 'Knowledge of healthy eating', 'Physical and psychological rewards', 'Availability and appearance' and 'Sometimes yummy and sometimes yucky'*. Findings highlighted enjoyment and social factors as strong influences of physical activity and fruit and vegetable intake. The overall findings provided some evidence for future implications and further quantitative and qualitative approaches were recommended to further establish the influential factors of children's healthy eating and physical activity habits in the Middle East.

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## **Acknowledgements**

First and foremost I would like to thank my supervisory team: Professor Andy Guppy, Dr. Angel Chater, and Dr. Emma Short for guiding and supporting me throughout my research. I have learnt substantially from your uncompromising emphasis on quality and meaningful research. Angel, you are my true inspiration and your passion for the field of health promotion in children is contagious. Andy, thank you for increasing my confidence and keeping me sane during stressful times. It has been an honour to work with such a knowledgeable and encouraging supervisors.

I wish to thank all of the young people, parents and schools who agreed to take part in my research. Without you this research would not have been possible!

I would like to thank my family in Sweden for ALWAYS taking pride in my achievements. I also want to thank my second pair of parents and family in Dubai. You have not only believed in me but you have helped me tremendously in all aspects of my life. I am very lucky to have you all in my life.

Thank you Jasper for never leaving my side. I truly loved having you sleeping on my lap while writing my thesis. I would also like to thank my husband Ravi for giving me the strength and motivation to keep going. I am so grateful to have you and love you with all my heart. Last but not least I would like to thank my beautiful son Kian (who came in to this world during my PhD journey). You are the best thing that has ever happened to me and I am so proud to be your mum. I love you more than words can say and look forward to catch up on all this time we missed along the way!

## **Chapter 1 Overview**

### **1.1. Aims and objectives**

The overall aim of this research programme was to investigate the factors that may influence physical activity and fruit and vegetable intake in adolescents in the United Arab Emirates, from a psychological perspective. A mixed methods research design was employed using a combination of quantitative and qualitative approaches. A mixed research method can be effective in the study of children's health behaviours and the combination of these designs holds the ability to provide better and more in-depth answers to research questions (Gorard and Makopolou, 2012). The research programme comprised of three parts, which are described below:

#### Study 1:

The aim of Study 1 was to see how health cognitions such as attitudes, perceived behavioural control, social norms and prototype perceptions, together with parental experiences, predicted adolescents' physical activity and fruit and vegetable intake, drawing from the Theory of Planned Behaviour (Ajzen, 1991) and Prototype/Willingness Model (Gibbons and Gerrard, 1995). The objectives were:

- To examine how the components from the Theory of Planned Behaviour predicted intentions and behaviour.
- To examine whether variables from the Prototype/Willingness Model increased the prediction of intentions and behaviour after variables from the Theory of Planned Behaviour, as well as parental influences, gender and age had been taken into account.
- To examine whether any of the influencing factors were moderated by age and gender.

### Study 2:

The aim of Study 2 was to test the effectiveness of two interventions on physical activity and fruit and vegetable intake, based on previous work on implementation intentions (Gollwitzer, 1993) and prototype images (Gibbons and Gerrard, 1995). The objectives were:

- To examine the effectiveness of an image intervention and an action planning intervention on actual behaviour, behavioural intentions and health cognitions across two time points.
- To examine whether the action planning intervention and image intervention had a stronger effect on actual behaviour, behavioural intentions and health cognitions in comparison to a control intervention.
- To examine whether the image intervention had a stronger effect on variables from the Prototype/Willingness Model, in comparison to the action planning intervention and control intervention.

### Study 3:

The aim of Study 3 was to build on the findings from Study 1 and gain a deeper understanding of adolescents' views of physical activity and healthy eating by exploring the factors that may influence their intentions and actions, from a qualitative perspective. The objectives were:

- To explore individual, social and psychological influences of physical activity and healthy eating.
- To evaluate socio-cognitive theoretical concepts drawing on the Social-cognitive theory (Bandura, 1986), the Theory of Planned Behaviour (Ajzen, 1991) and the Prototype/Willingness Model (Gibbons and Gerrard, 1995), by considering knowledge, outcome expectations, facilitators and social influences.

## **1.2. Overview of chapters**

This research programme is presented in 8 chapters, including this first chapter:

Chapter 2: This second chapter provides a broad overview of the epidemiology of obesity in the United Arab Emirates. It includes basic components such as the definition, current trends and prevalence of obesity. Following this the physical, psychosocial and societal consequences of obesity is discussed.

Chapter 3: This chapter provides an overview of lifestyle factors associated with obesity and introduces two major preventative health behaviours, physical activity and fruit and vegetable intake. The psychosocial factors that influence physical activity and fruit and vegetable intake in children are introduced in this chapter. A literature review of previous studies that examined the contributing factors of children's physical activity and healthy eating habits are presented.

Chapter 4: This theoretical chapter provides an overview of some of the psychological models that have been studied in relation to physical activity and fruit and vegetable intake. The first model to be introduced is the Theory of Planned Behaviour (Ajzen, 1991) followed by the Prototype/Willingness Model (Gibbons and Gerrard, 1995) and Social Cognitive Theory (Bandura, 1986).

Chapter 5: This chapter presents the first study of the current research programme. Study 1 examined the influences of the Theory of Planned Behaviour and Prototype/Willingness Model on physical activity and fruit and vegetable intake in children. A review of studies that previously used these models in health behaviour change research is presented.

Chapter 6: This chapter presents the second study of the current research programme. Study 2 examined the effectiveness of an action planning intervention (Gollwitzer, 1993) and an image intervention (Gibbons and Gerrard,

1995) on physical activity and fruit and vegetable intake. The chapter provides an overview of health promotion, including intervention design and planning. Evidence of effective theory based health promotion interventions are summarised and discussed.

Chapter 7: This chapter presents the third and final study of the current research programme. Study 3 investigated adolescents' views of physical activity, healthy eating and its influences from a qualitative perspective. A review of the qualitative literature on physical activity, healthy eating and influential factors are discussed.

Chapter 8: This chapter provides a summary of the chapters in the current research programme, bringing together findings from studies 1, 2 and 3. Strengths and weaknesses of the studies are addressed and implications based on the findings to the field of health psychology and recommendations for future research and intervention design are provided.



Chapter 2 – General introduction The major causes of ill health have a behavioural cause (Wardle and Steptoe, 2003). Obesity is preventable and is contributed to by a poor diet and lack of physical activity which both are health risk behaviours that health psychologists are seeking to understand. Obesity is one of the greatest public health challenges of the 21st century and is a growing international concern as it is increasing at an alarming rate (Koplan, Liverman and Klaark, 2010).

The countries in the Gulf region are witnessing an alarming rise in obesity, especially the high-income, oil-producing countries such as Saudi Arabia, United Arab Emirates, Bahrain, Qatar and Kuwait (Al-Haifi et al., 2013). Four countries from this region: Qatar, Bahrain, United Arab Emirates and Kuwait, have been included in the top 10 ranking of the heaviest countries in the world (Walpole et al., 2012). In the United Arab Emirates (UAE), over 66 percent of men and 60 percent of women are either obese or overweight and these figures are expected to rise (World Health Organization, 2013).

### **2.1. United Arab Emirates**

The United Arab Emirates is one of the world's pre-eminent oil-rich nations, located in the Gulf Cooperation Council (GCC) and is composed by seven Emirates (independent states): Dubai, Abu Dhabi, Sharjah, Um Al-Quwain, Fujairah, Ras Al Khaimah and Ajman (United Nations Development Program, 2015). Abu Dhabi is the capital city of the United Arab Emirates and the country is bordered in the south-eastern corner of the Arabic Peninsula (UAE government, 2012). Before the discovery of oil in the 1950s the United Arab Emirates' economy was dependent on fishing and a declining pearl industry. But since 1962, when Abu Dhabi became the first of the emirates to begin exporting oil, the country has experienced significant economic and industrial growth, particularly in the oil,

tourism, health care and construction industry (UAE government, 2012; United Nations, 2013). Dubai is the second largest of the Emirates, after Abu Dhabi, and it has a population at over 2.1 million inhabitants.

There is a large amount of expatriate workers in the United Arab Emirates, mainly in Abu Dhabi and Dubai. Due to the fast pacing industrial and economic developments in the country, migrant workers are recruited from all over the world and the population has increased substantially over the past decades. The population has grown from 287,000 in 1971 to 9.3 million in 2013 (Ministry of Foreign Affairs, 2014). In 2013, the United Arab Emirates had the fifth-largest international migrant population in the world with 7.8 million migrants, out of a total population of 9.3 million (United Nations, 2013). The population structure of the United Arab Emirates is therefore unique, with only 11 percent of the population being local Emiratis and 89 percent being expatriates of varying nationalities (Ministry of foreign affairs, 2014). The United Arab Emirates government does not allow foreigners to obtain Emirati citizenship only by living in the country. The only route to becoming a naturalised citizen is by marriage to an Emirati national and even this, however, does not guarantee citizenship (Gulf labour markets and migration, 2015).

The school system in the United Arab Emirates consists of both schools in the public and private sector. Dubai is the Emirate with the most private international schools (158 schools), exceeding the number of public schools (79 schools) (Ministry of Education, 2010; KHDA, 2015). Private schools in Dubai cater for over 89 percent of the student population of Dubai and 57.4 percent of Emirati students attends private schools. The private schools in in Dubai offer a wide range of curricula and fee levels to cater to people from different socio-economic backgrounds (KHDA, 2015). The United Arab Emirates public schools are restricted for Emirati citizens only at no cost (Ministry of Education, 2015).

There is a wide range of tuition fees in Dubai, ranging from AED 5,000 (£850) to AED 100,000 (£17,000) (KHDA, 2015).

The expatriate population of the United Arab Emirates have varying socio-economic, religious and ethnic backgrounds and the majority comes from the Indian subcontinent, Philippines, Europe, North America and Australasia (Ministry of foreign affairs, 2013). This poses a challenge for population based public health strategies and a number of public health issues significantly contribute to morbidity and mortality in the country (Loney et al., 2013). Due to the significant and industrial development in the country the United Arab Emirates has shifted from a traditional semi-nomad lifestyle in 1971, to a modern and technology driven lifestyle with a reduced amount of physical activity and an increase in unhealthy foods. This has led to a dramatic increase in the prevalence of obesity, diabetes and cardiovascular disease in the United Arab Emirates (Loney et al., 2013).

## **2.2. Obesity**

The cost of obesity on the wider economy is huge due to the associated costs of treating obesity and obesity related conditions (Waumsley, 2011). Obesity has been identified as a major risk factor in several physical illnesses such as heart disease, diabetes type 2, hypertension, osteoarthritis and lower back pain. It has been linked to psychological ill-health such as depression, low self-esteem and social isolation (Daniels et al., 2009) and it is a serious public health problem that is growing in many parts of the world in countries with both low and middle incomes (World Health Organization, 2012).

Psychological and behavioural issues play significant roles in both the development and consequences of obesity and obesity is, therefore, as much a psychological as a physical problem (Collins and Bentz, 2009). The current research programme is looking at obesity from a psychological perspective by

focusing on the social and cognitive influences on related health behaviours such as diet and physical activity among secondary school students in Dubai, United Arab Emirates. There is a lack of obesity related research conducted in the Middle East and the study programme is one of the first of its kind in the United Arab Emirates, which makes it unique.

### **2.2.1. Definition**

Overweight and obesity is defined by having an excess of body fat (World Health Organization, 2006). The World Health Organization (2006, page 1) described obesity as “*abnormal or excessive fat accumulation that may impair health*”. Body Mass Index (BMI) is a measure of obesity, which measures the ratio of a person’s weight in kilos, divided by height in centimetres. It is inexpensive and the most common method to measure obesity. BMI can be used as a guide to determine a healthy weight by classifying adults’ weight into categories (underweight, normal weight, overweight and obesity) or by measuring the amount of body fat based on height and weight (World Health Organization, 2006).

A BMI of 25 or above indicates overweight and a BMI of 30 or above indicates obesity in adults (World Health Organization, 2006). Children’s BMIs are calculated differently and includes age and gender. Dinsdale, Ridler and Ellis (2011) explained that it is more complicated to assess children’s BMI than adults’. Adults’ BMIs remain consistent unless they gain or lose weight. The BMI of children changes as they mature and there is also a growth difference between genders. It is therefore important to consider age and gender when calculating children’s BMIs. Children’s BMIs are therefore calculated into percentiles that indicate the approximate position of the child’s BMI among the same gender and age. A BMI around 50th percentile indicates a healthy weight. A BMI above the 91st percentile suggest that the child is overweight and obese if it is over the 98th percentile, meaning in a sample of 100 children, only two

would be above this percentile and ninety-seven would be below (Dinsdale, Ridler and Ells, 2011).

Waumsley and Nannette (2011) stated in their article that although BMI is widely used and remains as the standard measure of weight it does not separate lean and fat mass. Two individuals may for example have a high BMI but still have differences in their fat percentage. The person with higher levels of fat percentage may be at a higher risk of poor health than the person with a healthy fat percentage, but both of them would still be classified as obese. This means that the measurement of BMI can misplace individuals to a BMI category, which may result in an overestimation of the prevalence of obesity (Burkhauser and Cawley, 2008). Muscular athletes are for example often being misclassified as overweight when using BMI when their actual fat percentage is low. Other ways to measure obesity is waist circumference, waist-height ratio and total body fat (Gatineau and Mathrani, 2011; Burkhauser and Cawley, 2008).

In the United Kingdom, modified BMI thresholds have interestingly enough been recommended for the South Asian population who are at risk of chronic diseases and mortality at lower BMI levels than the Caucasian European population (Gatineau and Mathrani, 2011). Similar suggestions have been made in the Chinese population, where research has shown that the risk of diabetes and hypertension increased from a BMI value as low as 22 (Ko, Chan, Cockram and Woo, 1999). Asians often have a higher fat percentage than Caucasians, which means that obesity related ill health occur at a lower BMI cut-off level. This has also been studied in the Middle East (Saudi-Arabia) by Almajwal et al. (2009). The authors suggested the BMI threshold in the Middle Eastern population should be decreased as the presence of a significantly increased risk of co-morbidities at BMI values less than 25. This was also found in a study in Oman (Al-Lawati, Barakat, Al-Lawati and Mohammed, 2008). Kumar et al. (2011) also suggested the use of lower BMI thresholds among people of a Middle-Eastern

decent from Egypt, Iran, Iraq, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Syria, Yemen and the United Arab Emirates. Based on this, it could be suggested that healthcare professionals consider a lower BMI threshold when identifying the risk of weight-related conditions in people of Middle-Eastern and Asian decent. This has not yet been considered in the United Arab Emirates, where the international standards to measure BMI are still used (Musaiger et al., 2012).

### **2.2.2. Prevalence**

According to the World Health Organization (2014), the worldwide prevalence of obesity has doubled between 1980 and 2013. It has reached epidemic proportions globally, with at least 2.8 million people dying each year as a result of being overweight or obese. In 2013, more than 1.9 billion adults (above 18) were overweight globally and over 600 million were obese. It was also estimated that more than 42 million children globally under the age of five were overweight. Approximately 31 million of these are living in developing countries (World Health Organization, 2014). In the Western world, it has been estimated that one third of children and young people are overweight or obese and this will rise by two thirds by 2050 (Reilly, 2009). Once associated with high-income countries, obesity is now also prevalent in low- and middle-income countries and is no longer restricted to developed countries. Many developing countries face the double burden of obesity and malnutrition and this has become a serious problem for health systems in many African countries that not is able to manage the chronic disease burden (Provo, 2013).

Overweight and obesity is now linked to more deaths than malnutrition worldwide (Provo, 2013). Statistics have shown that obesity related deaths are triple the number of deaths related to malnutrition and the increasing prevalence of obesity is clearly visible throughout the world (Murray et al., 2012). In Europe, the prevalence has tripled in many countries since the 1980s,

and these figures continue to rise at an alarming rate, particularly among children (Branca, Nikogosian and Lobstein, 2007). In the Middle-Eastern region, the proportion of overweight or obese children below five, almost doubled between 2001 and 2010 (Musaiger, 2011). There is a strong link between childhood and adulthood obesity and children who are obese or overweight often grow up to be obese or overweight adults (Pate, Heath, Dowda and Trost, 1996).

***In developing countries with emerging economies the rate of obesity is almost 30 percent higher than in developed countries (World Health Organization, 2014). The prevalence of overweight and obesity in the Eastern-Mediterranean region (includes the Middle-Eastern countries) was second in the world after America (World Health Organization, 2011).*** The prevalence of obesity in the Gulf region, including United Arab Emirates (UAE) has become a major health problem in the past three decades (Musaiger, 2011). Available statistics from the region showed that the obesity rates are especially high in Kuwait and Saudi Arabia: 70-85 percent among males and 75-88 percent among females (adults). The obesity rates among adolescents in Saudi Arabia and Kuwait are among the highest in the world, with Kuwait having the highest estimates of 40-46 percent (Ng, Zaghoul, Ali, Harrison and Popkin, 2011). According to the latest available statistics for the United Arab Emirates in 2011 from the World Health Organization (2011), showed that 34 percent of the population was obese (females 43 percent and males 30.2 percent) and 72 percent was overweight or obese. The obesity rate for women is the 7<sup>th</sup> highest proportion in the world. The obesity rate for men is the 9<sup>th</sup> highest in the world, according to World Health Organization (2011).

Available statics indicate that there is an alarming high prevalence of overweight in children in the United Arab Emirates. In 2010, it was reported that 28 percent of male and 40 percent of female adolescents were overweight or obese. 25

percent of male and 41 percent of female children between the ages of six and ten were overweight or obese (Ng et al., 2012). A study conducted in public schools in Abu Dhabi and Al Ain demonstrated that the incidence of overweight and obese children was 19.8 percent among children ages 6 to 10 years old and 40.2 percent among children aged 10-16 years old (Junaibi, Abdulle, Sabri, Hag-Ali and Nagelkereke, 2013). Al-Haddad, Little and Ghafoor (2005) found that the frequency of obesity among youth in United Arab Emirates is two to three times greater than the published international standards. In similarity to these findings, research conducted by Bin Zaal, Musaiger and D'Souza (2009) found that the obesity among children in United Arab Emirates was greater than in the United States and Europe. It is not clear whether these figures only include Emirati nationals, but also the remaining population of the United Arab Emirates.

Research has also found that it is not only Emirati nationals who suffer from overweight and obesity. Figures from Health Authority Abu Dhabi (2012) showed that 20 percent of the expatriate population were obese (females 32 percent and males 17 percent). Research has shown that expatriate workers were more likely to gain weight and suffer from obesity after moving to the United Arab Emirates. The obesity level of workers from India increased by 6 percent, from Philippines by 2 percent and those from Pakistan was increased by 27 percent. This increase was linked to stress of moving to a new country, lack of exercise and increased food and drink oriented social life (Newson-Smith, 2010). In children, Malik and Bakir (2007) found that non-citizen girls between the ages of 5 and 17 were more likely to be obese than Emirati national girls.

Although there are studies on the prevalence of obesity among school children in the United Arab Emirates and the rest of the region, a majority of the statistics were not represented for the whole country and more focused on specific areas such as Dubai or Abu Dhabi. It would be valuable to gather national data for a better understanding of the rising childhood obesity epidemic in the United Arab



Emirates. The collection of national data, including both the Emirati and expat population, is essential in order to get a clear overview of the prevalence of obesity in the United Arab Emirates.

### **2.2.3. Consequences**

Obesity has become a significant public health concern across a big part of the world (Reilly, 2009). Obesity is not only a major risk factor for a number of non-communicable diseases but it also has negative physical and psychological impacts on people, which contribute to a major financial strain on the society (Morgan and Dent, 2010). The consequences of obesity can be divided in to three categories: physical, psychosocial, and societal consequences (Daniels et al., 2009). The consequences of obesity are explained below.

#### *2.2.1.1. Physical consequences*

The obesity related consequences linked to physical health ranges from back pain to life threatening conditions. Obesity has been identified as a major risk factor for many health problems and non-communicable diseases including Type 2 diabetes, heart disease, hypertension, certain kinds of cancers, stroke, joint problems etc. (Morgan and Dent, 2010). These health problems are linked indirectly and directly to behavioural, environmental and nutritional factors and have become the predominant cause of ill-health and death in the United Arab Emirates and other oil producing countries (Robinson, 2005).

In the Middle East, the prevalence of obesity, high levels of cholesterol and high blood pressure has increased significantly over previous years (Badran and Laher, 2011). Obese adults are five times more likely to develop type 2 diabetes than adults of a healthy weight (Gatineau et al., 2014). The population of countries in this region has a higher than average prevalence of Type 2 diabetes and obesity in comparison to the rest of the world and these rates are increasing (Al-Maskari

and El-Sadig, 2007). Type 2 diabetes in the United Arab Emirates, appears to be a significant problem, although available data is limited. The International Diabetes Federation (Sicree, Shaw and Zimmet, 2010) reported that United Arab Emirates in 2010 were in the top 5 (2<sup>nd</sup> place) of the countries in the world with the highest diabetes prevalence together with Nauru, Saudi Arabia, Mauritius and Bahrain. In 2000, 350,000 (11 percent) in United Arab Emirates had diabetes and this figure was expected to double by 2030 (Frag and Singh, 2009). However, the increase occurred at a faster rate and the prevalence of diabetes in United Arab Emirates had already nearly doubled to 19.2 percent in 2010 (Hamilton, 2012; Sicree et al., 2010).

A study by Freedman, Mei, Srinivasan, Berenson and Dietz (2007) showed that 70 percent of obese children had risk factors (such as high cholesterol and blood pressure) for heart disease. Other studies have also found that they are more prone to develop type 2 diabetes (Haines, Wan, Lynne, Barrett and Shield, 2007), joint and muscle problems (Wearing, Henning, Byrne, Steele and Hills, 2006), respiratory problems as well as gastro and liver problems (Han, Lawlor and Kimm, 2010). Other health risks linked to childhood obesity include eating disorders (such as anorexia and bulimia) and skin infections. It can also increase the risk of entering puberty early for females (Roberts and Marvin, 2011). Childhood obesity can have a harmful effect on the body in a variety of ways and is directly linked to a series of abnormalities in adult life (Al-Junaibi et al., 2013). Children that are overweight or obese often have higher blood pressure than children with a normal weight and this increases their risk of chronic conditions such as hypertension or diabetes in later life (Al-Junaibi et al., 2013). Overweight and obese children are more likely to become obese adults, and have a higher risk of developing serious health problems in adulthood such as high blood pressure, cardiovascular diseases etc. (Schwartz and Puhl, 2003; Pate et al., 1996).

#### 2.2.1.2. *Psychosocial consequences*

The psychosocial consequences of obesity range from low levels of self-esteem, social isolation, anxiety and depression. Several studies support the relationship between obesity and low self-esteem in both adults (Friedman et al., 2005) and children (Strauss, Rodzilsky, Burack and Colin, 2001). Obesity can reduce self-esteem and affect people's social lives and can leave them isolated and vulnerable. Adult obesity can also be caused by low self-esteem in childhood, especially among females (Ternouth, Collier and Maughan, 2009). Franklin, Denyer, Steinbeck and Caterson (2006) found that perceived physical appearance, athletic performance and global self-worth were lower in obese children than those with a healthy weight. This was especially apparent among obese females who also had lower levels of perceived social acceptance. However, one of the reviewed studies reported no significant relationship between obesity and self-esteem in children. Ozmen et al. (2007) found that obesity was not significantly correlated with self-esteem or depression in a group of Turkish adolescents, although there appeared to be a significant relationship between body satisfaction and psychological wellbeing.

There is also evidence that obesity is linked with poor body image in adults (Schwartz and Burnell, 2004) and children (O'Dea, 2008). O'Dea (2008) found in her research that obese adolescent females were most likely to have a poor body image and considered themselves as 'too fat'. There also appeared to be some differences in body satisfaction among some ethnic groups of obese females. Females with Middle Eastern backgrounds were more likely to have better body image compared to those with Caucasian and Asian background. O'Dea suggested these body image differences may reflect cultural body ideals, western ideals of feminine beauty such as the slim ideal, masculinity or socially constructed gender roles.

The mobility impairments associated with obesity may lead to avoidance of public places and facilities. Many obese individuals may feel embarrassed to go out to public places and for example fly in an aeroplane because they may not fit into the seat (Carter, Bullick and Joyce, 1994). Normal activities related to daily life may also become difficult and many people may avoid or find it uncomfortable to go out for meals, travel and shop for clothes (Sullivan et al. 1993). Overweight and obese people often face multiple forms of prejudice and discrimination, negative stereotyping and negative attitudes from people around them, even from health professionals (Puhl and Heuer, 2009).

Childhood bullying as a result of being overweight is also common. Dietz (1998) found that younger children who were obese were one-and-a-half times more likely to have been bullied than children with a healthy weight. This has also been found among adolescents where more than a quarter of study participants had been teased for weight reasons (Eisenberg, Neumark-Sztainer and Perry, 2003). Research has shown that obese children were more likely to have poor self-esteem and often felt lonely and sad. Research from the United Arab Emirates showed that obese children often have low self-esteem, are victims of bullying and often feel like they do not belong (Stott, Marks and Alegrante, 2013). Research has also shown that obese children are more likely to engage in health risky behaviours such as alcohol consumption and smoking (Jorm et al., 2003). Another study on adults pointed in the opposite direction: obese people were less likely to engage in substance abuse (Miller-Kovach, 2006).

Janssen, Craig, Boyce and Pickett (2004) found that overweight and obese school-aged children are more likely to be the victims and perpetrators of bullying behaviours than their normal-weight peers. Schwimmer, Burwinle and Warni (2003) found in their research that severely obese children and adolescents had lower health-related quality of life than children and adolescents with a healthy weight. They rated their quality of life similar as

those diagnosed with cancer. They also found that obese children and adolescents were 4 times more likely than those with a healthy weight to report impaired school function. A Middle-Eastern study conducted among 500 children between the age of 10 and 14 years in Kuwait found no association between obesity and health related quality of life (Boodai and Reilly, 2013). The authors suggested that there are cultural differences in attitudes towards obesity between Arab and Western societies. It would be interesting to study this further.

There is also a connection between stress and obesity. Stress-induced eating has contributed to the development of obesity and chronic life stress has been associated with an intake of unhealthy foods that are high in sugar and fat (Torres and Nowson, 2007). Cause and effect relationships between stress and obesity were discussed in an article by Foss and Dyrstad (2011). They pointed out that stress can be a cause of obesity but can also be a consequence of obesity. Foss and Dyrstad (2011) reviewed a number of studies and found that there is a clear relationship between weight gain and the stress hormone cortisol. Cortisol levels tend to be increased in people that gain weight due to stress. Weight gain can then trigger the stress response, which in turn can increase additional weight gain.

Mood and anxiety disorders were 25 percent more common in obese adults compared to those with a healthy weight (Simon et al., 2006). This has also been seen in children. Stunkard, Faith and Alison (2003) found that major depression disorder was more common in obese adolescents compared to those with a healthy weight. The prevalence was especially high among females. Although there is a link between depression and obesity it has been difficult to establish the direction of this link. Further research is required in order to determine whether obesity leads to depression or depression lead to obesity. Several

theories support each direction and more research in this complex field is required (Miller-Kovach, 2006).

#### 2.2.1.3. *Societal consequences*

Obesity also has an effect on the society and not only on the individual. There is a significant healthcare cost associated with treating obesity and its direct consequences both nationally and internationally (Rahim et al., 2014). In 2011, the Gulf countries spent around \$28.9 billion on treating non-communicable diseases (such as cardiovascular disease, cancer, chronic lung diseases and diabetes). This figure is estimated to rise to \$44 billion in 2014, \$60 billion in 2025 and \$68 billion in 2030 if the governments in the Cooperation Council for the Arab State of the Gulf (GCC) countries continue to take a treatment approach rather than a preventive approach (Rahim et al., 2014).

In the United Arab Emirates, a report by Al-Maskari, El-Sadig and Nagelkerke (2010) showed that the treatment of Diabetes patients in the country could cost the nation more than 440 million Emirati dirhams (US\$119.7m) a year. No exact figures of the costs of obesity on the United Arab Emirates economy has been found but taking into account the high rates of obesity and related disorders the economic impact would run into billions (El-Sharkawy 2009). Rahim et al. (2014) argued that it is crucial for the Arab countries to take action and there has been a weak response by the GCC governments to address the obesity issue. There is a great need of cost-effective and evidence based prevention and treatment programs to tackle the obesity issue in the Middle East. Due to the rapid industrial growth, leading to an increase in obesity in the United Arab Emirates over the last decade, it is relevant to study the psychological determinants of obesity preventative behaviours in children. The following chapter introduces the lifestyle factors associated with obesity in the United Arab Emirates.

### **Chapter 3 – Lifestyle factors associated with obesity**

Genetics, poor nutrition, physical inactivity, inadequate stress management and lack of healthy sleep can all lead to obesity (Egger and Dixon, 2014). Although there is a genetic component to obesity, poor lifestyle choices appear to be the major cause (Chouquet and Meyre, 2011). A person's genes cannot be controlled, but stress, emotion, sleep, physical inactivity and diet can be modified through lifestyle adjustments (Chouquet and Meyre, 2011). It is well known that a healthy diet and physical activity play a very significant role in the prevention and treatment of overweight and obesity (Chaput et al., 2011) and these important lifestyle factors are discussed below.

During the last decades in the United Arab Emirates, the prevalence of obesity has increased at an alarming rate (Musaiger, 2011). This can be explained by the rapid increase of the industrial development in the country which have led to subsequent changes in social and cultural environments, education, diet, nutrition and physical activity (AlNohair, 2014; Musaiger, 2011). World Health Organization (2006) reported that many developing countries are now faced with a double burden of both over-nutrition and under nutrition induced diseases. These countries are being exposed to unhealthy foods (rich in fats, salt and sugar), which also tend to be inexpensive. An unhealthy diet together with low levels of physical activity often results in overweight and obesity and the nutrition issues in these countries remains unsolved. The Middle East has a hospitality culture where food is the centre of social interactions and the fact that displaying some overweight is seen as a sign of wealth, aggravates unhealthy nutritional patterns (Klautzer, Becker and Mattke, 2014).

Overweight, obesity and related complications are largely preventable on both a community and individual level (World Health Organization, 2012). Lifestyle and behaviour choices are important factors in influencing weight status. At the individual level the steps to prevent weight gain are: daily exercise and a healthy diet. This includes limited energy intake from total fats, increased fruit and vegetable consumption, limited sugar intake and engagement in regular physical activity (Swinburn, Caterson, Seidell and James, 2004). This chapter introduces each health-behaviour separately, starting with physical activity, followed by fruit and vegetable intake. Prevalence, recommendations, benefits and influences of physical activity and fruit and vegetable intake are discussed, as well as some previous school-based interventions targeting these health-enhancing behaviours.

### **3.1. Physical Activity**

The time both adults and children are spending on sedentary activities has increased over the last three decades increased which can explain the high levels of obesity in the Gulf region that has been observed (Al-Hazzaa and Musaiger, 2010). Al Subhi, Bose and Al Ani (2014) studied the prevalence of physical activity and sedentary behaviour among adolescents in ten Middle Eastern countries. The World Health Organization collected the data in 2010. Overall, 29 percent of adolescents across the ten countries were considered as sedentary (spent three or more hours per day during a typical or usual day doing sitting activities). This figure increased in the United Arab Emirates where 51 percent of the children were sedentary (45 percent males and 55 percent females) (Al Subhi et al., 2014; World Health Organization, 2013). The results were gathered from public and private schools across the United Arab Emirates and included students from several different nationalities and ethnic backgrounds.

Over the last two decades, there is an increase in technological advances such as cars, elevators and escalators in the United Arab Emirates and this have led to a



decrease in physical activity (AlNohair, 2014). The proportion of children cycling or walking to school in the United Arab Emirates is low. Fikry and Al-Matroushi (2005) found that only 27 percent of boys and 11 percent of girls between the ages of 13 and 15 walked or cycled to school. These figures are low in comparison to countries like England, where around 46 percent of children walked or cycled to school in 2005/2006 (British Heart Foundation, 2009). The study by Fikry and A-Matroushi (2005) is the only known study up to date, but it can be assumed that the numbers are low, as people in the United Arab Emirates tend to depend heavily on car transportation (Barakat-Haddad, 2011).

Physical activity plays a very important role in order to prevent overweight, obesity and related ill health and provides fundamental health benefits for children, youth and adults (Biddle et al., 2010). Physical activity has been linked to increased wellbeing and decreased risk of ill health and it often contributes towards physical and psychological wellbeing (Biddle et al., 2010). Active children are likely to become active adults and inactive children are likely to become inactive adults, as habits that are formed early are likely to last the whole life (Craig, Lake, Kelly, Adamson and Mathers, 2011). Telama et al. (2005) found in a longitudinal study, that level of physical activity during childhood (between 9 and 18 years) predicted a higher level of physical activity 20 years later.

Research also suggests that physical activity can improve cognitive function, and may be the best way for the brain to develop frontal lobe-mediated cognitive processes such as problem solving skills and working memory (Brown and Vaughan, 2009; Mustard and McCain, 1999; Ratey and Hagerman, 2007). Physical activity has also been linked to improved academic achievement (Hillman, Castelli and Buck, 2005) and improved neurocognitive processing (Ratey and Hagerman, 2007). Physical activity, combined with a healthy diet is a great way to reduce the risk of many kinds of diseases and improve psychological wellbeing (Biddle et al., 2010) and promoting physical activity in the United Arab

Emirates and many other parts of the world, will have a great impact on reducing the burden of non-communicable diseases.

### ***3.1.1. Recommended levels of physical activity***

Scientific evidence supports the overall conclusion that children and young people should participate in some kind of physical activity to improve their health and wellbeing (Biddle et al., 2010). The global physical activity guidelines for children and young people are 60 minutes of at least moderate intensity physical activity daily (World Health Organization, 2011). Physical activity includes play, games, sports, transportation, chores, recreation, PE, and planned exercise. The 60 minutes can be accumulated throughout the whole day and can be by performing activities in multiple shorter periods throughout the day, and then adding together the time spent on each period (e.g. two periods of 30 minutes) (World Health Organization, 2011).

According to the World Health Organization (2011), most of the daily physical activity should be aerobic (such as walking, cycling). Vigorous intensity activities should also be incorporated and should include activities that strengthen muscles and bones, at least three times per week (such as running, field sports etc.). No official national recommendations of physical activity for children in the United Arab Emirates has been found, although in a report by the Dubai Health Authority (2012) it was recommended that school children participate in 60 minutes of physical activity daily.

### ***3.1.2. Physical activity levels in the United Arab Emirates***

Data from a large-scale study of 15,790 children between the ages of 13 and 15 in the United Arab Emirates showed that only 19.5 percent of the participants participated in 60 minutes of physical activity daily (Fikry and Al-Matroushi, 2005). Figures from the World Health Organization (2010) showed

that only 27 percent of adolescents in the United Arab Emirates were physically active for 60 minutes, 7 days per week, 23 percent of females and 35 percent of males. 28 percent of the students went to physical education class on three or more days each week during the school year (29 percent males and 27 percent females). This data was collected as part the World Health Organization's Global school based survey in 2010 and represented students from both private and public schools in the Eastern Mediterranean region. The physical activity levels in the United Arab Emirates were the fifth lowest in the Middle Eastern Region and only Saudi Arabia, Syria, Yemen and Kuwait had lower levels of physical activity among adolescents (13-15 year olds). The prevalence of physical inactivity among adolescents was the lowest in the region, in comparison to the Western Pacific, Africa and Americas (World Health Organization, 2014).

Physical inactivity is high in the United Arab Emirates and people are relying heavily on car transportation, domestic health and a preference for indoor activities (Barakat-Haddad, 2011). Among adults in United Arab Emirates, only 19 percent of the population gets enough exercise to keep themselves healthy according to the Dubai Health Authority (2010). Among expatriates, the figures were 21 percent of females and 32 percent of males. European male expatriates got the most exercise (60 minutes, 5 days per week), 28 percent, compared with a national average of 17 percent. Among females, Philippine expatriates were active the most, 45 percent, in comparison the average of 25 percent.

Research conducted by Henry, Lightowler and Al-Hourani (2004) used an activity diary to track daily energy expenditure to determine daily physical activity and television watching among adolescent females in the United Arab Emirates. They found that the amount of physical activity undertaken by girls in the United Arab Emirates was very low. The participants' average Physical activity level (PAL) score was 1.26 which is classified as 'extremely inactive' on

a 5-point scale ranging from 'extremely inactive' to 'extremely active'. They also found that participating females watched television 2.5 hours each day and this was the most predominant leisure time pursuit.

Research tools for the measurement of physical activity in adults and children have advanced substantially over the past decade (World Health Organization, 2014). It is very important to consider the measures that are being used when looking at physical activity. The most common tools used are questionnaire instruments. These self-report tools require participants to report and recall physical activity. It has been suggested to not use self-reports in children below 11, because these children often do not have the cognitive skills to answer accurately. Asking parents and teachers may also be problematic as parents and teachers can often not accurately recall children's physical activity or eating habits (Sallis, 2010). Surveys that are relying on self-report questionnaires from parents and children reported higher levels of physical activity than when objective measures (using accelerometers) were being used (British Heart Foundation, 2004; Sallis, 2010). For example one study that used accelerometers found that 42 percent of boys and as low as 11 percent of girls met 60 minutes of physical activity daily (Riddoch et al., 2007). Although measurement tools such as accelerometers provide more accurate data, they are costly and complex which means they would be difficult to use to collect data on the large population (Craig and Shelton, 2008). Although physical activity data in the United Arab Emirates has increased over the last few years (Barakat and AlHaddad, 2011; World Health Organization, 2014), there is definitely a great need to collect national data on the physical activity levels among children from the both the Emirati and Expat communities in the country.

There appear to be differences in physical activity levels between age groups in adolescents. Children's interest in physical activity tends to change with age and a decline has been evident during adolescence, both among males and females

(Whitehead and Biddle, 2008). A number of studies in the United Kingdom (Pearson, Atkin, Biddle, Gorely and Edwardson, 2009; Mulvihill, Rivers and Aggleton, 2000) and United States (Wall, Carlson, Stein, Lee and Fulton, 2011; Thompson, Humbert and Mirwald, 2003) all found that physical activity was decreasing with age among adolescents. In the United Arab Emirates, a very limited number of studies on age differences in physical activity in adolescents were found (most likely due to a lack of studies conducted). Henry et al. (2004) found no age differences between adolescent females in their study and physical activity was low across all age groups. In adults, the Health Authority Abu Dhabi (HAAD, 2012) found that physical activity was decreasing with age in adulthood, especially among women.

Interest and participation in physical activity also seem to differ between genders. Studies have indicated consistent findings and decreased levels of physical activity have been seen more clearly in girls compared to boys in the United States and United Kingdom (Pate et al., 2007; Bromley, Sproston and Shelton, 2005; Pearson et al., 2009). This gap is most apparent during adolescence but also in earlier years (Montgomery et al., 2004). Differences in physical activity levels between males and females were also apparent in the Middle East, where females were less likely to participate in physical activity than males (Musaiger, 2013). Figures from World Health Organization (2010) showed that adolescent boys in the United Arab Emirates were more physically active than girls (34 percent versus 22 percent). However, the opposite was found among adults in a report from the Dubai Health Authority (2011). The study showed that only 17 percent of adult males and 25 percent of females reached the recommended guidelines of 60 minutes of daily physical activity.

It is important to study the determinants of physical activity within age groups and genders, in order to successfully tailor interventions targeting the most powerful determinants. This is particularly important in the Middle Eastern

region, where there is a lack of published research in this field and this will therefore be considered in Study 1 of the current research programme.

### **3.2. Fruit and vegetable intake**

Fruit and vegetable intake was the second health behaviour to be considered for the current research programme. Good nutrition and a balanced healthy diet are vital for children as healthy eating during childhood leads to healthy growth and development (Craig et al., 2011). A healthy diet during this period of life can set up a positive pattern of healthy eating habits to carry through into adulthood (Craig et al., 2011). An unhealthy diet is one of the main risk factors of obesity and a range of non-communicable diseases such as cancer, diabetes and heart diseases and a healthy diet can improve health and prevent the risk of obesity and related ill-health (Swinburn et al., 2004). The increase of fast foods and sugar- dense beverages has increased over the past two decades in the United Arab Emirates and the intake of healthy foods has decreased (AlNohair, 2014). Changes in urbanization and the traditional dependence on locally grown food such as vegetables, fruits, wheat and dates have also decreased in the United Arab Emirates over the last two decades (AlNohair, 2014). Fast food has become popular among both children and adults, as accessibility to fast food restaurants has increased (Al-Hazzaa and Musaiger, 2010).

A healthy diet contains plenty of fruits and vegetables and fibre rich foods. It also includes reducing the intake of salt, fats and sugar rich foods (Ledoux, Hingle and Baranowski, 2011; Swinburn et al., 2004). Fruit and vegetables are beneficial to health and are generally low in calories and fat. They contribute to a healthy and balanced diet and are also a great source of fibre and vitamins. Overall, fruit and vegetables are a great replacement of energy dense foods with a low nutritional value such as sweetened dairy products, processed cereals etc., which are foods that adolescents often enjoy (Dauchet, 2009). A high consumption of

fruit and vegetables can significantly reduce the risk of many chronic diseases, especially cardiovascular disease (Leenders et al., 2013).

An intake of at least 5 portions (400 grams) of a variety of fruit and vegetables a day could prevent the development of cancer and other chronic diseases by 10-25 percent and reduce the risk of death from cardiovascular disease mortality by 15 percent (Leenders et al., 2013). Fruits and vegetables have been linked to reduced risk of cancer diagnosis and recurrence and diets including plenty of fruits and vegetables are a useful strategy for cancer prevention (Lanou and Svenson, 2010).

Fruits and vegetables is a good and healthy way to avoid hunger and have a positive role in weight management (Rolls, Ello-Martin and Tonehill, 2004). Evidence from a large study of 14 000 participants (aged 16 and over) in England suggests that mental health is correlated to fruit and vegetable intake and five portions of fruit and vegetables daily has been associated with high mental well-being. Other health related behaviours were also found to be linked to well being, but fruit and vegetables together with smoking, was consistently associated in both males and females (Stranges, Samaraweera, Taggart, Kandala and Stewart-Brown, 2014).

### ***3.2.1. Recommended levels of fruit and vegetable intake***

The World Health Organization (2003) has recommended a daily intake of a minimum of 400g (5 portions) of fruit and vegetables, which can reduce the risk of deaths from chronic diseases such as some cancers, heart disease and stroke. These recommendations of fruits and vegetable intake are also applicable to United Arab Emirates (Dubai Health Authority, 2011). A portion of fruits and vegetables is about a handful (or 80g) of fruit and vegetables or one glass of unsweetened fruit smoothies and pure fruit juice. The fruit and vegetables can be fresh, frozen, dried, raw, cooked or tinned (Montel, 2011).

### ***3.2.2. Fruit and vegetable intake in the United Arab Emirates***

Fruit and vegetable consumption in the Middle Eastern region is relatively low, with both men and women consuming an average of three portions per day (Lock, Pomerleau, Caser, Altmann and Martin, 2005). Other studies also indicated that the majority of the population of Arab Gulf countries did not consume sufficient quantities of fruit and vegetables, particularly children and youth (Musaiger, 2006; Musaiger, Takruri, Hassan and Abu-Tarboush, 2012).

The World Health Organization (2012) reported in 2003, that only 25 percent of adults in the United Arab Emirates consumed five portions of fruit and vegetables per day. No recent national figures about fruit and vegetable intake in the United Arab Emirates have been found. Statistics from the Dubai Health Authority's (Dubai Health Authority, 2009) survey on fruit and vegetable consumption among adults in Dubai, showed that 59 percent, more than half of the Dubai residents (divided in to Emirati nationals and Non-Emirati nationals) did not consume enough to achieve the target of 5 portions of fruits and vegetables (400 grams) daily. The result came from the Dubai Household Survey of 5000 households and is distributed by the Dubai Health Authority and Dubai statistic centre every 3-5 years (Dubai Health Authority, 2011). The reported intake was higher among Emirati nationals (54 percent) in comparison to the Non-Emirati nationals (40 percent). 53 percent of Emirati females and 54 percent of Emirati males reported a consumption of 5 portions of fruit and vegetables daily. Among the Non-Emirati participants (specific nationalities were not mentioned) 46 percent of females and 38 percent of males reached the daily recommendations of fruit and vegetable intake. This report was only applicable to adults (18+) and did not include any figures related to children's fruit and vegetable intake. Only 21 percent of adolescents (13-15 years) in the United Arab Emirates ate five or more portions of fruits and vegetables daily (Fikri and Al Matroushi, 2005). Lock et al (2005) studied dietary habits across the Middle



East. The average fruit and vegetable intake among adult males were reported as 251 grams (3.1 portions) and among females as 263 grams (3.3 portions). They reported that children in the United Arab Emirates, between the ages of 5 and 19 did not eat the recommended intake of 400 grams of fruits and vegetables daily. The average intake among children was reported as 226 grams (2.8 portions) for males and 233 grams (2.9 portions) for females.

Fruit and vegetable intake seem to vary between ages, as younger children tend to eat more fruit and vegetables than older children (Lock et al., 2005; Rasmussen et al., 2006). Lock et al. (2005) looked at several Middle Eastern countries together (including United Arab Emirates) and found that fruit and vegetable intake decreased with age in children, adolescents and younger adults. This is also evident in Western countries such as the United States, England and some European countries, however it was suggested that this was not always the case (Rasmussen et al., 2006).

Gender is another factor that seems to be influencing fruit and vegetable intake among adolescents in the United States (Emanuel et al., 2012) and the United Kingdom (Cooke and Wardle, 2005). This was also apparent in the United Arab Emirates (Lock et al., 2005), although there is a limited amount of research on this among children.

### **3.3. Psychosocial determinants of Physical activity and Fruit and vegetable intake**

As a step toward identifying effective interventions to promote physical activity and healthy eating among adolescence in the United Arab Emirates, a part of this research programme aimed to study some determinants of physical activity, as well as fruit and vegetable intake. It is important to understand the influences of physical activity and fruit and vegetable intake in order to gain a better understanding of these health behaviours in adolescents. There is a great lack of

research studying the influences of a healthy life style among adolescence in the Middle Eastern region (Musiager, 2013), thus; the objective of this study is to provide a better understanding of the influences of physical activity and healthy eating habits in this population. The socio-demographical, social, environmental and intrapersonal influences of physical activity and fruit and vegetable intake will be addressed in this chapter.

### ***3.3.1. Influences of physical activity***

The influences of physical activity have been studied frequently from both quantitative and qualitative perspectives. Some of the main facilitators have been identified as: social influences, enjoyment, socialisation and physical ability/appearance (Prochanska and Taylor, 2001; Biddle, Whitehead, Donovan and Nevill, 2005; Brooks and Magnusson, 2007; Cox, Schofield, Greasley and Kolt, 2006). For instance, Allender, Cowburn and Foster (2006) published a systematic review of qualitative studies on adults and adolescents participation in physical activity. The review showed that social interaction, weight management and enjoyment were common facilitators for taking part in physical activity among adolescents.

#### *3.3.1.1. Social influences*

Social influences have been directly linked to physical activity levels among adolescences (Biddle et al., 2005; Dwyer et al., 2006; Edwardson and Gorely, 2010; Salvey, Haye, Bowker and Hermans, 2012). The concept of social influence has been assessed by social norm in the Theory of Planned Behaviour (Ajzen, 1991). It is also included as an important construct in both the Prototype/Willingness Model (Gibbons and Gerrard, 1995) and Social Cognitive Theory (Bandura, 1986). Social Cognitive Theory (Bandura, 1986) and the construct of social learning, strongly supports parent-child relationships in relation to a number of behaviours. Based on the Social Cognitive Theory (Bandura, 1986), parents act as teachers for health behaviours and parental

modelling is strongly linked to children's own fruit and vegetable intake (Cooke et al., 2003; Jones et al., 2010; Neumark-Sztainer et al., 2002; Rasmussen et al., 2006; Wardle et al., 2005) and physical activity (Griffith et al., 2007; Thompson et al., 2003). These models are introduced in the following theoretical chapter (4).

Parents' behaviour, knowledge and attitudes towards healthy eating and physical activity (as well as other health behaviours), influences children and affects their own motivation and ability to perform the behaviour (O'Dea, 2003). As in relation to all health behaviours, parents can act as wonderful facilitators but they can also act as barriers to behaviour and if parents choose not to eat healthy or be physically inactive, it is also likely that their children will model that behaviour. Physically active parents often act as role models for their children which often result in increased physical activity levels for the child (Thompson et al., 2003). Griffith et al. (2007) conducted a study in the United States with a sample of at risk overweight children between the ages of 10 and 14, using a physical activity questionnaire for parents and children as well as a 7-day physical activity diary. The result showed that parental modelling was an important influencer of physical activity, as well as parental support. Griffith et al. (2007) suggested for health promotion efforts to target parents to increase physical activity in children.

The literature suggests that family influences are important and Bandura (1986) explained that parents act as direct influence of role modelling on children's health behaviours. Extensive research suggests that active parents, siblings and peers act as a strong influence on physical activity in this age group. These types of social influences often act as financial support (parents), encouragement and role modelling (Thompson et al., 2003). Data from a systematic review by Biddle et al. (2005) supports this and it was found that social influences from siblings played an important role and those with physically active siblings were more likely to be physically active themselves. A focus group study on adolescent

females by Whitehead and Biddle (2008) in the United Kingdom studied attitudes towards physical activity found that less active girls often received little encouragement from parents to be physically active and the more active girls received more encouragement to be active from their parents.

Social influences of peers also play a significant role in the facilitation of adolescents' physical active behaviour (Brooks and Magnusson, 2007). The results from their group study on females between the ages of 13 and 16 years in the United Kingdom showed that the participants were more likely to continue engaging in physical activities that were valued by their peers, in comparison to activities that were not perceived as valued. Early qualitative research by Coakley and White (1992) found that influences from parents, siblings and peers played an important role in physical activity. They also found that boyfriends acted as a social influencer of physical activity however, males were not influenced by their girlfriends to the same extent.

Social influences beyond family and peers have also been considered. MacPhail, Gorely and Clark (2003) identified encouragement from teachers and coaches as an important attractor to sport and physical activity participation among the participants. These findings were supported by Thompson et al. (2003) who conducted a longitudinal study of the impact of childhood and adolescent physical activity experiences on adult physical activity perceptions and behaviours, through interviews and questionnaires. Physical activity was tracked from childhood to adolescence and from adolescence to adulthood. The results indicated that that significant others, including peers, family and teachers/coaches had the greatest influence on youth's attitude towards physical activity. They also found that the relationship between peer influences and physical activity were stronger among males than females, which is supported by research by Dwyer et al. (2006).

It is likely that adolescents will be influenced to participate in physical activity if peers participate however, peer influences can also act as a barrier to physical activity. Youths that are influenced by non-active peers are likely to not participate in physical activity as suggested by the findings from a British study by Humbert et al. (2006). It is therefore important to understand that social influences can act as both facilitators and barriers to physical activity when creating strategies to improve physical activity levels among adolescents and this needs to be carefully considered in research and interventions.

#### *3.3.1.2. Psychological influences*

It is evident that peer influences plays an important role in the adolescents' physical activity (Allender, Cowburn and Foster, 2006; Coleman, Cox and Roker, 2008; Cox et al., 2006; Yungblut et al. 2012); however Biddle et al. (2005) found that enjoyment often acts as a stronger influential factor to physical activity participation than peer pressure. Enjoyment is an important factor in physical activity and may lead to increased levels (Brunton et al., 2003). Feelings related to enjoyment of physical activity seem to be more important than concerns about health and has been a strong and consistent predictor of physical activity in adolescents (Dishman et al., 2005 and Sallis et al., 1999). Mannell (1980) pointed out intrinsic motivation rather than extrinsic motivation is more dominant within exercise behaviour. In a study by Kilpatrick et al. (2005) it appeared that motivation for physical activity in youth was mainly linked to intrinsic reasons such as challenge, social recognition and enjoyment and also to extrinsic reasons such as appearance and stress management. In their research on older youths they found that intrinsic motivators such as enjoyment and benefits to health were more important than extrinsic motivators such as social recognition from peers. Brunton et al. (2003) suggested that boys more often identified enjoyment as a motivating factor and girls more often identified weight control as a motivating factor to physical activity. They argued that girls might be more motivated by extrinsic factors and boys by intrinsic factors.

Enjoyment is often influenced by factors such as competence, outcome expectations and perceived success. Cairney et al. (2012) found that participants, who perceived their athletic competence as lower, were less likely to enjoy PE. Enjoyment of PE lessons declined with age in females. Findings by Brooks and Magnusson (2007) indicate that adolescent females seem to enjoy non-competitive physical activity. They sometimes enjoyed team sports if it provided opportunities for enjoyment and enjoyed activities where they not were in competition with their peers. This was also apparent in Cox et al.'s (2006) focus group study where females were more likely to participate in physical activity if it was 'fun' and 'less competitive'. Feelings of enjoyment during sport and physical activity increased participation, both in adolescents and in younger children (Mulvihill et al, 2000) and dancing are one type of physical activity that has been highly enjoyed by females. Yungblut, Shinke and McGannon (2012) also found that enjoyment was the primary reason for participation in physical activities. Those participants with low levels of physical activity often found reasons to why they were not enjoying participation while participants with high physical activity levels found reasons to why physical activity was enjoyable. None of the participants were interested to participate in activities that they did not describe as enjoyable. Socialisation with peers were likely to enhance enjoyment by either making participants more confident about performing the skills and/or allowing them to reduce the seriousness of sports by way of making jokes and bonding with others. Meanwhile, not knowing anyone while participating in physical activity increased stress about not being good or skilled enough to perform the activity, with fear of judgment from others emerging as the primary concern. The literature above shows consistent findings, which indicate that socialisation; social support and enjoyment act as important facilitators of physical activity. These factors will be studied further in chapters 5 and 7 of the current research programme.

### **3.3.2. Influences of Fruit and vegetable intake**

It is important to understand the motivational factors of intake in order to promote fruit and vegetable intake among adolescents. The influencing factors of fruit and vegetable intake among adolescents have been studied in systematic reviews by Shepherd et al. (2001), Krolner et al. (2011) and Rasmussen et al. (2006). These reviews included qualitative studies (Krolner et al., 2006), quantitative studies (Rasmussen et al., 2006) and both (Shepherd et al., 2006). A majority of the research has identified the main facilitators of fruit and vegetable intake as availability, social influences from peers and family, and a desire to maintain a healthy weight and physical appearance.

#### *3.3.2.1. Social influences*

The importance of social influences in regards of physical activity was previously discussed in this chapter. It also appears that social influences are important in regards to fruit and vegetable intake (Rasmussen et al., 2006; Shepherd et al., 2006 and Krolner et al., 2011). It is important to bear in mind that this can occur in both directions and family and peers can act as both facilitators and barriers to fruit and vegetable intake.

In similarity to physical activity, the findings on parental influences in relation to healthy eating habits remain consistent across the literature. Cullen et al. (2000) found that social influences were strong predictors of fruit and vegetable intake. Social modelling by parents, especially through mothers appeared to be an important facilitator. Peers, during lunchtime in school, also acted as an important social influence. However, they also found negative peer responses for eating fruit and vegetables, which could act as a barrier to fruit and vegetable intake in school. In line with previous findings, Kubik, Lyttle and Fulkersen (2005) reported that social influences and support from peers, family and teachers increased intentions to eat fruits and vegetables.

Parental influences were evident in Nansel et al.'s (2013) study in the United States on the relationships between parents and youths' healthful eating attitudes and dietary intake. Parent diet-related behaviours appeared to have an important impact (both positive and negative) on the participants' attitudes and diet quality. Rasmussen et al. (2006) published a systematic review of the influences on older and younger children's fruit and vegetable intake. A majority of the reviewed papers (9 out of 10) indicated strong relationships between parental and child intake. Some of these studies were based on parents' actual intake and others on child's perceived intake. Neumark-Sztainer et al. (2002) studied children's eating behaviours in a large sample of 4746 adolescents in the United States. They found that parental intake played a significant role in their children's consumption adolescents were more likely to eat their daily five portions of fruits and vegetables if their parents did so. An Australian study by Pearson et al. (2009) found that parental modelling of fruit and vegetable behaviour was important predictor of intake intentions and behaviour, among 775 children aged 10 to 12 years. Parental influences appeared to be especially strong among the female participants. Parental self-reports were used to assess intake, which is a more reliable tool to use than child reported parental behaviour.

Parental influences are likely to decrease with age due to the increased influences of peers during adolescence. Parents may act as an influence of younger health behaviours (both healthy and unhealthy) to a greater extent than in older children as social interactions with peers becomes increasingly important to facilitators of behaviours and act as a more powerful influencer than parental norms (Beal, Ausiello and Perrin, 2001). Salvy, Elmo, Nitecki, Kluczynski and Roemmish (2011) studied the influence of parents and peers on healthful eating patterns in younger and children. Female adolescents ate healthier in presence of their friends than with their parents and it was suggested that the reason for this may be because they want to take on a good



impression in front of their friends. The study also indicated that adolescent males were not as influenced by the social context.

#### *3.3.2.2. Psychological influences*

The psychological influences of fruit and vegetable intake, such as enjoyment (Rasmussen et al., 2006; Thomas et al., 2003) knowledge (Shaikh, 2008), perceived barriers, control, attitudes and beliefs have also been studied (Murnaghan et al., 2009; Boucher, Gagne and Cote, 2012). People's beliefs in their own capability (self-efficacy) is also a strong predictor of fruit and vegetable intake (Bere and Klepp, 2004; Guillaumie et al., 2010). Self-esteem has also been linked to fruit and vegetable intake (Elfhag et al., 2008). All of these studies have been conducted in the West and no research is available in the United Arab Emirates. Environmental influences, such as cost and availability (Bruening et al., 2011; Capita and Alonzo, 2005) are also important according to research from the West. Again, no research on the environmental influences of fruit and vegetable intake is available in the United Arab Emirates. The Dubai Health Authority (2011) banned junk food in school cafeterias, however it is not clear how well this has been implemented across schools in the United Arab Emirates.

### **3.4. Summary**

The United Arab Emirates is witnessing an alarming rise in obesity (Al-Haifi et al., 2013). This is due to the rapid industrial development over the last decade in the United Arab Emirates and other countries in the Gulf region, which has led to an increase in wealth and enhanced lifestyles in terms of transportation, increased consumption of fast foods and greater opportunities for sedentary lifestyles (Al-Haifi et al., 2013; Al-Nohair, 2014; Badran and Laher, 2011). One of the greatest challenges facing the Arab countries is the lack of research and interventions of obesity and related ill-health (Alkhier, Elsharief and Alsharief, 2011). However, this is improving and the interest in obesity research in the region has increased

dramatically in the last 10 years, which is crucial for the development of an effective plan to deal with the problem of obesity in the Arab countries (Sweileh, Zuoud, Al-Jabi and Savalah, 2014). Even though the quality and quantity of the research about obesity from the Arab Gulf countries have increased, it is still lower in comparison to research from Western countries and Sweileh et al. (2014) therefore recommended that researchers in the region collaborate with international researchers and institutions in which obesity research has evolved.

To our knowledge, there has been little or no research on the influences of physical activity and fruit and vegetable intake in children in the United Arab Emirates. This study aims to fill this gap, with a focus on the determinants of physical activity and fruit and vegetable intake among secondary school students in Dubai (both expatriates and nationals). The focus is on adolescents as many of these factors change throughout life and adolescence seems to be a crucial time to establish positive health habits, not just during these years, but also across the lifespan (Garber et al., 2013). To meet this objective it is important to first investigate the theoretical background of cognitive factors that may have an influence on physical activity and fruit and vegetable intake. This is introduced in the following chapter. Chapter 4 introduces important socio-cognitive theories that are considered for the present research programme to predict adolescent's behavioural intentions in regards to physical activity and fruit and vegetable intake such as the Social Cognitive Theory (Bandura, 1986), Theory of Planned Behaviour (Ajzen, 1988) and Prototype/Willingness Model (Gibbons and Gerrard, 1995). Models such as these were the theoretical framework for the current research programme and will be studied in chapters 5, 6 and 7.

## **Chapter 4 – Socio-cognitive factors explaining physical activity and healthy eating**

There are a number of social cognition models that have been designed to examine, predict, and explain health behaviours and behaviour change. These models have been greatly influenced by a number of significant factors that motivate behaviours and behaviour change, such as social influences, attitudes, beliefs, intentions and goals (Bandura, 1986; Ajzen, 1985; Gibbons and Gerrard, 1995). A few common social cognition models used to examine various predictive factors of cognition on future health-related behaviours are: Social Cognitive Theory (SCT, Bandura, 1986), Theory of Planned Behaviour (TPB, Ajzen, 1991), and Prototype/Willingness Model (PWM, Gibbons and Gerrard, 1995). These models are used as theoretical frameworks for the current research programme and will be introduced in this chapter.

### **4.1. Theory of Planned Behaviour**

People's intentions and behaviour to eat healthy and be physically active are influenced by many factors such as accessibility, family (Brug et al., 2008), social influences (Povey et al., 2000) and also individual characteristics such as habits, preferences, and attitudes (Guillaumie, Goding and Vezina, 2010). It is thought that a good predictor of human behaviour is intention and so the theories attempt to identify what influences intention (Ajzen, 2011).

The Theory of Planned Behaviour (TPB) was developed by Icek Ajzen in 1988, as an effort to explain human behaviour. The Theory of Planned Behaviour (TPB; Ajzen, 1988) is essentially an extension of the Theory of Reasoned Action (TRA: Ajzen and Fishbein, 1980) and is a widely used theory within the field of psychology as an

attempt to explain behaviour, including health behaviour (Sutton, 2005). The Theory of Reasoned Action emphasised on the relationship between attitudes and behaviours, based on the assumption that behaviour is volitionally controlled. The importance of social cognitions in terms of subjective norms and attitudes were emphasised in this model (Ajzen and Fishbein, 1980). The theory of reasoned action was later developed in to the Theory of Planned Behaviour by including the measure of perceived behavioural control as it became clear that behaviour was not always volitional and under behavioural control (Ajzen, 1988).

According to Ajzen (1991), the Theory of Planned Behaviour assumed that a person's behaviour is determined by the intention to perform the behaviour. The constructs (attitudes, subjective norms and perceived behavioural control) determine an individual's intention in terms of trying to perform a behaviour rather than the actual performance of that behaviour (Schifter and Ajzen, 1985). Intention is a function of three constructs: subjective norms (a combination of perceived expectations from important others and the intentions to comply with these expectations), their attitudes towards the behaviour (beliefs and evaluations of behaviour outcomes) and perceived behavioural control (the perception a person has of his or her own ability to perform a certain behaviour) (Ajzen, 1991).

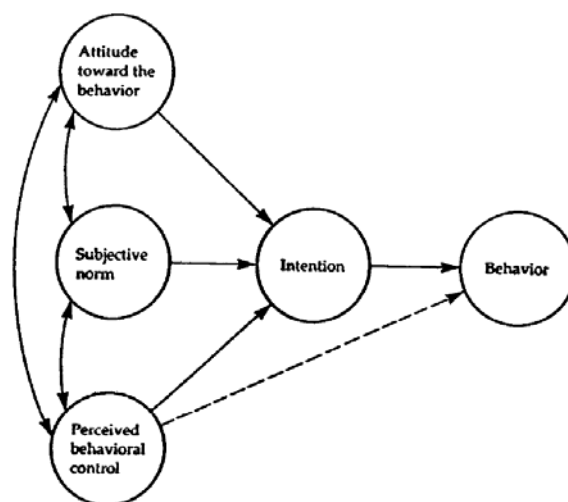


Figure 1: Theory of Planned Behaviour (Ajzen, 1991, p.182)

*Subjective norms* are determined by a person's different types of normative beliefs which are the perceived social pressure from significant others (i.e. parents, friends teachers) to carry out or not carry out a behaviour (Ajzen, 1991). It is also determined by his or her own motivation to comply with these significant others. Depending on the influences from these significant others, motivation to comply can range from non-existent to very high (Ajzen, 1991). For example, if a teenager's friends perceive that it is important to be physically active he or she is likely to be influenced by their beliefs, especially if he looks up to them and/or considers them important. If they do not think it is important to be physically active the chances are that he or she will not think so either. However, a number of normative beliefs, both positive and negative can influence subjective norms (Ajzen, 2011). His physically active parents may also influence the teenager with positive beliefs about physical activity norms. If the parent's beliefs are valued as more important than his friend's beliefs, he or she is likely to be physically active.

*Attitudes towards behaviour* are based on behavioural beliefs (Ajzen, 1991). These are the beliefs a person would have about the likely outcomes of performing a behaviour. This is weighted by the outcome value, which is the perceived desirability or evaluation of these outcomes. In the formation of attitudes, both negative and positive values of outcomes are likely to be considered. For example, a person may have both negative and positive attitudes towards fruit and vegetable intake. This can include positive attitudes such as good for health and weight control and the negative attitudes can be related to disliking the taste of fruits and vegetables (Ajzen, 1988; Ajzen, 1991).

The third construct of the Theory of Planned Behaviour is *perceived behavioural control*. This is based on the function of control beliefs (Ajzen, 1988). Ajzen (1991) suggested that a person's beliefs in their ability to be able to perform a specific behaviour are within their volitional control. For example, if a person

has high levels of perceived behavioural control and thinks he has the ability and resources to train for a 10K race, he will be more likely to be able to carry out the behaviour (e.g. train for the race) and deal with the obstacles and impediments involved. The likelihood of a behaviour to occur increases with the levels of perceived behavioural control and Ajzen (1991) suggested that control beliefs could influence a person's decision to perform certain behaviour. If a person does not believe they have the ability to perform the behaviour, they are likely to not even give it a try. According to Ajzen (1991), higher levels of perceived behavioural control should increase behavioural intentions. However, the Theory of Planned Behaviour proposes that perceived behavioural control not only affects behaviour intentions but also may also directly predict actual behaviour. Perceived behavioural control is the only construct of the Theory of Planned Behaviour that has been directly linked to actual behaviour.

The Theory of Planned Behaviour has been applied to a range of health behaviours and has been found to be a good predictor of fruit and vegetable consumption (Povey, Conner, Sparks, Jones and Shepherd, 2000; Gratton, Povey and Clark-Carter, 2007) and physical activity (Armitage, 2005; Hagger et al., 2002; Hagger et al., 2007). The model has also been linked to other types of health behaviours such as breast cancer screening (Rutter, 2000) and condom use (Sheeran and Taylor, 1999). The successful application of this model to fruit and vegetable intake, physical activity and other types of health behaviours has provided evidence to show that attitudes, subjective norms and perceived behavioural control are all predictive factors of intentions to engage in behaviour (Armitage and Conner, 2001; Godin and Kok, 1996; Hagger, Chatziantis, Biddle and Orbell 2001; Pawlak and Malinauskas, 2008; Sheeran and Taylor, 1999). In addition, research has found that behavioural, normative and control beliefs predict attitudes, perceived behavioural control and subjective norms (Hagger, Chatziantis and Biddle, 2002). The Theory of Planned Behaviour has been widely used, is tightly specified and a lot of research has been conducted using

this model as a theoretical framework to analyse the internal and motivational factors that influence physical activity and fruit and vegetable intake. The constructs of the Theory of Planned Behaviour in relation to physical activity and fruit and vegetable intake will be studied in chapters 5 and 6 of the current research programme and is further discussed below.

#### ***4.1.1. Attitudes, Perceived behavioural control and Subjective norms in physical activity and fruit and vegetable intake***

Several studies have used the Theory of Planned Behaviour (Ajzen, 1991) to predict physical activity and healthy eating in adolescents. Subjective norms, perceived behavioural control and attitudes have been linked as predictors of physical activity (Hagger et al., 2002; Hagger et al., 2001; Chatzisarantis, Hagger, Biddle and Karageorgis, 2002; Brickell, Chatzisarantis, Hagger, Biddle and Karageorgis, 2006) and fruit and vegetable intake (Gratton et al., 2007; Povey et al., 2000), to one extent or the other. Based on the Theory of Planned Behaviour, behavioural intentions seem to be a good predictor of specific behaviours, such as “I will eat 5 portions of fruits and vegetables today”. Behavioural intentions may be a poor predictor of behaviour in case of addiction such as smoking. It also seems to work better if there is a shorter time between intentions and behaviour, as a delay allows for opportunity of intentions to change (Harari and Legge, 2001). As the present study focused on specific behavioural intentions (recommended guidelines of physical activity and fruit and vegetable intake), the model seemed to be a good fit for the purpose of the study. The purpose of Study 1 was therefore to test these models that have been significant in a Western population, in the United Arab Emirates.

Many studies have examined the prediction of attitudes, perceived behavioural control and subjective norms on physical activity. For instance, Plotnikoff, Lubans, Costrigan and McCarger (2013) studied physical activity levels among a sample of 560 adolescents that were classed as either overweight or obese in

Canada. They found significant relationships between physical activity and the Theory of Planned Behaviour constructs, in particular perceived behavioural control and attitudes. Furthermore, Duncan, Ravis and Jordan (2012) studied the Theory of Planned Behaviour in relation to physical activity on a British sample of 197 participants between the ages of 13 and 14 years. Attitudes and perceived behavioural control acted as strongly significant predictors of intentions to be physically active. However, only perceived behavioural control influenced actual behaviour. This highlights the importance of behavioural control in the gap between intentions and behaviour in the Theory of Planned Behaviour.

Additional variables to the Theory of Planned behaviour have also been considered. The influence of self-efficacy and past behaviour on intentions to be physically active was investigated using an augmented version of the Theory of Planned Behaviour among 1152 adolescents of an average age of 13.5 years (Hagger et al., 2001). Self-efficacy and attitudes predicted behavioural intentions. Perceived behavioural control and subjective norms did not predict intentions. The study also showed that past behaviour predicted intentions both directly and indirectly through self-efficacy and perceived behavioural control. Hagger et al. (2002) also published a large meta-analysis on studies using the Theory of Planned Behaviour to predict physical activity in adolescents. Perceived behavioural control, together with self-efficacy and past behaviour, acted as the strongest influencers on behavioural intentions across the studies. Attitude, subjective norms and perceived behavioural control explained 45 percent of the variance in physical activity intentions. Perceived behavioural control and attitudes acted as stronger influencer of intentions and subjective norms appeared as a weak, but significant influencer on behavioural intentions.

Several authors (Duncan et al, 2012; Hagger et al., 2002; Plotnikoff et al., 2013) have argued that subjective norm is the weakest component of the Theory of Planned Behaviour in predicting behavioural intentions with perceived



behavioural control being the strongest predictor of behavioural intentions. However, this is not always the case. Aleselaimi (2010) found that subjective norms were strong predictors of behavioural intentions and also had a direct influence on physical activity in Saudi-Arabian secondary school and university students. Moreno-Murcia et al. (2013) found in a sample of Spanish adolescents that subjective norms, perceived behavioural control and attitudes were all effective predictors of physical active behaviours. Positive significant relationships between all constructs of the Theory of Planned Behaviour and physical activity were found in participants with a high intrinsic motivation to be physically active. Baker, Wood and Brownell (2003) also found that social norms directly influenced attitudes towards physical activity. The researchers suggested that participants who thought that people around them did not think it would be important to be physically active or were not physically active themselves were less likely to have positive attitudes towards physical activity. Nonetheless it is unclear to what extent subjective norms influence behavioural intentions and future research is needed to explore this.

Perceived behavioural control appears to be consistently powerful as a predictor of physical activity in the literature (Hagger et al., 2002). This also became evident in a British study by Everson, Daley and Ussher (2007) who found that all the constructs from the Theory of Planned Behaviour: attitude, subjective norms and perceived behavioural control explained participants' intentions to be physically active, but only perceived behavioural control (and intentions) significantly influenced actual behaviour. In another British study by Hagger, Chatzisarantis and Biddle (2002b) influences on physical activity intentions within the Theory of Planned Behaviour were examined in a sample of 1088 children between the ages of 10 and 14 years. They also found that attitudes and perceived behavioural control were important, and in this case these factors mediated the influence of autonomous (volitional) motivations to perform physical activity. Hagger and colleagues (2002b) therefore suggested that in

order to promote physical activity in adolescents, it would be beneficial to let children choose from a selection of physical activities. This would then hopefully increase their motivation to participate in the selected activity.

Furthermore, early research by Craig, Goldberg and Dietz (1996) supported the prediction of perceived behavioural control in intentions of physical activity. Perceived behavioural control and attitudes appeared as significant predictors of physical activity in the children. Ellis, Kosma and Symons-Downs (2012) found that perceived behavioural control and attitudes was strong influences of 8<sup>th</sup> and 9<sup>th</sup> graders intentions to be physically active. Subjective norms also acted as a significant influencer, however the effect was weak. Perceived behavioural control was again the only construct of the Theory of Planned Behaviour that influenced physically active behaviour (a weak but significant effect).

Furthermore, a number of the reviewed studies found that attitudes (Plotnikoff et al., 2013; Duncan et al., 2012; Murnaghan et al., 2009; Hagger et al., 2002b; Ellis et al., 2012 and Everson et al., 2007) and perceived behavioural control (Plotnikoff et al., 2013; Murnaghan et al., 2009; Duncan et al., 2012; Hagger et al., 2002b; Ellis et al., 2012 and Everson et al., 2007) influenced physical activity intentions. However, the only construct of the Theory of Planned Behaviour that influenced actual behaviour of physical activity seemed to be perceived behavioural control (Duncan et al., 2012; Ellis et al., 2012; and Everson et al., 2007). This leads to the discussion of the intention-behaviour gap that previously has been highlighted as a critique of the Theory of Planned Behaviour as intentions do not always lead to behaviour (Sniehotta et al., 2005; Sheeran, 2002; Conner and Armitage, 1998; Godin and Kok, 1996). Therefore, implementation intentions (Gollwitzer, 1993) in relation to physical activity and fruit and vegetable intake was introduced and studied in chapter 6 of the current research programme.

The Theory of Planned Behaviour has also been used to predict fruit and vegetable intake, which is another health promoting behaviour related to obesity (Povey et al, 2000; Gratton et al., 2007). Children's healthy eating patterns based on attitudes, subjective norms and perceived behavioural control was investigated in 780 adolescents between the ages of 14 and 19 in the United States (Backman, Haddad, Lee, Johnston and Hodkin, 2002). Positive attitudes were the strongest influence on healthful eating, followed by perceived behavioural control and subjective norms. Research conducted on adolescents (N=570) in Hong Kong revealed that perceived behavioural control was the strongest influencer on healthy eating intentions followed by attitudes and last subjective norms. The Theory of Planned Behaviour constructs predicted 45 percent of the variance of behavioural intentions (Chan and Tsang, 2011). Chan and Tsang (2011) also implemented a media based intervention promoting healthy eating that will be discussed in chapter 7.

Povey et al. (2000) successfully predicted healthy eating within an adult population using the constructs from the Theory of Planned Behaviour as well as two additional constructs: perceived social support and descriptive norms to predict healthy eating behaviours. Povey and colleagues (2000) found that perceived behavioural control, subjective norms and attitudes explained 42 percent of the variance in intentions to eat 5 portions of fruits and vegetables and 15 percent in actual behaviour. Descriptive norms and social support predicted intentions but not actual behaviour although social support influenced perceived behavioural control, which in turn influenced actual behaviour.

Gender differences have also been found. For instance, Emanuel, McCully, Gallagher and Updegraff (2012) studied gender differences within the Theory of Planned Behaviour to predict fruit and vegetable intake in adolescents in the United States. They found that females reported more positive attitudes and perceived behavioural control towards intake whereas males reported increased

subjective norms. The authors suggested that tailored interventions promoting fruit and vegetable intake in males should focus on positive attitudes and control. Gender differences were also considered in the current study, as well as any differences between age groups.

In similarity with the present study, Murnaghan et al. (2009) studied the influence of the constructs from the Theory of Planned Behaviour on both fruit and vegetable intake and physical activity. They found that all constructs of the Theory of Planned Behaviour influenced fruit and vegetable intake intentions. Healthy eating behaviours have been widely studied using the Theory of Planned Behaviour to predict intentions and behaviour.

#### **4.2. Prototype/Willingness Model**

Image/Prototype perception is another method for explaining adolescent behaviour and may be an important factor of children's perceptions of health and health behaviours. Prototypes are represented in the Prototype/Willingness Model (PWM), and act as a key role in predicting and motivating behaviour (Gibbons and Gerrard, 1995). Rick Gibbons and Meg Gerrard developed the Prototype/Willingness Model in 1995. The role of prototypes in adolescents' health-related decisions about health-risk behaviours has been examined from the perspective of this model (Gibbons, Gerrard, Blanton, and Russell, 1998). This model contends that adolescents' health decision-making strategies often are reactions to risk-conducive situations (social reaction path) rather than planned activities (reasoned path) (Gibbons and Gerrard, 1995). In similarity to the Theory of Planned Behaviour (Ajzen, 1988), the Prototype/Willingness Model considers attitudes and social norms but it also considers additional components: social influences (prototypes) and willingness.

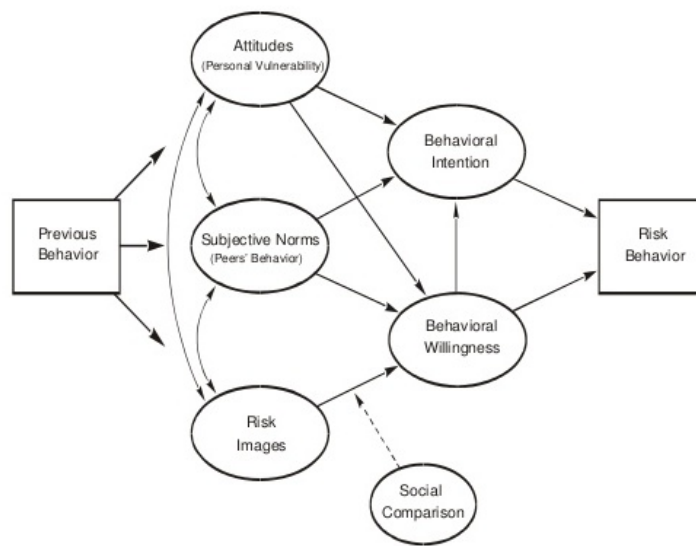


Figure 2: Prototype/Willingness Model (Gibbons, Gerrard and Lane, 2003)

The Prototype/Willingness Model has been widely used for adolescents as an attempt to describe and predict health behaviours (especially risk behaviours) based on the assumption of behaviours as social events (Gerrits et al., 2009; Ouellette, Gerrard, Gibbons and Reis-Bergan, 2009; Piko, Bak and Gibbons, 2007). The main assumption of the model is that much health risk behaviour is volitional (not under control) and not intended or planned. Behaviours that are planned and intended are referred to as the *reasoned path* (Gibbons, Gerrard, Blanton and Russell, 1998). The Prototype/Willingness Model assumes that many health behaviours are not intentional but instead are a reaction to social events and circumstances. This is referred to as the *social reaction path*. Another core assumption of the model is that adolescents' intentions to engage in health (risk) behaviours are influenced by social images (Gibbons et al., 1998). See figure 2 above for an explanation of the model.

Prototype, also known as perceived image (Gibbons and Gerrard, 1995) is the image that young people have of the people that engage in certain health behaviours. According to this model, two aspects of prototype perceptions influence health related decisions: the degree of liking one has for the risk image

(prototype evaluation) and similarity of the image to oneself (prototype similarity) (Rivis and Sheeran, 2002). A positive image of a certain prototype increases the likelihood of participation in the behaviour. A negative image of the prototype decreases the likelihood of participation (Gerrard, Gibbons, Houlinen, Stock and Pomery, 2008).

Willingness is based on what a person would be likely to consent to do in certain situations and has been defined as 'a person's openness to risk opportunity' (Gibbons et al., 1998). The model proposes that willingness to engage in a behaviour influences behaviour. Gibbons and Gerrard (1995) suggested that many adolescents do not intend to engage in risky behaviours, but are willing to do so should if the opportunity arise. Situational opportunities can trigger health risk behaviours even though the person did not plan to participate in the behaviour in the first place. This can explain certain behaviours as reactions to circumstances rather than a planned intention. Furthermore, an adolescent's favourability by the person that engages in the behaviour influences willingness (Oullette, Hessling, Gibbons, Reis-Bergen and Gerrard, 2005). For example, an adolescent who does not typically drink alcohol may engage in the behaviour because he or she has a positive opinion about another adolescent who does drink alcohol. He or she will be less willing to engage in the behaviour if his or her opinion of the person who drinks was a negative one.

Subjective norms, together with perceived behavioural control and attitudes predict health behavioural intentions according to the Theory of Planned Behaviour. However, the literature has often indicated that subjective norms do not consistently predict physical activity (Plotnikoff et al., 2013; Duncan et al., 2008; Hagger et al., 2002b) and other health behavioural intentions (Armitage and Connor, 2001). For example, a meta-analysis by Armitage and Connor (2001) indicated that the average variance of attitudes on behavioural intentions was twice as large as the variance of subjective norms on behavioural intentions.

Cialdini (2003) suggested that norms are indeed important construct in predicting behavioural intentions and behaviour, however this varies by the type of norm. Subjective norms refer to a person's perceived pressure from others to perform a behaviour. Cialdini (2003) meant that it would also be important to include descriptive norms, which are based on a person's perceptions of other people's behaviours and are based on observations of socially important others. White et al. (2009) studied the role of norms in the Theory of Planned Behaviour. They found support for additional normative variables such as descriptive norms and injunctive norms (refers to acceptable and unacceptable behavioural perceptions).

Gerrard et al. (2008) and Ravis and Sheeran (2003) also emphasised on the importance of including descriptive norms in models that aim to predict adolescents' health behaviours. This was later acknowledged by the Prototype/Willingness Model, which suggested that the more favourable descriptive norms or prototype perceptions of people who engage in the behaviour are, the more likely it is for a person to engage in the behaviour himself (Gibbons, Gerrard and Lane, 2003). So the more similar a person believes himself to be to a described smoker prototype and the more favourably he perceives him, the more likely he would be to engage in the behaviour (Gibbons et al., 1998).

Prototype perceptions have mainly been linked to health risk behaviours such as smoking (Gerrard, Gibbons, Stock, Lune and Cleveland, 2005; Aloise-Young, Hennigan and Graham, 1996) and alcohol consumption (Davies, Martin and Foxcroft, 2012; Blanton et al., 1999) among adolescents. However, prototype perceptions are also important influences on health-promoting behaviours, such as physical activity (Lazarus, Ourda, Barkoukis and Tsorbatzoudis, 2011) because the positive, desirable attributes of such behaviours may serve as motivational

goals for individuals in decision-making. Perceived image/prototype will be examined and further discussed in chapters five, six and seven of the current research programme.

#### ***4.2.1. Prototype perceptions in physical activity and healthy eating***

Most of the papers reviewed on prototype perceptions in adolescents' health behaviours were related to health risk behaviours. However a few studies focused on health promoting behaviours such as physical activity and fruit and vegetable intake. For instance, Kereszkes, Piko, Gibbons and Spielberg (2009) used the Prototype/Willingness Model as a framework for their research where they studied how social attitudes influence the development of exercise prototypes. The study took place in Hungary and included 548 secondary school students between the ages of 14 and 19 years. The results of this study showed that prototypes often were described as physically fit and positive. The participants often used positive adjectives such as sporty, popular, intelligent, attractive and self-assured to describe their exercise prototypes. They did not find any gender differences between prototype perceptions but there appeared to be differences depending on the participants' levels of physical activity. This was especially apparent among the males in the study. Males who participated in higher levels of physical activity were more likely to have positive exercise prototypes in comparison to those who participated in lower levels of physical activity. The authors further suggested that health initiatives promoting physical activity should focus on fostering positive images of peers that are physically active. Another study by Hampson, Andrews, Peterson and Duncan (2007) conducted in the United States to evaluate children's prototype images of physically active people during childhood. This was a longitudinal study that tracked children over a period of 3.5 years. The mean age of the children at the first point of data collection was 9.5 years and was 13.0 years at the second point of data collection. The results showed that there was a positive relationship between prototypes and physical activity levels. Children that had a more



favourable prototype of physically active people during the first point of data collections were also more likely to engage more in physical activity during the second point of data collection.

Ouelette, Hessling, Gibbons, Reis-Bergen and Gerrard (2005) also investigated prototype perceptions and its effect on exercise behaviour, however this was carried out on young adults. The study took place in the United States including 152 college students. Both prototypes of people that participate and do not participate in exercise behaviours were considered. They also considered future consequences of exercise behaviour by asking to picture their future self-image. The results indicated that health images (prototypes and self) had an impact on exercise behaviour. This study also used an image intervention, which will be discussed in the following chapter.

Prototype similarity, based of descriptive norms also appears to be an important influencer in relation to health eating (Beaulieu and Godin, 2011). Behavioural willingness to engage in healthy or unhealthy eating and the prototype perceptions of people that engages in these behaviours have also been studied based on Gerrard and Gibbon's (1995) work, however the number of studies are limited among both adults and children. It remains a need for more research using the Prototype/Willingness model to get a better understanding of children's prototypes of healthy eaters and the effect it may have on healthy eating behaviours.

In adults, prototype research on females in the Netherlands (Dally and Buunk, 2009) studied weight-loss diet behaviours together with prototypes of overweight and thin women. Females with perceived similarity to the overweight prototype image were more likely to take part in a weight-loss diet. This was not the case for females with a perceived similarity of the thin prototype image. The authors suggested people that take part in diet behaviours

to lose weight often are motivated by a fear to fit in to an over-fat image/identity and this could be considered in health promotion.

A few studies also investigated healthy eating prototype perceptions in adolescent samples, however the numbers are limited. De Gerrits, de Ridder, de Wit and Kuijer (2009) evaluated adolescents' prototypes of healthy and unhealthy eaters in the Netherlands. The participants held favourable prototypes of healthy eaters and unfavourable prototypes of unhealthy eaters. There were no differences between age, gender or BMI. There also appeared to be a link between unhealthy prototype perceptions and unhealthy eating, but not vice versa. The authors suggested that it would be beneficial to use unhealthy prototype images in health promotion targeting unhealthy eating. Further research by Gerrits et al. (2010) studied unhealthy and healthy prototypes in relation to consumption of fatty foods and fruits and vegetables. 511 adolescents between 14 and 19 in three countries (United States, Netherlands and Hungary) took part in this study. 8 percent of the variance in the consumption of fatty foods was explained by diet concerns, low self-control and unfavourable prototype perceptions. In regards to fruit and vegetable intake, only self-control acted as a predictor of actual behaviour. No known research has up to date considered Prototype perceptions in any of the Arab countries. Overweight in the Arab world is often a sign of high social status, beauty, fertility and prosperity (AlNohair et al., 2014; Klautzer et al., 2014) and it would therefore be interesting to explore whether prototype perceptions of healthy individuals in this part of the world would be considered as less favourable, in comparison to Western countries.

#### **4.3. Social Cognitive Theory (SCT)**

Albert Bandura developed the Social Cognitive Theory (SCT) in 1986. This model was based on Bandura's (1977) Social Learning Theory, which included the principles of observational learning and vicarious reinforcement. Bandura (1977)

suggested that both behavioural consequences and beliefs play an important role in determining behaviour. Social Learning Theory was originally based on Skinner's (1948) Operant Conditioning Theory, which explained that behaviours are based on behavioural consequences. Bandura (1977) suggested that beliefs also were also important in determining behaviour and blended his ideas with Skinner's theory of behavioural consequences.

A person's actions and cognitions are easily influenced by what people around them say or do making social influences important for individual decision-making. Social learning is based on observational learning, which is the type of learning that occurs by observing the behaviours of others. Bandura (1977) described how observing other people's behaviour through modelling had an impact on the observer's behaviour. Bandura (1977) suggested that observing the behaviour and learning experiences of socially important people influence human behaviour. Understanding the importance of parents and other social models is key in health promotion in children.

According to Bandura (1977), cognitive processing and a person's interpretation of the situation is key to social learning. Vicarious consequences are also part of the Social Learning Theory. When others' behaviours are observed, the observer will also observe what will happen after the behaviour, the consequence. If a person is feeling reinforced by the consequence of the behaviour, he or she is likely to continue engaging in that behaviour. If a person is not reinforced by the consequence of the behaviour, he or she may choose not to participate. For example, if a teenager observes the behaviour of peers who smoke and values the observed rewards for the smoking behaviour (for example, popularity), he or she may feel reinforced to smoke. According to social learning, reinforcement is therefore an important predictor of both positive and negative behaviours.

Social Cognitive Theory includes some further elements that are important in explaining human behaviours (Bandura, 2004). The elements include: *outcome expectations, goal setting, perceived self-efficacy, knowledge, perceived facilitation and perceived impediments*. The combination of these elements in Social Cognitive Theory greatly determines behaviour change.

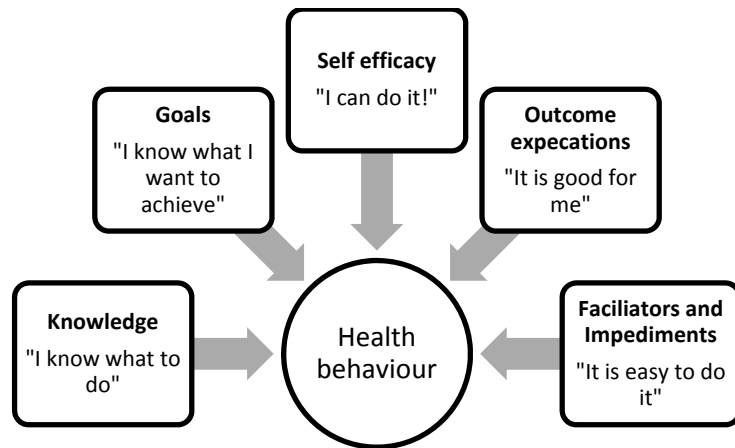


Figure 3: Social Cognitive Theory (Bandura, 2004)

*Outcome expectations* refer to the perceived costs and benefits of health behaviours and are a person's expectations of the consequence (outcome) of the behaviour. Outcome expectations can be divided into three types of outcomes—physical, social and self-evaluative (Bandura, 2004). Physical outcomes refer to costs and benefits of the health behaviour, including positive (pleasurable) and negative (adverse) effects. If for example, a person is engaging in physical activity, the positive effect may be weight-loss and the negative effect may be sore muscles or a sprained ankle from running. Social outcomes refer to social reactions and include the social approval that the health behaviour evokes. An example could be a person who is engaging in physical activity may receive praise from his/her parents as a positive effect but simultaneously have friends complaining that he/she is too busy to socialise due to sports practice. The third type of outcome expectation is self-evaluative outcomes, which refers to the positive and negative self-reactions to the health behaviour. It is important that a person feels enjoyment and self-pleasure in order to continue a health behaviour. Bandura (2004) explained that people often regulate their

behavioural actions based on their self-evaluative reactions and motivation and self-regulation is crucial in behaviour change. Behaviours that provide self-satisfaction are more valued and therefore more likely to continue than those behaviours that provide self-dissatisfaction.

*Perceived self-efficacy* is one's belief in one's own competence, power and ability to complete tasks (Bandura, 1997). Self-efficacy has a very important impact on goal setting behaviours and behavioural change. Bandura (2004, p. 144) explained: '*Unless people believe they can produce desired affects by their actions, they have little incentive to act or persevere in the face of difficulties. Whatever other factors may serve as guides and motivators, they are rooted in the core belief that one has the power to produce desired changes by one's actions*'. High self-efficacy will influence the effort people make to change health behaviours and it will help overcome barriers that act as de-motivators. A person with a high sense of self-efficacy is more likely to overcome challenges and focus on the opportunities rather than the obstacles (DeVellis and DeVellis, 2000). On the other hand, a person with low self-efficacy is less likely to overcome barriers and setbacks as his/her low self-efficacy levels would reduce motivation to behaviour change. Self-efficacy has proven to be an important influencer of a number of health behaviours such as physical activity (Dishman et al., 2005), healthy eating (Fitzgerald, Heany, Kelly, Nixon and Shelvin, 2013) and smoking cessation (Heale and Griffin, 2005).

If a person does not have the *knowledge* of the costs and benefits of a health behaviour, he or she will have little reason to change. Knowledge alone, will not lead to behaviour change but it will create the precondition for change (Bandura, 2004). Other self-influences like self-efficacy are needed for successful behaviour change. *Perceived facilitators* and *impediments* are also important factors in behaviour change. Level of self-efficacy will determine how well a person deals with impediments and overcomes barriers.

*Goal setting* (Bandura, 1986) is also an important element of the Social Cognitive Theory and refers to plans people set for themselves and the strategies they use to achieve the goals. Goals that are based on individual personal value system are more likely to be rewarding and motivating. Bandura (2004) suggested that realistic short-term goals help people to succeed by guiding present actions. Long-term goals direct personal change but there are too many influences that may disrupt the process and it is therefore better to set short-term goals.

Social Cognitive Theory has been widely used in health promotion among adolescents. The elements of this theory provide an explanation of behaviour change and behaviour maintenance and often serve as a useful theoretical framework when studying adolescents' health behaviours such as fruit and vegetable intake (Bere and Klepp, 2004), physical activity (Dewar, Lubans, Plotnikoff and Morgan, 2012), smoking (Bricker et al., 2010), alcohol consumption (Kao and Carter, 2013) and safe sex practices (Kao and Carter, 2013). Some of the components from this model is used to further explore adolescents' physical activity and fruit and vegetable intake in Study 3.

#### **4.4. Summary**

The current research programme expands health behaviour literature by studying the influencing factors of physical activity and fruit and vegetable intake in an environment where very little research within this place has taken place. There is a void in the literature of obesity-studies in the Middle East even though this is a clear issue in this part of the world and the current study therefore offers a unique contribution beyond previous research. The study is targeting pre-adolescent and adolescent participants as this is a crucial time for habit formation (Garber et al., 2013; Mikkila et al., 2004) and is a time where responsibilities and social patterns are being established.

The theoretical framework of the current research programme will empirically analyse physical activity and fruit and vegetable intake using constructs from the Theory of planned behaviour (Ajzen, 1991), the Prototype/Willingness model (Gibbons and Gerrard, 1995) and the Social Cognitive Theory (Bandura, 1986) using a combined of qualitative and quantitative research methods. To address the gap between intentions and behaviour, Implementation intention (Gollwitzer, 1993) was considered for an intervention in Study 2.

Study 1 studied the influencing factors of physical activity using the Theory of planned behaviour, looking at attitudes, perceived behavioural control and subjective norms (Ajzen, 1991), a model that has been widely used predict a variety of health behaviours among children, including physical activity (Baker et al., 2003; Craig et al., 1996; Duncan et al., 2012; Ellis et al., 2012; Hagger et al., 2002; Hagger et al., 2007; Mureno-Murcia et al., 2013; Muranghan et al, 2009; Plotnikoff et al., 2013; ) and fruit and vegetable intake (Beaulieu and Godin, 2011; Blanchard et al., 2009; Boucher et al., 2012; Chan and Tsang, 2011; Fila and Smith, 2006; Gallagher and Updegraff, 2012; Gratton et al., 2007; Gronhoj et al., 2013; Kothe and Mullan, 2014; Lien et al., 2002; Muranghan et al., 2009; Povey et al, 2000). However, there is a limited amount of research using the Theory of Planned Behaviour in the Middle East (Alselaimi, 2010). The current study therefore aimed to test this model that has been significant in Western populations, in the United Arab Emirates. The Theory of Planned Behaviour was extended with constructs from the Prototype/Willingness model, looking at perceived image and similarity (Gibbons and Gerrard, 1995). As the study was conducted among secondary school students, the aim was to study the influence of image on physical activity and fruit and vegetable intake as this has shown to be an important influencer of adolescent health behaviours (Gibbons and Gerrard, 1995) and is a construct that not is considered by the Theory of planned behaviour (Rivis et al., 2003). Parental modelling of physical activity and fruit

and vegetable intake (based on Social Cognitive Theory, 1986) was also considered in Study 1.

Based on chapter 5, and drawing from the Implementation Intention model (Gollwitzer, 1993) and the Prototype/Willingness model (Gibbons and Gerrard, 1995) the aim of chapter 6 was to test the effectiveness of an image intervention on adolescents' physical activity and fruit and vegetable intake. This was compared to an action planning intervention, which drew the theory about Implementation intention, as an attempt to fill the gap between intention and behaviour (Gollwitzer , 1993).

The influences of physical activity and fruit and vegetable intake were further studied in Study 3, from a qualitative perspective. Drawing from the Social Cognitive Theory (Bandura, 1986) but also the Theory of Planned Behaviour (Ajzen, 1991) and the Prototype/Willingness Model, the rationale for this was to get a further, in depth understanding of the social cognitive factors behind physical activity and fruit and vegetable intake by studying knowledge, social influences, outcome expectations, barriers and facilitators of these healthy behaviours.



## **Chapter 5 – Study 1**

### **5.1. Introduction**

Epidemiological research on obesity and related health behaviours tend to have a behavioural aetiology (Wardle and Steptoe, 2003). Although there is a genetic component to obesity poor lifestyle choices appears to be the major cause (Chouquet and Meyre, 2011). Physical activity and healthy eating play a very important role in prevention and treatment of obesity and overweight. These health behaviours tend to decline during adolescences, both among males and females (Whitehead and Biddle, 2008). In general, physical activity and fruit and vegetable intake within this age group is low in the United Arab Emirates (Dubai Health Authority, 2011).

As previously discussed in chapter 4, there are a number of social-cognition models that are attempting to explain the psychological and social factors that influence health behaviours among adolescents and have previously been linked to physical activity and healthy eating (Ogden, 2004). The Theory of Planned Behaviour (Ajzen, 1991) and the Prototype/Willingness (Gibbons and Gerrard, 1995) are two models that were used as a theoretical framework for the current research programme. In the present study, it was investigated to see whether the constructs from these models (attitudes, subjective norms, perceived behavioural control and perceived image), together with parental experiences, predicted physical activity and fruit and vegetable intentions and behaviour.

A majority of the reviewed studies of the Theory of Planned Behaviour showed that perceived behavioural control was the most successful predictor of health

behavioural intentions (Kothe and Mullan, 2014; Povey et al., 2000; Gronhoj et al., 2000; Chan and Tsang, 2011; Beaulieu et al., 2011; Fila and Smith, 2000; Liet et al., 2002; Boucher et al., 2012; Blanchard et al., 2012) and attitudes (Povey et al., 2000; Gronhoj et al., 2013; Chan and Tsang, 2011; Martens et al., 2005; Bealeu and Godin, 2011; Backman et al., 2011; Fila and Smith, 2006; Lien et al., 2002; Blanchard et al., 2009 and Boucher et al., 2012). Many previous studies using the Theory of Planned Behaviour have led us to believe that subjective norms do not appear as an important predictor of physical activity (Plotnikoff et al., 2013; Duncan et al., 2012; Hagger et al., 2002b). This was also suggested by Armitage and Conner (2001), with reference to a variety of health behaviours. They conducted a meta-analysis on 185 studies and found that the constructs from the Theory of Planned Behaviour accounted for 27 percent of the variance in behaviour and 39 percent in behavioural intentions. Subjective norms were the component of the Theory of Planned Behaviour that had the weakest influence on health behaviour intentions in comparison to perceived behavioural control and attitudes.

Within the context of physical activity and healthy eating, researchers (Rivis et al., 2006; Lazura et al., 2011) have also considered the influence of additional variables not described in the original Theory of Planned Behaviour model. It has been suggested that the narrow conceptualization of the normative component in the Theory of Planned Behaviour may be responsible for the weakening effect of the subjective norm-intention relation (Armitage and Conner, 2001; Rivis et al., 2006; Sheeran and Orbell, 1999). Two further conceptualizations of social influence have been identified as being particularly important in adolescents' health behaviours, namely descriptive norms and prototype perceptions (Rivis et al., 2006). These types of social influence are included in Gibbons and Gerrard's Prototype/Willingness Model of adolescent health-risk behaviour (Gibbons, Gerrard and Lane, 2003).

Descriptive norms refer to what others do and are mainly based on observations of peers' behaviours in given situations (Cialdini, Reno, and Kallgren, 1990). Prototype evaluation is based on this and is the degree of liking a person has of another's behaviour (Gibbons and Gerrard, 1997). This has appeared to be an influencer of adolescents' behaviour, especially risk behaviours (Rivis et al., 2006). Gibbons and Gerrard (2003) explained that prototype perceptions and descriptive norms are especially influential in this age group because of the great impact of social influences in adolescents. Prototypes are another way of examining the influence of norms on behaviour and are defined as stored representations of the typical person that engages in the target behaviour (Gibbons and Gerrard, 1995; Gibbons et al., 1998). Prototypes represent a core construct of the Prototype/Willingness Model (Gibbons and Gerrard, 1995), which was introduced in the theoretical chapter 4.

As previously discussed in chapters 3 and 4, social interactions are of great importance during adolescence. Gibbons and Gerrard (1995) therefore suggested that adolescents' behaviour often is spontaneous, rather than intentional. The Prototype/Willingness Model (Gibbons and Gerrard, 1995) suggests that adolescents are influenced by their willingness to participate in health behaviours and has mainly been used to predict health risk behaviours such as smoking (Gerrard et al, 2005), drink-driving (Rivis, Abraham and Snook, 2011) and alcohol consumption (Todd and Mullan, 2011) in adolescents. However, the model has also been used to explain health-promoting behaviours such as healthy eating (Gerrits et al., 2009; Gerrits et al., 2010) and physical activity (Hampson et al., 2007; Keresekez et al., 2009; Lazura et al., 2011; Ouelette et al., 2005; Rivis et al., 2016; Todd and Mullan, 2011).

## **5.2. Expanding the Theory of Planned Behaviour with the Prototype/ Willingness Model**

Research on the role of norms in the Theory of Planned behaviour has been frequently studied and it appears that subjective norms is the weakest influencer of behavioural intentions (Armitage and Conner, 2001) and personal factors such as perceived behavioural control and attitudes, appears to be stronger predictors of health behavioural intentions. This has led to the examination of other types of norms. For instance, Ravis and Sheeran (2003) conducted a meta-analysis of several studies using the Theory of Planned Behaviour. The results showed that descriptive norms significantly predicted behavioural intentions (average correlation = .44), over and above the effects of the attitudes, subjective norms and perceived behavioural control. A few studies have used a combined approach and included both the Theory of Planned Behaviour and the Prototype/Willingness Model as framework for their research. This is also applicable to the present study of this research programme. Lazura et al. (2011) studied physical activity intentions from the perspective of both these models. This study took place in a Greek secondary school using 254 adolescents in grades 8 and 9 (mean age= 13.59). However, the results showed that prototype favourability and similarity were not linked to physical activity intentions. The constructs from the Theory of Planned Behaviour did not predict physical activity intentions either.

Ravis, Sheeran and Armitage (2006) studied whether prototype perceptions and descriptive norms, enhanced the prediction of three health risk behaviours (alcohol, fatty foods and smoking) and three health enhancing behaviours (exercise, sleep and eating breakfast) after they constructs from the Theory of Planned Behaviour was considered. The study took place in college in the United Kingdom and included 247 participants with a mean age of 16.6 years. The result showed that the constructs from the Prototype/Willingness Model accounted for a significant proportion of behavioural intentions for all six of the health

behaviours, including exercise. Prototype evaluation and prototype similarity contributed to 5 percent of the explained variance of behavioural intentions (towards both risky and enhancing health behaviours). From the Theory of Planned Behaviour, attitudes and past behaviour was the strongest predictor of behavioural intentions, followed by subjective norms. Subjective norms were significantly predicted in exercise and fatty foods intentions only. Ravis et al. (2006) suggested that the constructs from the Prototype/Willingness Model, in particularly prototype similarity, should be included as constructs of the Theory of Planned Behaviour. They also suggested that health promotion initiatives include both healthy and risky prototypes when targeting increase physical activity levels among adolescents.

Ravis et al. (2006) explained that the role of norms in the Theory of Planned behaviour is too narrow and that it is important to consider descriptive norms as well. Ravis and Sheeran (2003), Ravis et al. (2006) and Povey et al. (2000) found that descriptive norms predicted behavioural intentions to a greater extent than subjective norms. This should therefore be considered in research using the Theory of Planned Behaviour in adolescents. Ravis and Sheeran (2003) suggested that when the Theory of Planned Behaviour is used in this age group, it would be useful to include descriptive norms in future applications of the Theory of Planned Behaviour as it has been shown to enhance the prediction of behavioural intentions, even after attitudes, perceived behavioural control and subjective norms has been accounted for, and can perhaps better capture the role of social influencers in determine health behavioural intentions than social norms.

The numbers of studies that have investigated the role of descriptive norms and adolescents' prototype perceptions in relation to health promoting behaviours are limited and we know a lot less about adolescents' social images of people who engage in health protecting behaviours. The majority of research using the

Prototype/Willingness Model focuses on health risk behaviours such as smoking, condom use and alcohol consumption (Gerrard et al, 2005). There is a lack of research of the Prototype/Willingness Model to predict physical activity and healthy eating behaviours among adolescents and it therefore remains a need to study this further. Lazura et al. (2011) suggested that children's prototype perceptions of healthy behaviours could be valued as positive and desirable. These perceptions may then in turn serve as motivational goals for individuals in decision-making. Furthermore, a couple of studies included both the Theory of Planned Behaviour and Prototype/Willingness Model to predict physical activity, among other behaviours in adolescents (Lazura et al., 2011; Ravis et al., 2006). No studies combined these two models to predict healthy eating behaviours. Ravis et al. (2006) suggested an extension of the Theory of Planned Behaviour by using the constructs from the Prototype/Willingness Model to explain both health promoting and risk behaviours.

As previously discussed in chapter 3, parental behaviour has also appeared as strong influences on children's physical activity (Alselaimi, 2010; Chater et al., 2007; Hagger et al., 2001; Hagger et al., 2002; Hennesey et al., 2010; Griffith et al., 2007; Jago et al., 2011; Lally and Gardner, 2013; Lazura et al., 2011; Pugliese and Tinsley, 2007; Thompson et al., 2003;) and healthy eating behaviour (Bel et al., 2001; Bere and Klepp, 2005; Cooke et al., 2003; DeBrujijn et al., 2006; Jones et al., 2010; Lien et al., 2001; Nansel et al., 2013; Neumark-Sztainer et al., 2002; Pearson et al., 2009; Rasmussen et al., 2006; Roemmish et al., 2011; Salvy et al., 2011; Wardle et al., 2005; Wong and Mullan, 2009) in the literature. Based on a review of the literature, the present study investigated how parental behaviour and a combination of the constructs from the Theory of Planned Behaviour and the Prototype willingness model influenced physical activity and fruit and vegetable intake in adolescents, to see whether it would be fruitful to expand the Theory of Planned Behaviour with the Prototype/Willingness model in studies on adolescents. These models have been significant in Western samples

and the aim was therefore to test these models in the United Arab Emirates. Demographical differences related to gender and age were also studied.

### **5.3. Aims and objectives**

The aim of Study 1 was to see to what extent health cognitions such as attitudes, perceived behavioural control, social norms and prototype perceptions, together with parental behaviour, predicted adolescents' physical activity and fruit and vegetable intake, drawing from the Theory of Planned Behaviour (Ajzen, 1991), Prototype/Willingness Model (Gibbons and Gerrard, 1995) and Social Cognitive Theory (Bandura, 1986).

Study 1 had three objectives. The first objective was to test the ability the Theory of Planned Behaviour (TPB; Ajzen, 1991), to predict intentions and actual behaviour of adolescents' physical activity and fruit and vegetable intake. Perceived behavioural control, attitudes towards behaviour and subjective norms were considered.

The second objective was to test a combination of the two models: Theory of Planned Behaviour and Prototype/Willingness Model, to see whether prototype evaluation and similarity increased the prediction of intentions and actual behaviour, after influences from the Theory of Planned Behaviour, and parental experiences were considered.

The third and final objective of this study was to determine whether any of these influences were moderated by age and gender.

An overview of the objectives for the first study of the research programme is illustrated in figure 4 below.

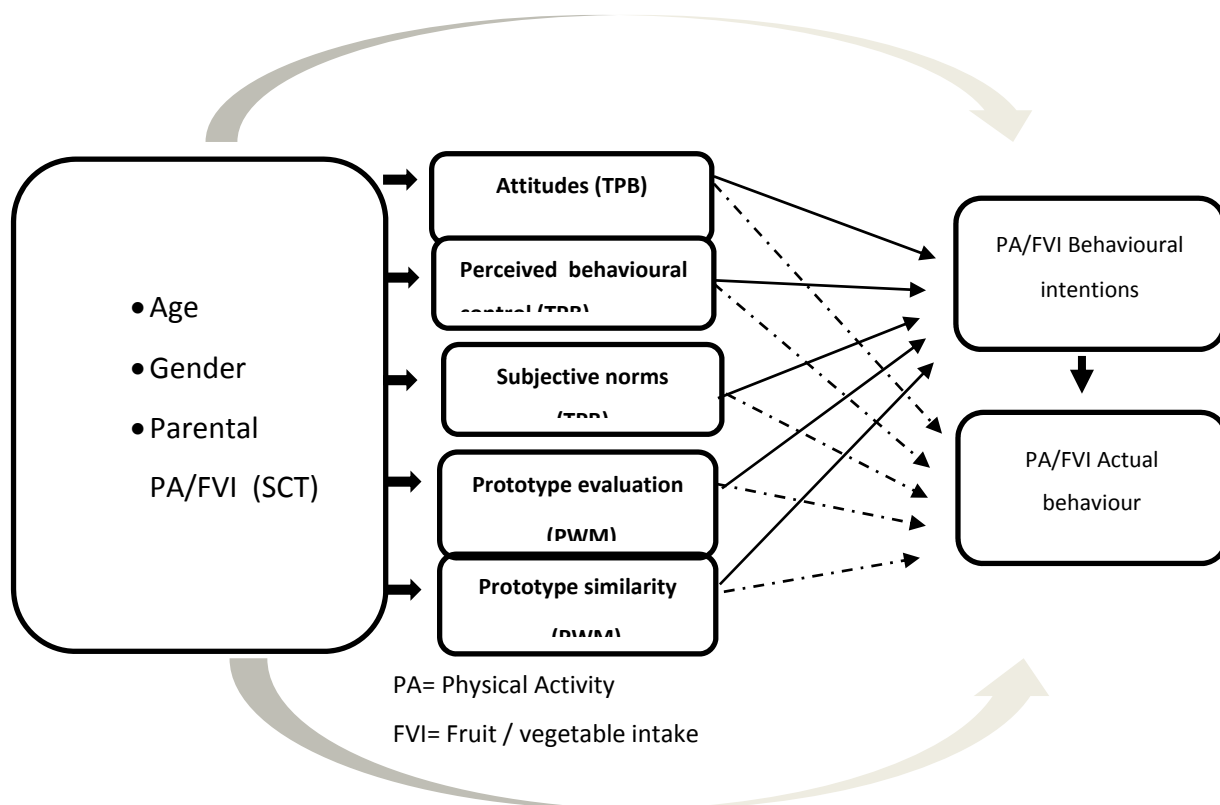


Figure 4: An overview of Study 1

#### 5.4. Research Questions

With the above aims and objectives in mind, Study 1 seeks to address the following research questions.

1. How well can the Theory of Planned Behaviour predict behavioural intentions and behaviour of physical activity and fruit/vegetable intake?
2. Do variables from the Prototype/Willingness Model enhance the prediction of physical activity and fruit and vegetable intake?
3. Are there any gender or age differences between intentions, behaviour and health cognitions?
4. Can adolescents' intentions and behaviour be predicted by their observations of the health behaviours of their parents?



## 5.5. Hypotheses

- **Hypothesis 1a:** Variables from the Theory of Planned Behaviour (attitudes, subjective norms, perceived behavioural control) will be significant predictors of physical activity intentions.
- **Hypothesis 1b:** Variables from the Theory of Planned Behaviour (attitudes, subjective norms, perceived behavioural control) will be significant predictors of fruit and vegetable intake intentions.
- **Null Hypothesis 1a:** Variables from the Theory of Planned Behaviour (attitudes, subjective norms, perceived behavioural control) will not be significant predictors of physical activity intentions.
- **Null Hypothesis 1b:** Variables from the Theory of Planned Behaviour (attitudes, subjective norms, perceived behavioural control) will not be significant predictors of fruit and vegetable intake intentions.
- **Hypothesis 2a:** Behavioural intentions and perceived behavioural control will be significant predictors of physical activity actual behaviour.
- **Hypothesis 2b:** Behavioural intentions and perceived behavioural control will be significant predictors of fruit and vegetable actual behaviour.
- **Null Hypothesis 2a:** Behavioural intentions and perceived behavioural control will not be significant predictors of physical activity actual behaviour.

- **Null Hypothesis 2b:** Variables from the Theory of Planned Behaviour (attitudes, subjective norms, perceived behavioural control) will not be significant predictors of fruit and vegetable actual behaviour.
- **Hypothesis 3a:** Prototype variables (evaluation and similarity) will enhance the prediction of <sub>physical</sub> activity behavioural intentions, after the Theory of Planned Behaviour, gender, age and parental behaviour variables have been taken into account.
- **Hypothesis 3b:** Prototype variables (evaluation and similarity) will enhance the prediction of fruit and vegetable behavioural intentions, after the Theory of Planned Behaviour, gender, age and parental behaviour variables have been taken into account.
- **Null Hypothesis 3a:** Prototype variables (evaluation and similarity) will not enhance the prediction of physical activity behavioural intentions after the Theory of Planned Behaviour, gender, age and parental behaviour variables have been taken into account. .
- **Null Hypothesis 3b:** Prototype variables (evaluation and similarity) will not enhance the prediction of fruit and vegetable behavioural intentions, after the Theory of Planned Behaviour, gender, age and parental behaviour variables have been taken into account.
- **Hypothesis 4a:** Prototype variables (evaluation and similarity) will enhance the prediction of physical activity actual behaviour, after the

Theory of Planned Behaviour, gender, age and parental behaviour variables have been taken into account.

- **Hypothesis 4b:** Prototype variables (evaluation and similarity) will enhance the prediction of fruit and vegetable actual behaviour, after the Theory of Planned Behaviour, gender, age and parental behaviour variables have been taken into account.
- **Null Hypothesis 4a:** Prototype variables (evaluation and similarity) will not enhance the prediction of physical activity actual behaviour, after the Theory of Planned Behaviour, gender, age and parental behaviour variables have been taken into account. .
- **Null Hypothesis 4b:** Prototype variables (evaluation and similarity) will not enhance the prediction of fruit and vegetable intake actual behaviour, after the Theory of Planned Behaviour, gender, age and parental behaviour variables have been taken into account.
- **Hypothesis 5a:** There will be a significant difference in some or all of the physical activity study variables (attitudes, subjective norms, perceived behavioural control, prototype evaluation, prototype similarity, behavioural intentions and recent health behaviour) between gender and/or age groups.
- **Hypothesis 5b:** There will be a significant difference in some or all of the fruit and vegetable intake study variables (attitudes, subjective norms, perceived behavioural control, prototype evaluation, prototype similarity,

behavioural intentions and recent health behaviour) between gender and/or age groups.

- ***Null Hypothesis 5a:*** There will be no significant difference in some or all of the physical activity study variables between gender and/or age groups.
- ***Null Hypothesis 5b:*** There will be no significant difference in some or all of the fruit and vegetable study variables between gender and/or age groups.

## **5.6. Methodology**

### **5.6.1. Design**

This part of the research programme employed a quantitative questionnaire design to assess whether the constructs from the Theory of Planned Behaviour, Prototype/Willingness Model and parental behaviour and demographics predicts intentions and actual behaviour to engage in physical activity and fruit/vegetable consumption. Data was collected at baseline (Time 1), and 7 days later (Time 2). At time 2, only actual behaviour was considered. The overall independent variables of the study were the constructs from the Theory of Planned Behaviour: attitudes; subjective norms and perceived behavioural control; prototype perceptions from the Prototype/Willingness Model. Parents' physical activity and fruit and vegetable experiences (child reported) were also considered as independent variables. The dependent variables were the adolescents' intentions to be physically active and actual behaviour to engage in physical activity and fruit/vegetable intake. However, all of the variables mentioned above became dependent variables by investigating any significant differences between demographical factors: gender and age. The data on the physical activity and fruit and vegetable intake was analysed separately.

### **5.6.2. Participants**

Following approval from the Department of Psychology's ethics committee, fifteen schools in Dubai were contacted via email and invited to participate in the research programme, in September 2011 (appendix 1d). Of the fifteen schools contacted, only four schools agreed to participate. The four schools chosen for the research programme were of similar characteristics, in terms of curriculum and fees and one school was excluded, as some of the characteristics were different from the other schools (curriculum and rating). The chosen schools all offered the British National Curriculum and received a rating of 'good' from the

Dubai School Investigation Bureau (DSIB) and were for-profit. The school fees were between £10,900 and £12,100 for each academic year (KHDA, 2015).

Two of the schools, School D and School E, were fast to respond and wanted the data collection to take place within two weeks (October, 2011). The third school did not respond to the invitation until two months later, and the data collection in this school was delayed due to scheduling difficulties and took place in February of 2011. Data from a total of N=188 was collected from these three schools. This sample also participated in Study 2. To increase the sample size, another set of school invitation letters was sent out (See appendix 1a). School I responded to the invitation and was interested to participate in the study. The data from school I was collected in September of 2011. This sample was not included in the intervention sample of Study 2, as the desired sample of participants already had been achieved. The sample from school I was the only sample that was included in the time 2 follow up analysis for Study 1, as these participants did not receive an intervention.

In total, N=536 participated in the study at time 1, between 10 and 15 years of age. Of these, 11 were excluded due to excessive missing data. At time 2 N=468 participated. Student absentees could possibly explain the large reduction of participants. A further 128 participants were not included in the follow up analysis at time 2, as these participants were part of intervention groups A and B of Study 2 (chapter 6). This data could therefore not be included in the intention-behaviour relationship analysis. Including the whole study sample, 33.4 percent of the participants were British, 20.3 percent were 'other westerner', 19.8 percent were South Asian, 12.1 percent were Middle Eastern, 9.7 percent were Emiratis, 3.9 percent were 'others' and 2.4 percent were 'other Asian'. The participants were between the ages of 11 and 14 years with a mean age of 12.6 years (SD=1.1). The reason why adolescents were targeted in the research programme was because during this period of development is a time when

children start becoming more independent and peers have more influence than parents, which offers a partial explanation why many health damaging behaviours start during this time (Beal et al., 2001). Many health behaviours are also established during adolescence and continue into adulthood (Mikkila et al., 2004). 38.2 percent were Christian, 26.5 percent were Muslim, 18.3 percent were Hindu or Sikh, 9.7 percent did not belong to a religion, 2.4 percent belonged to 'other' religion and 0.7 percent was Buddhist. 50.1 percent of the participants were male and 49.9 percent were females. A detailed description of participants' age, gender, nationality and religion can be found in Table 1 above. The schools were referred to in anonymised form as schools D, E, R and I.

The schools could not provide any information regarding the socio-economic status of their students. Considering the high tuition fees of the schools, it could perhaps be assumed that the students came from a more advantaged socioeconomic background than schools with low tuition fees. The overall statistics of BMI in all schools showed that 14.5 percent of the students were overweight or obese (BMI above the 85th percentile) and 1.4 percent were underweight (BMI below 5th percentile). The rates of overweight and obesity were lower than previous statistics from the United Arab Emirates, which showed an overweight and obesity rate of 34 percent (Ng et al., 2010). However this was among Emirati nationals only. No data was available from other private schools including both nationals and expats.

Table 1: Total number of participants by age, gender, nationality, religion and school

	School D Oct 2010 N=61	School R Oct 2010 N=67	School E Feb 2010 N=60	School I Sept 2011 N=348	Total N=531
<b>Age</b>					
M/SD	12.3/0.8	12.6/0.6	12.3/8.8	12.8/1.2	12.6/1.1
11 years	16.4%	0%	16.7%	19.5%	16.4%
12 years	42.6%	40.3%	38.3%	17.2%	25.5%
13 years	34.4%	55.2%	40.0%	29.0%	34.1%
14 years	6.6%	4.5%	5.0%	22.7%	16.6%
<b>Gender</b>					
Male	44.3%	65.7%	53.3%	46.0%	50.1%
Female	55.7%	34.3%	46.7%	51.0%	49.9%
<b>Nationality</b>					
British	36.1%	41.8%	46.7%	29.0%	33.4%
Other Western	24.6%	11.9%	20.0%	21.9%	20.3%
Middle Eastern	9.8%	19.4%	13.3%	12.1%	12.1%
Emirati	8.2%	9.0%	3.3%	5.7%	6.2%
South Asia	19.7%	16.4%	16.7	21.0%	19.8%
Other Asia	0%	3.0%	0%	3.2%	2.4%
Other	1.6%	4.5%	0%	4.9%	3.9%
<b>Religion</b>					
Christian	37.7%	37.3%	36.7%	38.8%	38.2%
Muslim	24.6%	37.3%	31.7%	23.9%	26.5%
Hindu	18.0%	13.4%	20.0%	19.0%	18.3%
Buddhist	1.6%	3.0%	1.7%	0%	0.7%
Other	3.3%	1.5%	1.7%	2.6%	2.4%
None	14.8%	7.5%	8.3%	9.5%	9.7%

#### School D

School D was the first school to participate in the collection of data in October 2010. This was secondary school starting from year 7 until year 12 and located in



Umm Suquiem in Dubai. In this school (890 students), 14.1 percent of the students were overweight or obese (BMI above the 85th percentile) and 1.5 percent were underweight (BMI below 16, 5th percentile). The school fees were approximately £12,000 for each academic year. N=61 (40 male and 21 female) from three year groups (7, 8 and 9) in school D took part in the study. N=10 of the participants were 11 years old, N=26 were 12 years old, N=21 were 13 years old and N=4 were 14 years old. This difference in age between the schools would be expected due to the time of year data were collected. School D received an intervention as part of Study 2 and was therefore not included in Time 2 data analysis (intentions predicting behaviour).

#### School E

School E took part in the study in October 2010, included year groups 7, 8 and 9 and was the second school to take part in the data collection. This was a combined secondary and 6<sup>th</sup> form school starting from year 7 until year. The school fees were approximately £12,100 for each academic year. In this school (846 students), 13.9 percent of the students were overweight (BMI above the 85th percentile), and 1.4 percent were underweight (BMI below 16, 5th percentile). A total of N=60 (29 male and 31 female) participated. N=10 of the participants were 11 years old, N=23 were 12 years old, N=24 were 13 years old and N=3 were 14 years old.

#### School R

School R was the third school to participate in the study in February 2011. This school offered both primary and secondary education. The school fees were approximately £12,100 for each academic year. In this school, (788 students), 15.1 percent of the students were overweight (BMI above the 85th percentile) and 1.3 percent were underweight (BMI below 16, 5th percentile). 85 percent were at a healthy weight. Out of the 60 participants

(36 male and 31 female) were N=27 12 years old, 37 were 13 years old and 3 were 14 years old. Out of the 67 participants, were N=44 male and N=23 female. N=32 were male and N=28 were female. School R received an Image intervention as part of Study 2 and was therefore not included in Time 2 data analysis (intentions predicting behaviour).

#### School I

School I was the final school to participate and took part in September of 2011. This school catered for students from foundation stage to 6<sup>th</sup> form and was located in the Greens in Dubai. The school fees were approximately £10,900 for each academic year. In this school (630 students), 14.8 percent of the students were overweight (BMI above the 85th percentile), and 1.2 percent were underweight (BMI below 16, 5th percentile). A total of N=348 (175 male and 173 female) from four year groups (7-10) took part in the data collection. Of these, 11 were excluded due to excessive missing data. N=2 were 10 years old, N=68 were 11 years old, N=60 were 12 years old, N=101 were 13 years old, N=79 were 14 years old and N=27 were 15 years old. See Table 1 above for a more detailed description, including percentages of the participating sample from all the schools.

#### **5.6.3. Materials**

##### *Theory of Planned Behaviour (TPB)*

Items based on Ajzen's (2006) TPB questionnaire were used to measure the TPB components in relation to physical activity and fruit/vegetable intake. Wordings and response formats for the items were developed using examples from Conner and Sparks (1995) and has been previously used by Chater et al (2007). Subjective norms (with items such as "*People who are important to me approve of my eating 5 portions of fruit and vegetables each day next week*"), Perceived behavioural control (with items such as: "*It would be easy for me to do 60 minutes of physical activity next week*"), Behavioural intentions (with items such

as” *I intend to eat five portions of fruit and vegetables each day next week*”), was all measured on 5-point scales ranging from strongly disagree to strongly agree, with two questions for each health behaviour. Attitudes were also measured on a 7-point scale. Including one item for each behaviour such as *“For me, to do 60 minutes of physical activity would be . . .”* participants are asked to rate on six bipolar (-3 to +3) semantic differential scales, using the adjectives *bad–good, harmful–beneficial, unpleasant–pleasant, unenjoyably– enjoyable and foolish–wise*. Low scores indicated a negative attitude with high scores indicating a positive attitude towards the respective health behaviour.

#### *Prototype/Image*

The following definition of a prototype (Gibbons et al., 1995) was presented to the participants: *‘The following question concerns your images of people. What we are interested in here are your ideas about typical members of different groups. For example, we all have ideas about what typical movie stars are like or what the typical grandmother is like. When asked, we could describe one of these images – we might say we think the typical movie star is pretty or rich, or that the typical grandmother is sweet and frail. We are not saying that all movie stars or all grandmothers are exactly alike, but rather that many of them share certain characteristics’*. Prototype evaluation was assessed by asking participants how favourable their impression was of the type of person their age that engage in daily physical activity/eat fruit/vegetable intake on a 7-point scale (extremely unfavourable to extremely favourable). Participants are asked to think about the adjectives that describe a person who engage in the behaviours. The sixteen adjectives are; healthy, exciting, popular, immature, “cool” (sophisticated), unattractive, independent, careless, glamorous, dull (boring), good looking, dirty, successful, unhealthy, uncool, and leader. This was rated on a 7-point scale, ranging from “Not at all-Extremely”. These items are based on research conducted by Chater et al. (2007). Prototype similarity was assessed by the response to *‘In general, how similar are you to the type of person your age who*

*engage in physical activity/fruit and vegetable intake?’ on a 7- point scale (not at all similar to me, to very similar to me).*

#### *Parental Behaviour*

Parental behaviour was measured by 2 items: ‘How many days did your mum/dad or other caregiver engage in 60 minutes of physical activity/ eat 5 portions of fruit and vegetable during the last week?’. This was assessed on an 8 point scale ranging from 0 day to 7 days.

#### *Recent behaviour*

Self-reported behaviour was measured using two questions asking participants ‘How many days did you engage in 60 minutes of physical activity/ eat 5 portions of fruit and vegetable during the last week?’. This was assessed on an 8 point scale ranging from 0 day to 7 days. These questions were based on research by Chater et al. (2007). Examples of fruit and vegetables portions (Department of Health, 2008) and examples of physical activities (British Heart Foundation, 2004) were also provided.

#### *Demographics*

Respondents were asked to fill in their age, gender, nationality, country of birth, father/mother’s country of birth and religion.

#### **5.6.4. Procedure and ethical considerations**

Data were gathered between October 2010 and September 2011 in four schools in Dubai, United Arab Emirates. The schools were sent a letter inviting them to participate in the study (see appendix 1a+1d). The school principals were informed about the aims and purposes of the study and permission was granted. After approval had been given from the schools, a parental consent form was sent out to all the parents, seeking approval for their children to participate in the study. Schools D, E and R received a letter combined with Study 2 (appendix

1c). The parents in school received a letter aimed at Study 1 only (appendix 1b). The parent consent letters were printed on school headed paper, an approach that has shown to provide a much higher response rate from parents (Chater et al., 2007). It was also often the preferred method for the head-teacher as it was felt that this made the research programme personal to the school. The nature of the study was described on this consent form, including ethical guidelines and the parents were instructed to read, sign and return it to the school. These consent forms were then given to the researcher prior to distributing the questionnaires at Time 1. Consent was also sought from the students before completing the questionnaire at Time 1 (see front page of questionnaire, appendix 2). The nature of the study was described at the front page of the questionnaire, including ethical guidelines. Through all consent forms, ethical issues were taken into consideration (consent, deception, debriefing, and withdrawal from the investigation, confidentiality and protection of participants). All concerned parties were informed that the participation was voluntary and they could withdraw from the study at any time. They were also informed about the aim of the study, that they were taking part in psychological research and that all information given by the participants were strictly confidential and anonymous and that they were not be at any risk to their psychological well-being and physical health. The researcher's contact details were stated and they were encouraged to contact her if they had any further questions. There was no need for deception in this study. All research aims were made explicit to parents and participants. School and parental consent forms can be found in Appendix 1 and the student consent form can be found in Appendix 2 (front page of the questionnaire). Children who were not given parental consent to participate, or did not wish to participate in the study were assigned to another class during data collection.

In three of the schools (school D, school E and school R), all participants were gathered together in exam halls and stayed together as a group throughout. For

school I, which was the largest sample size, data were collected in a large exam hall, one year group at the time. For all schools, data were collected at two time points over a period of 7 days. At time 1 (baseline), the researcher began with briefing the participants and distributed the questionnaires. The participants were asked to carefully read the questions and select the answers that best described themselves. Lesson slots between 60 and 80 minutes were allocated for data collection. No time limit was given, although data collection never exceeded 60 minutes. Participants were instructed to write the first letter of their name followed by birth month at the top right corner of the questionnaire. The purpose with this was to code each questionnaire in order to be able to match it with second questionnaire at time 2. The participants were then asked to return questionnaires when completed. At time 2, 7 days later, the same procedure was followed and the participants were asked to complete the same questionnaire again. The data gathered from Schools R and D and the second time point was not considered for the analysis, as these groups were part of the experimental intervention groups for Study 2.

#### ***5.6.5. Statistical analysis***

SPSS version 19.0 and AMOS 20 were used to compute the statistical analysis for this study. Physical activity and Fruit and vegetable intake were tested and presented separately. The statistical analysis composed of two parts: descriptive and analytical. Descriptive statistics of the general characteristics of the participants included frequency, percentage, mean and standard deviation to present general descriptive such as age, gender, religion and nationality. Cronbach Alpha was calculated to test the reliability for each of the measures used, including previously used standardised measures. Each health behaviour was tested and presented separately. The statistical analysis used was presented based on the hypothesis of this study.

Hypotheses 1 stated that the Theory of Planned Behaviour would significantly predict behavioural intentions and hypothesis 2 stated that behavioural intentions and perceived behavioural control will predict actual behaviour. Structural equation modelling (path analyses) was used to test the hypotheses and assess model fit. Testing hypotheses 3 and 4, four Hierarchical regressions (two for each health behaviour) were computed to evaluate the predictive power of the Theory of Planned variables. Variables from the Prototype/Willingness model were added to the model to test if they would enhance the prediction of physical activity and fruit/vegetable intentions and actual behaviour. For all regressions, the Theory of Planned behaviour constructs (attitudes, perceived behavioural control and subjective norms) were entered into one block, followed by the Prototype/Willingness model, which were entered into the following block. Hierarchical regressions were previously done by Ravis et al. (2006) and Lazura et al. (2011), to examine whether the combined model (TPB and PWM) better predicted intentions/behaviour over and above the Theory of Planned behaviour variables.

Hypothesis 5 predicted that there would be significant differences in the model constructs and actual health behaviour between the participants' gender and age groups. Multivariate Analysis of Variance (MANOVA analysis) was computed to identify any differences in attitudes, subjective norms, perceived behavioural control, prototype perceptions, behavioural intentions and actual behaviour between gender and age groups.

## 5.7. Results

### 5.7.1. Reliability and descriptive statistics for all scales

The second study of the current research programme investigated adolescents' health cognitions of physical activity and fruit and vegetable intake by looking at the variables from the Theory of Planned Behaviour and Prototype/Willingness Model. The means, standard deviation, number of items, participants included maximum and minimum scores of all scales (Theory of Planned Behaviour and Prototype/Willingness constructs, parental behaviour and recent behaviour) are displayed in Table 2 below. This table also includes the reliability coefficient for the Theory of Planned Behaviour and Prototype willingness scales.

Table 2: Reliability and descriptive statistics for all items used - Study 1

		Range	M	SD	Range	No. Items	N	Cronbach Alpha's
<i>Intentions</i>	<i>Physical activity</i>	0-7	4.89	1.6	0-7	4	523	0.93
	<i>Fruit and vegetable intake</i>	0-7	4.48	1.94	0-7	4	527	0.93
<i>Subjective norms</i>	<i>Physical activity</i>	1-5	3.99	1.0	1-5	3	522	0.70
	<i>Fruit and vegetable intake</i>	1-5	3.78	1.04	1-5	3	526	0.82
<i>Perceived beh cont.</i>	<i>Physical activity</i>	1-5	4.32	1.90	1-5	3	523	0.82
	<i>Fruit and vegetable intake</i>	1-5	4.27	1.49	1-5	3	525	0.86
<i>Attitudes</i>	<i>Physical activity</i>	1-5	4.18	0.83	1-5	5	522	0.86
	<i>Fruit and vegetable intake</i>	1-5	4.18	1.00	1-5	5	523	0.76
<i>Prototype evaluation</i>	<i>Physical activity</i>	1-7	4.93	1.21	1-7	16	524	0.77
	<i>Fruit and vegetable intake</i>	1-7	4.51	1.03	1-7	16	521	0.82
<i>Prototype similarity</i>	<i>Physical activity</i>	1-7	4.45	1.70	1-7	1	510	-
	<i>Fruit and vegetable intake</i>	1-7	4.28	1.61	1-7	1	513	-
<i>Parental behaviour</i>	<i>Physical activity</i>	0-7 days	4.17	2.10	0-7	1	514	-
	<i>Fruit and vegetable intake</i>	0-7 days	5.00	1.91	0-7	1	524	-
<i>Recent behaviour</i>	<i>Physical activity</i>	0-7 days	4.43	1.91	0-7	1	530	-
	<i>Fruit and vegetable intake</i>	0-7 days	3.95	2.30	0-7	1	525	-

#### 5.7.1.1. Theory of Planned Behaviour scales

Intentions to be physically active and eat fruits and vegetables were measured using 3 items for each health behaviour and referred to how many days per week



the participants intended to participate in both behaviours. Analysis using Cronbach's Alpha scores showed strong reliability scores of both scales:  $\alpha = .93$  for physical activity (N=523, M=4.89, SD=1.6) and  $\alpha = .93$  for fruit and vegetable intake (N=527, M=4.48, SD=1.94). These results indicated that the average participant intended to do 60 minutes of physical activity for 4.89 days per week and also eat 5 portions of fruit and vegetables 4.48 days per week, in the next 7 days.

The *direct* measures on behavioural intentions of the Theory planned behaviour include Attitudes, Perceived behavioural control and Subjective norms. Attitudes towards physical activity and fruit and vegetable intake was measured with 5 items for each health behaviour, on a 5 point likert scale with the respective anchor points: (1)bad–good(7), (1)harmful–beneficial(7), (1)unpleasant–pleasant(7), (1)enjoyable–enjoyable(7) and (1)foolish–wise(7). Low scores indicated a negative attitude and high scores positive attitudes towards the respective health behaviour. A good reliability of both scales were found, showing scores of  $\alpha = .86$  for physical activity (N=522, M=4.18, SD=0.83) and  $\alpha = .76$  for fruit and vegetable intake (N=523, M=4.18, SD=1.00). These figures indicated that the participants on average had positive attitudes towards both physical activity and fruit and vegetable intake. Subjective norms were measured on a 5 point likert scale using 3 items for each health behaviour. There was a good Cronbach Alpha reliability for both scales:  $\alpha = .76$  for physical activity (N=522, M=3.99, SD=1.0) and  $\alpha = .82$  for fruit and vegetable intake (N=526, M=3.70, SD=1.04). The scale rated between 1 and 5 based on to what extent the participant perceived social pressure to be physically active and eat fruit and vegetables and the result indicated fairly neutral perceived social pressure. Finally, perceived behavioural control was measured with 3 items for each health behaviour on a 5 point likert scale, ranging from 1 to 5, with low scores indicating low control and high scores indicting high feelings of control towards the behaviour. The reliability scores for both scales were strong:  $\alpha = .82$  for physical

activity (N=523, M=4.32, SD=1.90) and  $\alpha = .86$  for fruit and vegetable intake (N=525, M=4.27, SD=1.49). These figures indicated high feelings of perceived behavioural control among the participants.

#### 5.7.1.2. *Prototype/Willingness Model scales*

The Prototype evaluation scale included 16 items asking participants to evaluate behaviour specific prototype, using positive and negative adjectives such as 'healthy', 'uncool' and 'good looking'. This was measured on a 7-point likert scale ranging from 1 (not at all) to 7 (extremely). Lower scores indicated a negative view of the typical person that engaged in the health behaviour and higher scores indicated a positive view. The reliability scores for the evaluation scales were good for both health behaviours. The score for physical activity (N=521, M=4.93, SD=1.2) was  $\alpha = .77$  and  $\alpha = .82$  for fruit and vegetable intake (N=524, M=4.45, SD=1.70). These results indicated that the participants had fairly neutral but leaning towards positive views of the typical young person that engaged in physical activity and fruit and vegetable intake. The Prototype similarity score was measured using one 1 item only on a 7 point scale. The mean for physical activity was mid-scored: 4.45 (SD=1.21, N=513) for physical activity and 4.28 (SD=1.70, N=510) for fruit and vegetable indicating that the average participant rated himself as fairly similar to the typical people that engaged in the health behaviours.

#### 5.7.1.3. *Recent behaviour and parental behaviour*

Recent and parental behaviour were measured with 2 separate items for each health behaviour and the questions referred to how many days per week themselves or their parents participated in the respective health behaviour in the past week. The average parental behaviour score gave a mean of 4.18 (SD=1.86, N=514) for physical activity and 5.00 (SD=2.02, N=525) for fruit and vegetable intake. This indicated that the average parent participated in 30 minutes of physical activity 4.09 days in the past week and ate 5 portions of fruit

and vegetables 5.21 days. The average recent behaviour score gave a mean of 4.39 days in the previous week (SD=1.90, N=530) for physical activity participation and 3.95 days (SD=2.30, N=530) for fruit and vegetable intake. All scores can be seen in Table 2 above.

Descriptive data showed that the participants reported that they had eaten 3.95 portions of fruits and vegetables in the past week. This amount was higher than previously reported figures in children in the United Arab Emirates (2.8 portions/weekly by Lock et al. 2005). The participants had been physically active 4.45 days in the past week, which was in line with previous figures presented by Hazzaa et al. (2011) who found that children were active 4.5 days per week. Only 20.4 percent of the participants met the recommended guidelines and reported that they were physically active for 60 minutes daily over the past week. 16.4 percent met the guidelines of 5 portions of fruit and vegetables over the past week. See appendix 3 for an overview of the participants' previous physical activity and fruit and vegetable intake.

### **5.7.2. Physical activity**

#### *5.7.2.1. Predicting intentions and behaviour*

At first, a correlation matrix was computed to investigate the correlations between intentions, perceived behavioural control, attitudes, subjective norms, parental behaviour, recent behaviour, prototype evaluation and prototype similarity. These relationships can be seen in Table 3 below.

*Table 3: Correlations of PA study variables - Study 1*

PA variables	1	3	4	5	6	7	8	9
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1. PA intentions	1.00							
3. Parental behaviour	.30***	1.00						
4. Subjective norms	.27***	.32**	1.00					
5. Perceived beh. control	.41***	.21***	.20***	1.00				
6. Attitudes	.37***	.12**	.18***	.30***	1.00			
7. Prototype evaluation	.14***	.06	.12**	.17***	.18***	1.00		
8. Prototype similarity	.33***	.12**	.20***	.32***	.18***	.28***	1.00	
9. Actual behaviour	.39***	.18***	.28***	.19**	.22**	.11*	.16**	1.00

It can be seen in Table 3 above that all of the study variables (recent behaviour, parental behaviour, subjective norms, perceived behavioural control, attitudes, prototype evaluation and similarity) are positively and strongly significantly ( $p < .001$ ) correlated with intentions to be physically active. All constructs, apart from prototype evaluation are strongly or moderately correlated with one-another. Prototype similarity was correlated to all study variables apart from parental behaviour. Actual behaviour was also significantly correlated ( $p < .05$ ) with all of the study variables.

#### 5.7.2.2. *Prediction of intentions and Physical Activity using the Theory of Planned Behaviour*

Path analysis was conducted to examine the direct and indirect influences of the constructs from the Theory of Planned behaviour on intentions and physical activity (hypothesis 1a and 2a). It was hypothesised (hypotheses 1a and 2a) that attitudes and subjective norms predict behavioural intentions directly and perceived behavioural control predicts behaviour both directly, and indirectly through intentions. Behavioural intentions should also predict behaviour. Specifically, a path model (Figure 5) was estimated that included the hypothesised relations among the Theory of Planned Behaviour constructs. Previous criteria of good fit were used to evaluate the adequacy of the model (Fan, Thompson and Wang, 1999), a cut-off close to 0.95 for Comparative Fit Index (CFI) and a cut-off value close to 0.06 for the Root Mean Square Error of Approximation (RMSEA). Estimation of the model revealed a RMSEA value of

.058 and CFI value of .955, which suggests an acceptable fit. The Chi-Square test results represent the difference between the observed data and what was expected from the model. The results show that CMIN ( $\chi^2$ )=334.962,  $df=120$ ,  $p<.001$ . This suggests that the model is not an entirely adequate fit to the data. Byrne (2001) explained that it is unusual to find well-fitted hypothesised models using the Chi-Square statistics.

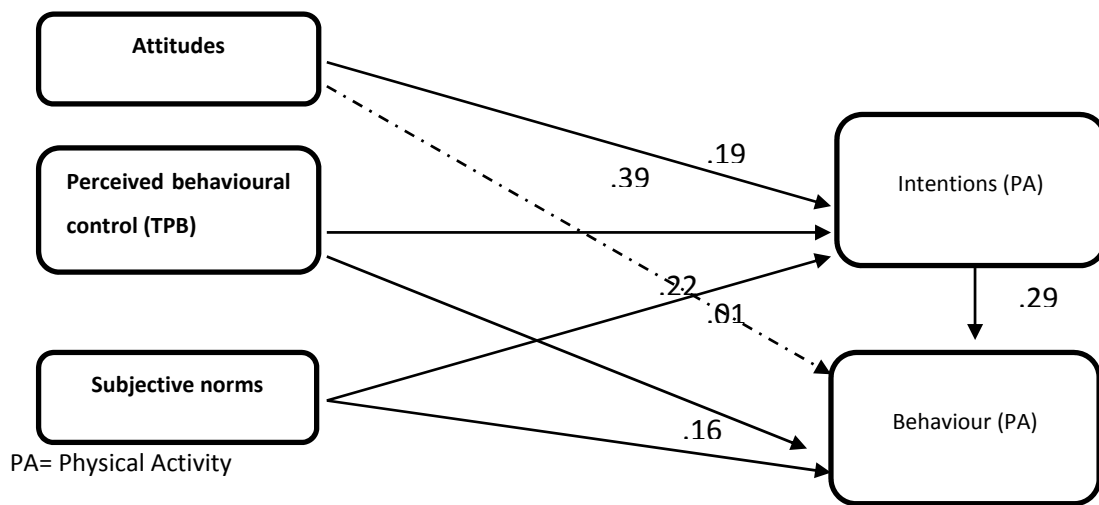


Figure 5: Path coefficients for the Theory of Planned Behaviour and physical activity

Direct and indirect effects (via intentions) tested subjective norms, perceived behavioural control and attitudes on intentions and behaviour. The model supported statistically significant direct effects of subjective norms on physical activity behaviour. Subjective norms and attitudes indirectly influenced physical activity through behavioural intentions. The findings indicated that Theory of Planned behaviour predicted 35.4 percent of the variance in intentions, but only 17.9 percent of the variance in behaviour (Figure) 5. From table 4 below it can be seen that subjective norms ( $\beta=0.22$ ,  $p<.001$ ), perceived behavioural control ( $\beta=0.39$ ,  $p<.001$ ) and attitudes ( $\beta=0.39$ ,  $p<.001$ ) significantly predicted intentions. Subjective norms ( $\beta=0.16$ ,  $p<.01$ ) predicted physical activity. Intentions also predicted behaviour ( $\beta=0.29$ ,  $p<.001$ ). Hypothesis 1a was therefore accepted as it was shown that attitudes and subjective norms predicted behavioural intentions

directly. Hypothesis 2a was partly rejected, as perceived behavioural control did not predict behaviour directly, but indirectly through intentions. Behavioural intentions also predicted physical activity.

*Table 4: Path Analysis regression weights of the Theory of Planned Behaviour and physical activity*

		<b>B</b>	<b>C.R.</b>
Attitudes	Behavioural intention	.189***	3.875
Subjective norms		.219***	4.808
Perceived behavioural control		.386***	7.947
Attitudes	Physical activity	.110	1.739
Subjective norms		.161**	2.690
Perceived behavioural control		-.014	-.212
Intentions		.287***	4.341

### 5.7.2.3. Adding prototype perceptions to the Theory of Planned Behaviour predicting Physical activity intentions

A hierarchal multiple regression was carried out to test whether the variables from the Prototype/Willingness Model added to explanation of the variance in physical activity intentions after the variables from the Theory of Planned Behaviour, parental behaviour, gender and age were considered. The variables were entered in blocks, which in total created 5 models.

*Table 5: Multiple regression adding the PWM to the TPB - PA intentions*

PA intentions predictors	<b>B</b>	<b>B</b>	<b>R</b>	<b>R<sup>2</sup></b>	<b>R<sup>2</sup> change</b>
	<b>Initial</b>	<b>Final</b>			

Model 1	Age	-.208	-.155***	.208	.043***	.043
Model 2	Gender	-.116	-.108**	.238	.057**	.013
Model 3	Parental behaviour	.262	.157**	.353	.125***	.068
Model 4	Attitudes	.244	.239***			
	Subjective norms	.130	.106**			
	Perceived beh. Control	.281	.242***	.581	.338***	.213
Model 5	Prototype evaluation	-.025	.025			
	Prototype similarity	.175	.175***	.603	.353***	.026

**\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$**

At the first stage of the analysis, only age was entered to see what variance it made on intentions. It can be seen in Table 5 above that a strongly significant ( $p < .001$ ) proportion, 4.3 percent of the variation in intentions was explained by age which suggested that physical activity intentions decreased with age ( $\beta = -.155$ ). The second step added gender, which accounted for 1.3 percent of the variance in intentions ( $\beta = -.108$ ,  $p < .01$ ). Age and gender together, accounted for 5.7 percent of the variation on intentions. The next variable that was added to the model was parental behaviour, which alone accounted for 6.8 percent of the variance in physical activity intention ( $\beta = -.157$ ,  $p < .01$ ). The 4th step of the hierarchal regression analysis included the addition of the Theory of Planned Behaviour variables: attitudes, perceived behavioural control and subjective norms to the model. All three variables had significant effects on intentions and together accounted for 21.3 percent of the overall variation on intentions. Perceived behavioural control was the strongest predictor with a final  $\beta$  weight of .242 ( $p < .001$ ), followed by attitudes ( $\beta = .239$ ,  $p < .001$ ) and subjective norms ( $\beta = .106$ ,  $p < .01$ ). This would suggest that children with positive attitudes, higher feelings of control in relation to the behaviour and who believe that socially important people think they should eat fruits and vegetables were more likely to

have higher intentions to eat 5 portions of fruit and vegetables each day. Subjective norms were not as significant as attitudes and perceived behavioural control. Adding prototype perceptions to the model led to a statistically strongly significant increase in  $R^2 = .353$ ,  $F(2,477) = 9.791$ ,  $p < .001$ , accepting hypothesis 3b. However, only prototype similarity was a significant ( $\beta = .175$ ,  $p < .001$ ) predictor of physical activity and accounted for 2.6 percent of the variance.

Even though, most of the variance was explained by the constructs from the Theory of Planned Behaviour variables, adding the Prototype/Willingness model to the equation showed statistically significant beta weights. The full model, including all study variables (age, gender, parental behaviour, attitudes, perceived behavioural control and subjective norms, prototype evaluation and prototype similarity) was statistically significant,  $R^2 = .353$ ,  $F(1,477) = 9.791$ ,  $p < .001$ ; adjusted  $R^2 = .353$ . The overall model accounted for 35.3 percent of the variation on intentions. The data did not show any multicollinearity as all the variables were below 3. This meant that none of the tested variables were highly correlated with each other.

#### *5.7.2.4. Adding prototype perceptions to the Theory of Planned Behaviour predicting PA behaviour*

The next step was to test whether the variables from the Prototype/Willingness Model added to the explanation of the variance in physical activity behaviour after the variables from the Theory of Planned Behaviour, gender and age were considered. Behavioural intention was also considered at this point. The variables were entered separately in blocks (the TBP and PWM entered in one block per model), which in total created 6 models. The main variables in the regression analysis were examined for normality assumptions. Very few of the variables indicated significant deviations from normality in terms of skewness and kurtosis.



Table 6: Multiple regression adding the PWM to the TPB – PA behaviour

FVI behaviour predictors		B	B	R	R <sup>2</sup>	R <sup>2</sup> change
		Initial	Final			
Model 1	Age	-.127	-.059	.127	.016	.016
Model 2	Gender	-.089	-.046	.155	.024	.008
Model 3	Parental behaviour	.169	-.039	.229	.052**	.028
Model 4	Attitudes	.157	.102			
	Subjective norms	.216	.172**			
	Perceived beh. control	.057	-.027	.378	.143***	.091
Model 5	Prototype evaluation	.009	.003			
	Prototype similarity	.043	.002	.380	.145	.002
Model 6	Intentions	.266	.266***	.432	.187***	.042

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$

It can be seen in Table 6 above that the two steps of entering age followed by gender did not predict fruit and actual physical activity ( $R^2 = .024$ ,  $p > .05$ ). Adding parental behaviour to the equation increased the  $R^2 = .028$  ( $p < .01$ ) and could explain 2.8 percent of the variance on actual behaviour. The Theory of Planned Behaviour accounted for 9.1 percent of the variation on actual behaviour and increased the  $R^2 = .091$  ( $p < .001$ ). However, subjective norm was the only significant predictor of behaviour with a final  $\beta$  weight of .172 ( $p < .01$ ).

Prototype/Willingness model did not make a significant contribution in predicting actual behaviour ( $p > .01$ ). Intentions the 6th<sup>th</sup> factor to be added to the model, which significantly predicted 4.2 percent of the variance of actual behaviour ( $\beta = .266$ ,  $p < .001$ ). This meant that hypothesis 4b was rejected,  $R^2 = .145$ ,  $F(2,318) = .328$ ,  $p > .00$ . The overall model (including gender, age, parental behaviour, Theory of Planned Behaviour variables, Prototype/Willingness

variables and intentions) explained 18.7 percent of the variance of actual behaviour  $R^2=.187$ ,  $F(1,317)= 16.529$ ,  $p<.001$ ; adjusted  $R^2=.202$ .

5.7.2.5. *Age and gender differences in the physical activity study variables*

As a next step, analysis tested hypothesis 5a, which suggested differences in the study variables between age groups and gender were found among the participants of the current research programme. A series of factorial multivariate analysis of variance (MANOVA) were performed exploring differences in the target study variables (perceived behavioural control, attitudes, subjective norms, prototype evaluation, prototype similarity and recent behaviour) between gender and age groups.

A factorial MANOVA was performed to look for gender and age differences in the study variables in relation to physical activity. The results showed that there were no multivariate statistically significant differences in the study variables between males and females: ( $F [7, 466] = 1.27$ ,  $p>.05$ ; Wilks' Lambda = 0.980). However, significant differences were found between age groups ( $F [21, 1281] = 2.82$ ,  $p<.001$ ; Wilks'  $\Lambda= 0.877$ ; partial  $\eta^2=.036$ ) thus hypothesis 5a was therefore partly confirmed. These differences can be seen in Table 7 below.

*Table 7: Differences between age groups in the physical activity study variables*

	11YRS	12YRS	13YRS	14YRS	
	M (SD)	M (SD)	M (SD)	M (SD)	F

Recent behaviour	4.56(1.82)	4.67(1.58)	4.41(1.81)	3.91(2.05)	3.93**
Intentions	5.33(1.51)	4.96(1.41)	5.04(1.51)	4.20(1.76)	12.51***
Subjective norms	4.01(.98)	3.86(1.04)	4.03(.95)	3.91(.90)	1.10
Perceived behavioural control	4.47(.65)	4.17(1.06)	4.30(1.09)	3.76(1.16)	4.61**
Attitudes	4.51(.79)	4.44(.80)	4.63(.58)	4.23(.92)	4.23**
Prototype evaluation	5.01(1.31)	4.87(1.07)	4.84(.93)	4.92(1.07)	.24
Prototype similarity	4.92(1.67)	4.22(1.72)	4.45(1.69)	4.33(1.68)	2.96*

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$

However, it appeared that there were weak significant gender differences within both intentions and recent behaviour of physical activity after looking at the Between-subjects analysis in the SPSS output. Therefore, another MANOVA was performed, only including recent behaviour and intentions as dependent variables. This analysis indicated weak but significant Multivariate gender differences: ( $F [2, 503] = 3.17, p < .05$ ; Wilks'  $\Lambda = .988$ ;  $\eta^2 = .012$ ). This can be seen in Table 8 below.

*Table 8: Differences between gender in the physical activity study variables*

	Males		Females	
	M (SD)		M (SD)	F
Recent behaviour	4.62(1.77)		4.13(1.86)	4.77*
Intentions	5.11(1.60)		4.67(1.56)	4.49*
Subjective norms	3.92(1.05)		3.99(0.88)	0.41
Perceived behavioural control	4.19(1.06)		4.14(0.94)	1.53
Attitudes	4.54(0.77)		4.42(0.77)	2.44
Prototype evaluation	4.86(1.08)		4.92(0.98)	.01
Prototype similarity	4.45(1.82)		4.42(1.58)	.22

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$

#### 5.7.2.5.1. Recent behaviour

After running a LSD post hoc test, it became evident that the recent physical activity mean score for 11 year olds ( $M = 4.56, [SD = 1.88]$ ), 12 year olds ( $M = 4.60 [SD = 1.56]$ ) and 13 year olds ( $M = 4.45 [SD = 1.80]$ ) was significantly higher

( $p < .01$ ) than the mean scores for 14 year olds ( $M = 3.86$  [ $SD = 1.88$ ]). Decline in past physical activity levels increased with age at the age of 11 years and 14 years. The male participants ( $M = 4.62$ , [ $SD = 1.77$ ]) reported a higher recent behaviour in physical activity over the past week ( $F [1, 504] = 5.79$ ,  $p < .05$ ) in comparison to females ( $M = 4.13$ , [ $SD = 1.86$ ]). Age and gender differences in physical activity recent behaviour can be illustrated in figure 6 below.

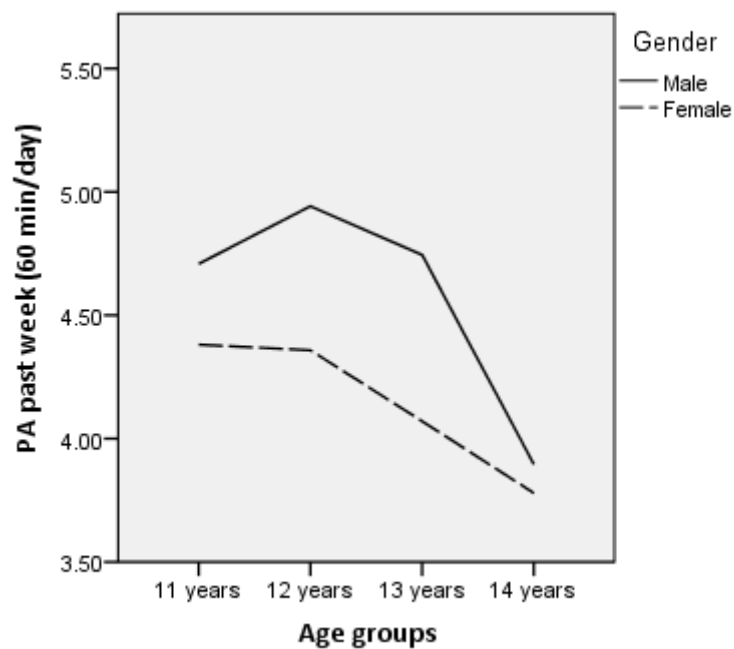


Figure 6: Age group and gender differences in PA recent behaviour

#### Behavioural intentions

Weak but significant differences ( $F [2, 503] = 3.17$ ,  $p < .05$ ) was also found in mean intention scores to be physically active over the next week between males ( $M = 5.11$  [ $SD = 1.60$ ]) and females ( $M = 4.67$ , [ $SD = 1.56$ ]). The male participants reported higher intentions to be physically active over the next week in comparison to the females.

A significant difference was also found for physical activity intentions between age groups ( $F [3, 452] = 12.51$ ,  $p < .001$ ). LSD post hoc analysis showed that the past physical activity mean score for 11 year olds ( $M = 5.41$ , [ $SD = 1.48$ ]), 12 year

olds ( $M = 4.97$  [SD = 1.42]) and 13 year olds ( $M = 5.09$  [SD = 1.50]) was significantly higher ( $p < .001$ ) than the mean scores for 14 year olds ( $M = 4.12$  [SD = 1.76]). These results showed a decline in intentions with age and both females and males had higher intentions to be physically active at the age of 11 years than at the age of 14 years. The main differences of gender and age can be illustrated in figure 7 below.

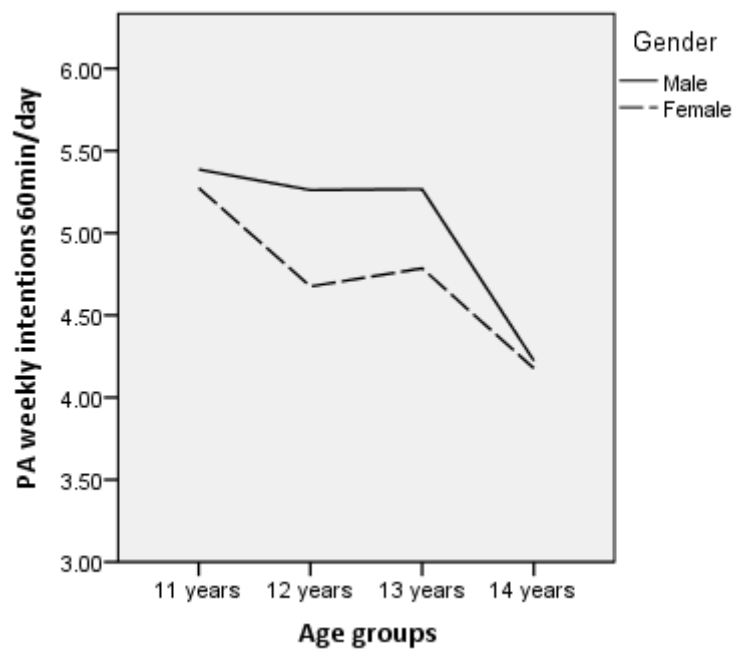


Figure 7: Differences between age groups and gender in PA intentions

#### 5.7.2.5.2. Perceived behavioural control, attitudes and subjective norms

Further age differences were found in perceived behavioural control ( $F [3, 452] = 4.61, p < .01$ ). LSD post hoc analysis showed that the perceived behavioural control mean scores for 12 year olds ( $M = 4.20$  [SD = 1.08]) and 13 year olds ( $M = 4.24$  [SD = 1.02]) was significantly higher ( $p < .05$ ) than the mean score for 14 year olds ( $M = 3.90$  [SD = 1.07]). These results indicated that perceived behavioural control decreased with age and younger children had stronger feelings of behavioural control in comparison to older children. This is illustrated in figure 8 below. No significant differences were found in levels of perceived behavioural control between the genders ( $F [1, 452] = 1.53, p > .05$ ).

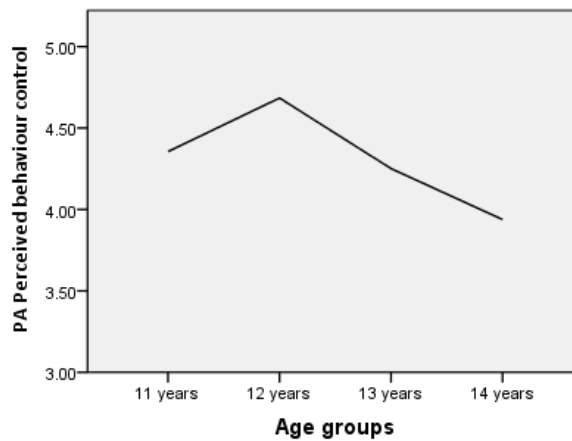


Figure 8: Differences between age groups in PA perceived behavioural control

Attitudes towards physical activity also decreased in age ( $F [3, 452] = 4.23, p < .01$ ). There appeared to be a slight peak in the mean scores at 12 years ( $M = 4.64 [SD = 0.57]$ ) but then the scores declined. 11 year olds ( $M = 4.55 [SD = 0.74]$ ) and 12 year olds had slightly more positive attitudes towards physical activity in comparison to 14 year olds ( $M = 4.31 [SD = 0.93]$ ). This difference is illustrated in figure 8 below. No significant differences in attitudes towards physical activity were found between the genders ( $F [1, 452] = 2.44, p > .05$ ).

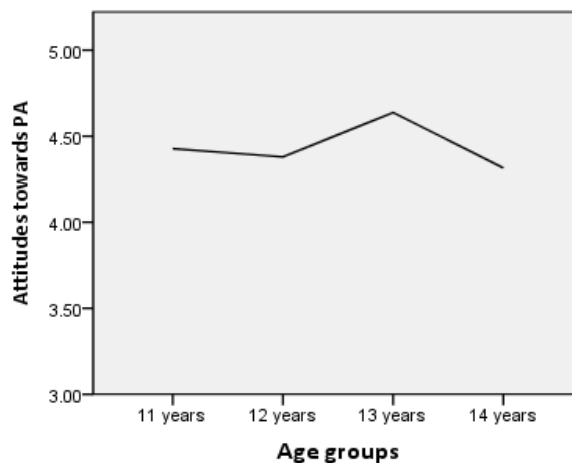


Figure 9: Differences between age groups in PA attitudes

No significant differences in subjective norms scores were found between genders ( $F [1, 452] = 4.11, p > .05$ ) or age groups ( $F [3, 452] = 1.10, p > .05$ ).

#### 5.7.2.5.3. Prototype variables

In relation to the Prototype/Willingness Model, the only measure that indicated significant gender differences between the age groups was prototype similarity ( $F [3, 452] = 2.96, p < .05$ ). 11-year-old children ( $M = 4.94 [SD = 1.68]$ ) showed increased levels of prototype similarity ( $p < .05$ ) in comparison to 14 year olds ( $M = 4.38 [SD = 1.67]$ ). There was also a significant difference in prototype similarity ( $p < .005$ ) between 11 year olds and 12 year olds ( $M = 4.19 [SD = 1.72]$ ). This indicated that younger children were more likely to perceive themselves as similar to a person that is physically active in comparison to older children. This difference is illustrated in Figure 10 below. No significant differences were found in perceived prototype similarity between genders ( $F [1, 452] = 0.22, p > .05$ ).

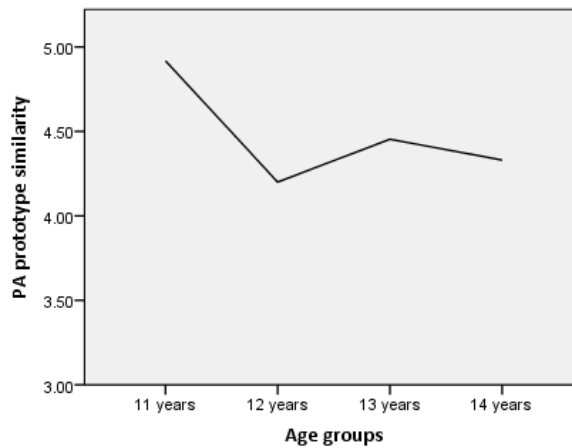


Figure 10: Differences between age group on PA prototype similarity

There were no significant differences in prototype evaluation between genders ( $F [1, 452] = 0.01, p > .05$ ) or age groups ( $F [3, 452] = 0.24, p > .05$ ).

### 5.7.3. Fruit and vegetable intake

#### 5.7.3.1. Predicting intentions and behaviour

Multiple correlations were performed to investigate the relationships between intentions, perceived behavioural control, attitudes, subjective norms, parental behaviour, recent behaviour, prototype evaluation and prototype similarity. These relationships can be seen in table 9 below.

Table 9: Correlations of FVI study variables - Study 1

FVI variables	1	2	3	4	5	6	7	8	9
1. FVI intentions	1.00								
2.Recent behaviour	.74***	1.00							
3.Parental behaviour	.44***	.43***	1.00						
4.Attitudes	.41***	.27***	.22***	1.00					
5. Perceived beh. control	.48***	.37***	.30***	.33***	1.00				
6. Subjective norms	.49***	.40***	.36***	.27***	.31***	1.00			
7. Prototype evaluation	.14***	.18***	.16***	.13**	.24***	.19***	1.00		
8. Prototype similarity	.27***	.21***	.08***	.14**	.13***	.20***	.35***	1.00	
9.Actual behaviour	.32***	.37***	.15***	.08	.19***	.18***	.08	.04	1.00

Table 9 shows that all of the study variables were strongly significantly correlated ( $p < .001$ ) with intentions to eat fruits and vegetables. All these correlations were positively correlated to each other. In regards to actual behaviour; significant correlations were found with behavioural intentions, recent behaviour, parental behaviour, perceived behavioural control and subjective norms ( $p < .001$ ). Attitudes, prototype evaluation and prototype similarity was not significantly correlated to actual behaviour ( $p < .05$ ).

#### 5.7.3.2. Prediction of intentions and Fruit and vegetable intake using the Theory of Planned Behaviour

A second path analysis was conducted to examine the direct and indirect influences of the constructs from the Theory of Planned behaviour on intentions and fruit and vegetable intake. Using the same, a path model (Figure 11) was estimated that included the hypothesised relations among the Theory of Planned Behaviour constructs. As in the previous hypothesis for physical activity, it was repeatedly hypothesised (hypotheses 2a and 2b) that attitudes and subjective norms predict behavioural intentions directly and perceived behavioural control predicts behaviour both directly, and indirectly through intentions. It was also predicted that behavioural intentions should also predict behaviour.



Previous criteria of good fit were used to evaluate the adequacy of the model (Fan, Thompson and Wang, 1999), a cut-off close to 0.95 for Comparative Fit Index (CFI) and a cut-off value close to 0.06 for the Root Mean Square Error of Approximation (RMSEA). Estimation of the model revealed a RMSEA value of .057 and CFI value of .958, which suggests an acceptable fit. The Chi-Square test results represent the difference between the observed data and what was expected from the model. The results show that CMIN ( $\chi^2$ )=332.003, df=120,  $p < .001$ . This suggests that the model is not an entirely adequate fit to the data. Byrne (2001) explained that it is unusual to find well-fitted hypothesised models using the Chi-Square statistics.

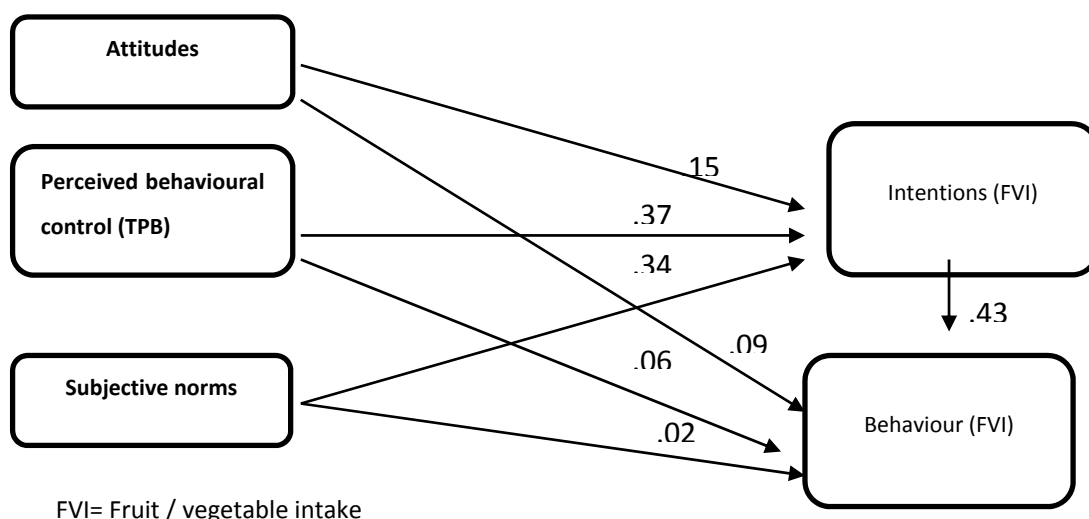


Figure 11: Path coefficients for the Theory of Planned Behaviour and fruit and vegetable intake

Direct and indirect effects (via intentions) tested subjective norms, perceived behavioural control and attitudes on fruit and vegetables intentions and behaviour. The model supported no statistically significant direct effects of attitudes, perceived behavioural control and subjective norms on fruit and vegetable behaviour. Attitudes had a statistically significant indirect effect on behaviour through intentions.

The findings indicated that Theory of Planned behaviour predicted 45.6 percent of the variance in fruit and vegetable intentions and 19.6 percent of the variance in behaviour (Figure 11). From table 9 below it can be seen that subjective norms ( $\beta=0.37, p<.001$ ), perceived behavioural control ( $\beta=0.34, p<.001$ ) and attitudes ( $\beta=0.15, p<.001$ ) significantly predicted intentions. None of the constructs from the Theory of Planned Behaviour predicted fruit and vegetable intake ( $p>.05$ ), partly rejecting hypothesis 2b. Hypothesis 2b was partly accepted as behavioural intentions predicted behaviour ( $\beta=0.43, p<.001$ ).

Table 9: Path Analysis regression weights of the Theory of Planned behaviour

		<b>B</b>	<b>C.R.</b>
Attitudes	Behavioural intention	.154***	3.875
Subjective norms		.374***	4.808
Perceived behavioural control		.336***	7.947
Attitudes	Behaviour	-.095	1.533
Subjective norms		.060	.883
Perceived behavioural control		-.016	.248
Intentions		.431***	6.125

### 5.7.3.3. Adding prototype perceptions to the Theory of Planned Behaviour predicting FVI intentions

Another hierarchal multiple regression was carried out to test whether the variables from the Prototype/Willingness Model added to explanation of the variance in fruit and vegetable intentions after the variables from the Theory of Planned Behaviour, gender and age was considered. The variables were entered in blocks, which in total created 5 models.

Table 10: Multiple regression adding the PWM to the TPB – FVI intentions

FVI intentions predictors		<b>B</b>	<b>B</b>	<b>R</b>	<b>R<sup>2</sup></b>	<b>R<sup>2</sup> change</b>
		<b>Initial</b>	<b>Final</b>			
Model 1	Age	-.098*	-.066*	.098	.010*	.010

Model 2	Gender	.132**	.071*	.164	0.27**	.017
Model 3	Parental behaviour	.431***	.237***	.459	.211***	.206
Model 4	Attitudes	.198***	.189***			
	Subjective norms	.251***	.233***			
	Perceived beh. Control	.264***	.271***	.666	.444***	.233
Model 5	Prototype evaluation	-.097**	-.097**			.
	Prototype similarity	.177***	.177***	.687	.473***	.029

**\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$**

At the first stage of the analysis, only age was entered to see what variance it made on intentions. It can be seen in Table 10 above that a significant ( $p < .01$ ) proportion, 1.0 percent of the variation in intentions was explained by age, which suggested that fruit and vegetable intentions decreased with age ( $\beta = -.066$ ). The second step added gender, which accounted for 1.7 percent of the variance in intentions. There appeared to be a weak but significant correlation between genders and intentions ( $\beta = .071$ ,  $p < .05$ ). Age and gender together, accounted for 2.7 percent of the variation on intentions. The next variable that was added to the model was parental behaviour, which alone accounted for 20.6 percent of the variance in physical activity intention. Including age, gender and adding parental behaviour to the model ( $\beta = .237$ ,  $p < .001$ ), led to a  $R^2 = .211$ . The 4th step of the hierarchical regression analysis included the addition of the Theory of Planned Behaviour variables: attitudes, perceived behavioural control and subjective norms to the model. All three variables had a strong effect on intentions and accounted for 23.3 percent of the overall variation on intentions. Perceived behavioural control was the strongest predictor with a final  $\beta$  weight of .271, followed by subjective norms ( $\beta = .233$ ) and attitudes ( $\beta = .133$ ). This would suggest that children with positive attitudes, higher feelings of control in relation to the behaviour and who believe that socially important people think

they should eat fruits and vegetables were more likely to have higher intentions to eat 5 portions of fruit and vegetables each day. Adding prototype perceptions to the model led to a statistically significant increase in  $R^2 = .233$ ,  $F(8,487) = 54.558$ ,  $p < .001$ , which meant that hypothesis 3b was accepted. Both prototype evaluation ( $\beta = -.097$ ,  $p < .01$ ) and prototype similarity ( $\beta = .177$ ,  $p < .001$ ) were significant predictors of fruit and vegetables intentions and accounted for 2.9 percent of the variance.

Even though, most of the variance was explained by parental behaviour and the Theory of Planned Behaviour variables, both of the prototype variables had statistically significant beta weights. Prototype similarity presented with  $\beta = .177$  and when the influence of the other predictor variables were reflected in the model, the prototype evaluation variable had a significant negative influence on intentions ( $\beta = -.097$ ,  $p < .01$ ). The full model, including all study variables (age, gender, parental behaviour, attitudes, perceived behavioural control and subjective norms, prototype evaluation and prototype similarity) was statistically significant,  $R^2 = .473$ ,  $F(8,487) = 54.558$ ,  $p < .001$ ; adjusted  $R^2 = .464$ . The overall model accounted for 47.3 percent of the variation on intentions. The data did not show any multicollinearity as all the variables were below 3. This meant that none of the tested variables were highly correlated with each other.

#### *5.7.3.4. Adding prototype perceptions to the Theory of Planned Behaviour predicting FVI behaviour*

The next step was to test whether the variables from the Prototype/Willingness Model added to the explanation of the variance in fruit and vegetable behaviour after the variables from the Theory of Planned Behaviour, gender and age was considered. Behavioural intention was also considered at this point. The variables were entered separately in blocks (the TBP and PWM entered in one block per model), which in total created 6 models. The main variables in the

regression analysis were examined for normality assumptions. Very few of the variables indicated significant deviations from normality in terms of skewness and kurtosis.

*Table 11: Multiple regression adding the PWM to the TPB – FVI behaviour*

<i>FVI behaviour predictors</i>		<b>B</b>	<b>B</b>	<b>R</b>	<b>R<sup>2</sup></b>	<b>R<sup>2</sup> change</b>
		<b>Initial</b>	<b>Final</b>			
Model 1	Age	.013	.076	.016	.000	.000
Model 2	Gender	-.019	-.072	.023	.001	.000
Model 3	Parental behaviour	.176	-.040**	.175	.031**	.030
Model 4	Attitudes	.025	-.080			
	Subjective norms	.180	.045**			
	Perceived beh. control	.081	-.064	.272	.074**	.043
Model 5	Prototype evaluation	-.004	-.066.			.
	Prototype similarity	.137	.142**	.303	.092*	.018
Model 6	Intentions	.503	.503***	.473	.224***	.132

**\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$**

It can be seen in Table above that the two steps of entering age followed by gender did not predict fruit and vegetable actual intake ( $R^2 = .001$ ,  $p > .05$ ). Adding parental behaviour to the equation increased the  $R^2 = .030$  ( $p < .01$ ) and could explain 3.1 percent of the variance on actual behaviour. The Theory of Planned Behaviour accounted for 4.3 percent of the overall variation on actual behaviour and increased the  $R^2 = .043$  ( $p < .01$ ). However, subjective norm was the only significant predictor of behaviour with a final  $\beta$  weight of .045.

As it can be seen in table 11 above, hypothesis 4b could be accepted as the Prototype/Willingness model accounted for 1.8 percent, a weak but significant contribution in predicting actual behaviour with an increased  $R^2 = .018$  ( $p < .01$ ).

Out of the two, prototype similarity was the only construct that significantly predicted behaviour with a final  $\beta$  weight of .142. Intentions the 6th<sup>th</sup> factor to be added to the model, which significantly predicted 13.2 percent of the variance on actual behaviour ( $\beta=.503, p<.001$ ). The overall model (including gender, age, parental behaviour, Theory of Planned Behaviour variables, Prototype/Willingness variables and intentions) explained 22.4 percent of the variance of actual behaviour  $R^2=.224, F(1,319)= 54.404, p<.001$ ; adjusted  $R^2=.202$ . The data did not show any multicollinieraity as all the variables were below 3.

5.7.3.5. *Age and gender differences in fruit and vegetable intake study variables*

Another factorial MANOVA was performed to look for gender and age differences in the study variables in relation to fruit and vegetable intake. The results showed that there was statistically significant differences in the study variables between age groups: ( $F [17, 1329] = 1.74, p<.05$ ; Wilks'  $\Lambda=.936; \eta^2 = .024$ ). This can be seen in table 12 below.

*Table 12: Age differences in the fruit and vegetable intake study variables*

	11YRS	12YRS	13YRS	14YRS	
	M (SD)	M (SD)	M (SD)	M (SD)	F
Recent behaviour	4.12(2.29)	4.20(2.10)	4.00(2.22)	3.52(2.37)	2.16
Intentions	4.58(2.00)	4.69(1.98)	4.58(1.74)	4.14(2.03)	2.32
Subjective norms	3.87(1.01)	3.88(1.00)	3.71(1.06)	3.80(.98)	0.01
Perceived behavioural control	4.18(.90)	4.32(1.26)	4.28(1.60)	4.40(1.96)	0.28
Attitudes	4.06(1.00)	4.27(1.19)	4.21(.88)	4.21(.85)	0.80
Prototype evaluation	4.81(.98)	4.56(.89)	5.54(1.08)	4.60(.99)	1.79
Prototype similarity	4.69(1.61)	4.04(1.66)	4.17(1.62)	4.39(1.52)	2.80*

**\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$**

Significant differences were also found between genders and the fruit and vegetable study variables: ( $F [6, 470] = 3.30, p < .01$ ; Wilks'  $\Lambda = .960$ ;  $\eta^2 = .075$ ) thus hypothesis 5 was confirmed. These differences can be seen in Table 13 below:

*Table 13: Gender differences in the fruit and vegetable intake study variables*

	Males	Females	
	M (SD)	M (SD)	F
Recent behaviour	3.96(2.27)	3.98(2.23)	1.01
Intentions	4.23(1.97)	4.77(1.82)	11.30***
Subjective norms	3.61(1.09)	3.97(.91)	18.28***
Perceived behavioural control	4.22(.95)	4.38(1.91)	1.01
Attitudes	4.12(.86)	4.27(1.09)	2.81
Prototype evaluation	4.55(1.07)	4.65(.93)	.57
Prototype similarity	4.17(1.70)	4.37(1.54)	1.62

**\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$**

#### 5.7.3.5.1. Recent behaviour

The results from the MANOVA did not reveal any significant differences in recent behaviour of eating 5 portions of fruits and vegetables each day for the past week between either genders ( $F [1, 452] = 0.01, p > .05$ ) or age groups ( $F [3, 452] = 2.16, p > .05$ ).

#### 5.7.3.5.2. Behavioural intentions

By looking at table 4 above, it can be seen that there were strong significant gender differences in the participants' intentions to eat five portions of fruit and vegetables in the following week ( $F [1, 469] = 11.30, p < .001$ ). Females ( $M = 4.78, [SD = 1.83]$ ) reported higher intentions in comparison the males ( $M = 4.23, [SD = 1.96]$ ). This is illustrated in Figure 12 below.

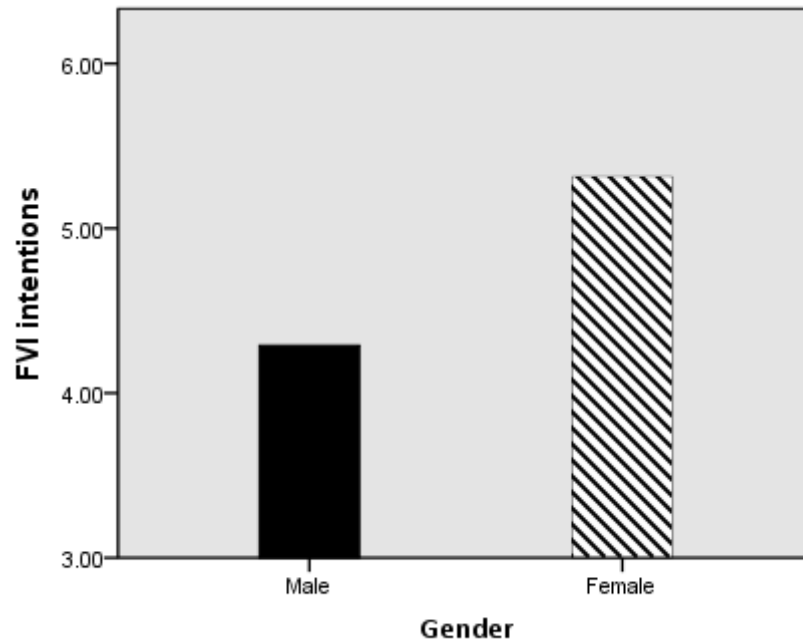


Figure 12: Gender differences in FVI intentions

No significant differences in fruit and vegetable intake intentions were found between age groups ( $F [3, 452] = 2.32, p > .05$ ).

#### 5.7.3.5.3. Perceived behavioural control, attitudes and subjective norms

Strong significant gender differences were seen in subjective norms ( $F [3, 469] = 18.28, p < .001$ ) but no differences between age groups were observed ( $F [3, 469] = 0.01, p > .05$ ). Female participants ( $M = 3.97, [SD = 1.09]$ ) scored higher on the subjective norms scale in comparison to males ( $M = 3.62, [SD = 1.09]$ ), which indicated higher feelings of social pressure to eat fruits and vegetables among the females in comparison to the males. This difference is illustrated in a bar chart below (Figure 13).



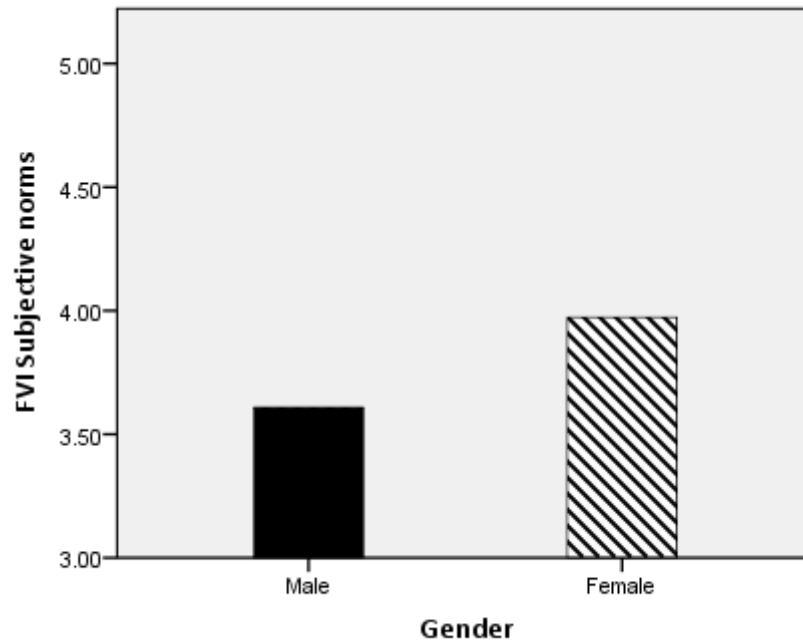


Figure 13: Gender differences in FVI subjective norms

No further differences in the Theory of Planned Behaviour variables were identified as significant in the results. No differences in perceived behavioural control between either genders ( $F [1, 469] = 1.01, p > .05$ ) or age groups ( $F [3, 469] = 0.28, p > .05$ ) were observed. Differences in attitudes towards fruit and vegetable intake between genders ( $F [1, 469] = 2.81, p > .05$ ) and age groups ( $F [3, 469] = 0.80, p > .05$ ) were neither observed.

#### 5.7.3.5.4. Prototype variables

It can be seen from Table 12 above that the significant differences identified in the MANOVA between age groups were associated with prototype similarity from the Prototype/Willingness Model ( $F [3, 475] = 3.09, p < .05$ ). There was significant differences ( $p < .05$ ) between 11 ( $M = 4.69 [SD = 1.61]$ ) and 12 year olds ( $M = 4.04 [SD = 1.65]$ ) prototype similarity scores, and also between 11 year old and 13 year old children's scores ( $M = 4.17 [SD = 1.52]$ ). Children seemed to be more likely to perceive themselves as similar to a person that they admire that eat fruit and vegetables at the age of 11, however this perception dropped at the age of 12 and then started to increase again among 14 year olds. This can be

seen in figure 14 below. No age differences were found in prototype evaluation scores ( $F [3, 469] = 1.78, p > .05$ ).

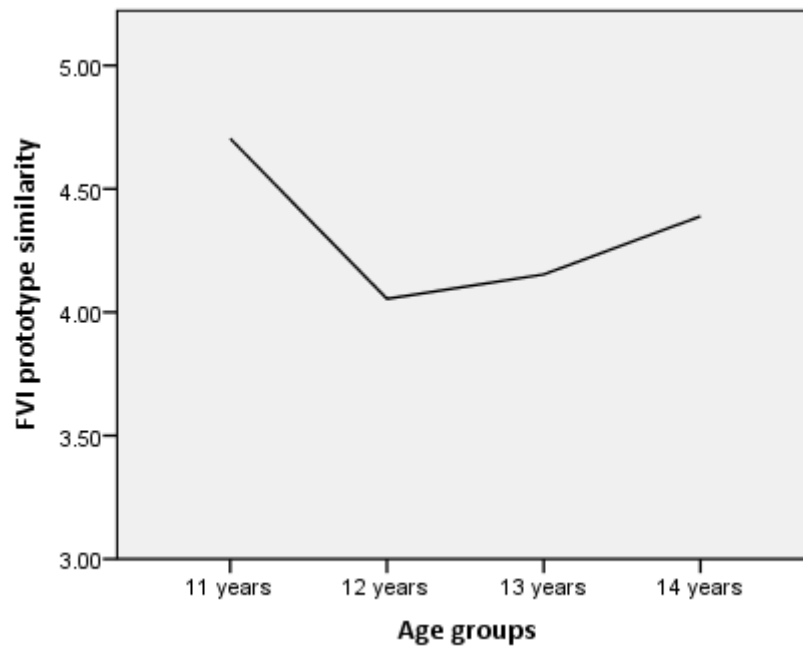


Figure 14: Age differences in FVI prototype similarity

In regards to prototype evaluation, no significant differences between age groups ( $F [3, 469] = 1.79, p > .05$ ) or genders ( $F [1, 469] = 0.57, p > .05$ ) were observed which indicated that there were no evident differences in the views younger and older, males and females held of young people that ate fruits and vegetables.

## **5.8. Discussion**

Study 1 examined how health cognitions such as attitudes, control, social norms and image, together with parental experiences, predicted physical activity and fruit and vegetable intake amongst adolescents living in the United Arab Emirates. The aims were: (a) to test whether constructs from the Theory of Planned Behaviour (Ajzen, 1991) predicted adolescents' physical activity and fruit and vegetable intake (b) to test whether the Prototype/Willingness Model, in addition to the Theory of Planned Behaviour (age, gender and parental behaviour), increased the prediction of intentions and behaviour, and (c) to test whether any of the study variables and relationships were moderated by age and gender.

The results indicated that the constructs from the Theory of Planned Behaviour (attitudes, subjective norms and perceived behavioural control) predicted behavioural intentions, which meant that hypotheses 1a and 1b could be accepted. The data also showed that behavioural intentions were strong predictors of actual behaviour (both physical activity and fruit and vegetable intake). Perceived behavioural control did not predict behaviour directly, but indirectly through intentions. It was interesting to find that subjective norms predicted physical activity behaviour directly and this is further discussed below. Hypotheses 3a and 3b were accepted as the result showed that the Prototype/Willingness Model enhanced the prediction of behavioural intentions for physical activity and fruit and vegetable intake. Adding prototype similarity to the model appeared to have the strongest effect on behavioural intentions. Prototype similarity enhanced the prediction of the model (together with parental behaviour and subjective norms) and had a significant effect on actual fruit and vegetable intake, which meant that hypothesis 4b was accepted. There

also appeared to be some differences between age and gender in the study variables, accepting hypothesis 5. The results are discussed below.

### ***5.8.1. The Theory of Planned Behaviour explaining intentions and behaviour***

The Theory of Planned Behaviour provided strong evidence for overall predictive validity of behavioural intentions both in regards to physical activity and fruit and vegetable intake. Hypothesis 1 confirmed that attitudes, perceived behavioural control and subjective norms predicted behavioural intentions directly. However, perceived behavioural control did not have a direct effect on behaviour, but so did subjective norms (for physical activity only). Behavioural intentions were also strong predictors of behaviour. Previous research (Hagger et al., 2002) has revealed that perceived behavioural control and attitudes have the most influential effect on intentions whereas subjective norms have a weaker effect on physical activity intentions. The present study indicated that perceived behavioural control seemed to be particularly important and appeared as the strongest predictor of physical activity intentions within the model, followed by subjective norms and attitudes. However, subjective norms were the strongest influencer of fruit and vegetable intake intentions, followed by perceived behavioural control and attitudes.

Perceived behavioural control and attitudes are strongly significant as predictors each time tested and supports numerous of previous findings (Armitage and Conner, 2001; Hagger et al., 2002). Subjective norms significantly predicted intentions across both health behaviours in the present study, even though some researchers found that subjective norms did not act as an important predictor of physical activity (Plotnikoff et al., 2013; Duncan et al., 2012; Hagger et al., 2002b). Ajzen (1991) explained that the relative importance of subjective norms is suspected to vary across health behaviours, which would be important to consider when using the model. The behaviours studied for the present study

were physical activity and healthy eating, two behaviours which are likely to be influenced by peers as both behaviours take place in social settings which could explain why subjective norms appeared to an important factor in the present study.

Prinstein (2009) suggested that peers often influenced weight related behaviours such as healthy eating and physical activity. The significant influence of subjective norms on behavioural intentions can perhaps be explained by peer influences. Subjective norms are typically measured (as in the present study), by asking participants to indicate how “important others” would want them to do. The measurement of this construct has been suggested as a limitation and could perhaps explain the lack of predictive association with behavioural intentions (White et al., 2009), and it has therefore been suggested to be more specific (specify peers, parents, teachers, etc.) when asking students about social norms (De la Haye et al., 2010). Peer influences are important during this transitional phase in life and adolescents’ perceptions of peer expectations have been shown to be an important influencer of behaviours (Stok et al., 2014). Adolescents will try hard to comply with social norms from peers and being part of a peer group is becoming more important (Coleman, 2011). Peer influences were further studied descriptive norms through the Prototype/Willingness model and appeared to be an important influencer of behavioural intentions. This is discussed further below.

Subjective norm was also the only construct from the Theory of Planned Behaviour that was successful in predicting physical activity. Behavioural intentions were however, strong predictors of actual behaviour. Evidence showed that intentions based on attitudes and subjective norms predicted physical activity better than intentions based on perceived behavioural control. None of the constructs from the Theory of Planned behaviour predicted fruit and vegetable intake directly, however intentions based on attitudes better

predicted fruit and vegetable intake than intentions based on subjective norms and perceived behavioural control. This would suggest that intervention research should test the effectiveness of interventions aimed at enhancing adolescents' attitudes towards physical activity and health eating to see whether it would enhance behaviour through enhanced behavioural intentions.

Previous studies have frequently found perceived behavioural control to be the only variable from the Theory of Planned Behaviour to act as a direct influencer of physical activity (Craig et al., 1996; Duncan et al., 2012; Ellis et al., 2012; Hagger et al., 2002) and fruit and vegetable intake (Lien et al., 2002; Kothe and Mullan, 2014). However, the role of subjective norms has been highlighted in the literature on healthy eating behaviour where a number of studies found that it was a successful predictor of actual behaviour (Fila and Smith, 2006; Icked, 2011; Povey et al., 2000).

The influence of subjective norms in the current study can perhaps be explained by differences between Middle-Eastern collectivistic and Western individualistic cultures (Triandis, 1995). This assumption would be supported by Hagger et al. (2007), who found that subjective norms were lower in an individualistic sample (UK) and higher in collectivistic samples (Greece/Hungary). Aleselaimi (2010) studied physical activity among people in Saudi-Arabia and also found that subjective norms had a greater impact on behavioural intentions than attitudes and perceived behavioural control and suggested that this may be due to cultural differences between individualistic and collectivistic societies. Even though the present study was carried out in the Middle East which traditionally is collectivistic, it is not clear whether United Arab Emirates is truly collectivistic or not, due to the country's unique cultural, economic and social context with a large amount of expatriate workers from all over the world (Engin and McKeown, 2012). The role of subjective norms in the prediction of both physical activity and health eating in different cultural settings should therefore be studied further.

Behavioural intentions predicted physical activity and fruit and vegetable intake which, indicated that intentions translated into behaviour. However since past behaviour not was accurately measured and therefore could not controlled for (a major limitation of the study), habitual influences could not be ruled out. The role of past behaviour that has been formed in to a habit is a strong predictor of future behaviour (Armitage and Conner, 2001) and should therefore be addressed for future studies. A large amount of the variance (65.7 percent for physical activity and 53.7 percent for fruit and vegetable intake) remained unexplained after including all study variables in the present data analysis. To address this gap, an interventional approach was taken on in Study 2, using implementation intentions (Gollwitzer, 1993). One of the limitations with the Theory of Planned Behaviour is its inconsistency in predicting actual behaviour, which has created a gap between intentions and behaviour (Sheeran, 2002). Adoption of health behaviour can be explained through two stages according to Gollwitzer (1993). The first stage is motivational and involves the development of behavioural intentions and can be explained well by the Theory of Planned Behaviour. However, the Theory of Planned Behaviour does not acknowledge the stage where people plan out their behavioural intentions. This stage is known as the volitional stage and involves the planning process of making intentions in to actions (implementation intentions) and was addressed in Study 2, as a second step of the current research programme.

Another limitation, according to Hagger and Chatzisarantis (2009), is that the model does not explain the reasons behind the formation of people's beliefs. They therefore sought to examine additional factors in the model in order to get a better understanding of people's beliefs and motivational factors by integrating aspects from the Self-determination theory (Deci and Ryan, 1985). Moreno-Murcia et al. (2013) found that all of the Theory of Planned variables predicted physical activity in participants with high intrinsic motivation to be physically

active, which is something that could be considered for future research. The influencing factors of physical activity and fruit and vegetable intake were therefore studied further in chapter 8 from a qualitative perspective, using a focus group methodology.

#### 5.8.2. Expanding the Theory of Planned Behaviour with the Prototype/Willingness Model

The results from the current study showed that the Prototype/Willingness Model significantly enhanced the prediction of physical activity intentions by 2.6 percent and fruit and vegetable intentions by 2.9 percent, after controlling for gender, age and parental influences. Adding the Prototype/Willingness model to the Theory of Planned Behaviour did not significantly enhance the prediction of physical activity but did so for fruit and vegetable intake, which was rather interesting.

Looking at the Prototype constructs, it was shown that prototype evaluation, i.e. the image of a person that engages in the behaviour appeared to be less powerful than prototype similarity. Prototype similarity, how a person identify himself with that image was however a powerful predictor of both intentions and sometimes behaviour. Prototype similarity was a strongly significant predictor of fruit and vegetable intake and behaviour, whereas prototype evaluation only predicted behavioural intentions. In regards to physical activity, only prototype similarity predicted behavioural intentions. None of the Prototype variables predicted physical activity. The findings indicated that the closer the participants believed themselves to be to the prototype of a person of the same age who is physically active and eat fruits and vegetables, the more likely they were to have intentions to engage in the respective behaviour. Identifying oneself with a healthy prototype appeared to be more motivating



than the way the prototype was viewed. This suggests that identifying oneself with people who do or do not engage in physical activity or fruit and vegetable intake is important in motivating intentions. This is in line with previous research by Ravis et al. (2006) and Ravis and Sheeran (2003 and 2006) who also found that prototype similarity was the most consistent predictor of intentions of a variety of health behaviours (risky and enhancing). Ravis et al. (2006) suggested that a possible reason to why prototype evaluation was less important than prototype similarity may be that liking is less important than identification in regards to adolescents' health decisions. There remains a need to explore this further and also to study the influence of prototype perceptions on health enhancing behaviours as a majority of the reviewed literature have studied health risky behaviours based on the Prototype/Willingness Model (Gerrard et al., 2005; Lazura et al., 2011; Ravis et al., 2006). However since the current study focused on healthy prototypes it would also be interesting to consider unhealthy prototype perceptions in adolescents in the Middle East. Overweight in the Arab world is often a sign of wealth and beauty (AlNohair et al., 2014; Klautzer et al., 2014) and it would therefore be interesting to study Arab participants' perceptions of unhealthy prototypes, to see if these would be considered as more favourable, in comparison to Western countries.

Previous researchers have suggested that subjective norms are the weakest influencer of intentions in comparison to attitudes and perceived behavioural control (Armitage and Conner, 2001; Hagger et al. 2002), however this was not apparent in the present study. Ravis et al. (2006) suggested that the conceptualization of social influences is too narrowly explained in the Theory of Planned Behaviour by only measuring subjective norms. In the current study, subjective norms appeared to be a strong predictor of behavioural intentions and also behaviour at times, as in similarity with prototype similarity. Prototype similarity is also a type of social norms, namely descriptive norms that is based on a person's perceptions of other people's behaviours (Calidini, 2003). The role

of descriptive norms has been previously considered in health research (Rivis and Sheeran, 2003; Rivis et al., 2006; White et al., 2009). Gibbons et al. (2003) suggested that favourable descriptive norms increase behavioural intentions, which was apparent in the present study. This supports Rivis et al. (2006) who suggested that including prototype perceptions and descriptive norms in the Theory of Planned Behaviour would increase the explained variance on behavioural intentions and also enhance our understanding of social influences in relation to health behavioural intentions. Rivis and Sheeran (2009) conducted a meta-analysis found that the role of descriptive norms were stronger in adolescents, in comparison to adults, suggesting that children are not just motivated by the approval of significant others (subjective norms), but also significant others actual behaviour. It was particularly interesting to find in the present study that prototype similarity enhanced the prediction of fruit and vegetable intake, but not physical activity, whereas subjective norms predicted both physical activity and fruit and vegetable intake. This should be studied further.

### ***5.8.3. Controlling for parental behaviour***

Parental behaviour strongly significantly accounted for 20.6 percent of the variance of fruit and vegetable intake intentions and 3.0 percent of the variance on actual behaviour. These effects were lower in physical activity where parental behaviour explained 6.8 percent of behavioural intentions and. No significant effect was found on physical activity. It was interesting to find that parental behaviour appeared to be more important in fruit and vegetable intake in comparison to physical activity. Previous research has shown that parental behaviour play an important role in the prediction of physical activity (Bauer et al., 2008; Trost, 2011) and fruit and vegetable intake (Cooke et al., 2003; Jones et al., 2010; Neumark-Sztainer et al., 2002; Rasmussen et al., 2006; Wardle et al., 2005) and this was also evident in the present study.

Parental influences may decrease with age in children and peer influences often become powerful (Beal et al., 2011). Future research could therefore also consider peer influences in addition to parental influences in regards to physical activity and fruit and vegetable intake. It is also possible that child-reported parental behaviour not is as accurate as parental-reported behaviour. Children may not always be aware of their parents' actual behaviour, as they always not are present when the behaviour occurs. Cullen et al (2001) reported that child-reported measures on parental behaviour are often unreliable. It would therefore be recommended for future studies to use parental-reported measures of parental behaviour instead of child-reported measures. Another limitation with the current study was that there was only one question asking the participants about their parent's behaviour. Parental behaviour should have been separated in to maternal and paternal behaviour in order to get a clearer picture of actual behaviour as this can vary between mothers, fathers and other caregivers and this is further discussed below.

#### ***5.8.4. Gender and age differences***

The results of the current study indicated that there were some age and gender differences in health cognitions, intentions and behaviour of physical activity and fruit and vegetable intake. This meant that hypothesis 7 was accepted. Greater differences were apparent among age groups, in comparison to gender. In regards to physical activity, the result showed that actual behaviour and intentions decreased with age. This is in line with previous research, which suggested that physical activity levels often are lower in adolescents (Whitehead and Biddle, 2008). Little is known about the psychological factors that may influence this finding. Pate et al. (2007) found in a study in the United States, that girls' participation in physical activity declined by nearly 20 percent from the age of 13 (8<sup>th</sup> grade) to 15 (10<sup>th</sup> grade). Pubertal changes and psychological variables such as body dissatisfaction have been pointed out as possible determinants of physical activity in this age group. Mulvihill et al. (2000)

suggested that participants' levels of self-consciousness in relation to physical appearance often increased with age and this was more common among females.

There were also differences between genders which showed that males were physically active more often in comparison to females, which has been evident in previous research, especially during adolescence (Pate et al., 2007; Bromley, Sproston and Shelton, 2005; Pearson et al., 2009; Montgomery et al., 2004). One explanation can be that boys are more encouraged to participate in sports and it is linked to masculinity (Messner, Hunt and Dunbar, 1999). Women's sports are often underrepresented in the media and males playing sports is frequently shown. Messner et al. (1999) also suggested that women rarely appear without men in the sports programming commercials. Boys also tend to report greater sports competence, endurance, strength and enjoyment of physical education programs more compared to girls (Klomsten, Marsh and Skaalvik, 2005). Girls often tend to feel self-conscious about their skills and competence, which can impact on their physical activity levels (Allender, Cowburn and Foster, 2006). Furthermore, Yungblut, Shinke and McGannon (2012) found in a qualitative study that self-perception, enjoyment and peer support were especially important factors in Canadian adolescent females' physical activity levels. These gender differences are further discussed and explored in chapter 7.

There also appeared to be differences in physical activity health cognitions between age groups, which suggested that certain health cognitions salient to physical activity intentions decreases with age. No differences were found between genders. The results showed that positive attitudes towards physical activity and perceived behavioural control decreased between the age of 11 and 14 years among the participants. A weak but significant decrease in prototype similarity perceptions with increased age was also found which suggested that

older participants identified themselves less often to physically active peers, in comparison to younger participants.

In regards to fruit and vegetable intake, no significant differences were found in behaviour or intentions between age groups. The only health cognition that differed between ages was prototype similarity, which indicated a slight decrease between the ages of 11 and 13 years. Strong significant differences were found in behavioural intentions, which indicated that females intended to eat 5 portions of fruits and vegetables daily, to a higher extent than males. This is in line with previous studies indicated that females eat more fruit and vegetables than males, both in adolescents and adulthood (Beech et al., 1999; Emanuel, 2012; Cooke and Wardle, 2005). The results also indicated that females reported higher on subjective norms and perceived behavioural control in comparison to males, which suggested that females perceived more pressure from socially important people to eat fruits and vegetables in comparison to males and also had higher perceptions about their own ability to eat fruits and vegetables. Eagly (1987) explained that females often have a greater need to please others and are more likely to follow majority opinions in comparison to males which could explain the differences found in the current study. Munoz-Silva (2007) also found increased levels of subjective norms and perceived behavioural control reported by females in comparison to males. Other research found the opposite; subjective norms and perceived behavioural control were higher among male adolescents than in females (Emanuel et al., 2012; Fila and Smith, 2006; Plotnikoff et al., 2010). Further research is required to determine gender differences in the Theory of Planned Behaviour. This would be important to consider when tailoring health promotion interventions based on constructs from the Theory of Planned Behaviour.

#### ***5.8.5. Limitations and practical implications of Study 1***

One limitation with the current sample was that their socio-economic status was not considered. In England, it has been found that children with lower socio-economic background were less likely to be members and take part in sports or youth clubs (Magnusson, Sjoberg, Kjellgren and Lissner, 2011). Children from low socio economic backgrounds were also more likely to walk more but participated less in sporting activities (Craig and Shelton, 2008). Brodersen, Steptoe, Boniface and Wardle (2007) found that levels of sedentary behaviour were greater in respondents from lower socio economic backgrounds. Research from the US showed that children from a low socio economic background spent less time doing physical activity and spent more time on sedentary behaviours such as watching TV and playing video games. Differences between socio-economic groups have also been found in relation to healthy eating habits. Socioeconomic disparities in fruit and vegetable consumption are persistent and several studies have shown that children and adolescents from lower socio-economic backgrounds consume less fresh fruit and vegetables (Giskes, Turrell, Patterson and Newman, 2002; Rasmussen et al., 2006; Wardle et al., 2003).

No research has been found up to date of the socio-economic status on physical activity and healthy eating habits among children in the United Arab Emirates. Dubai Health Authority (2009) found no link between income and physical activity in adult Emirati nationals. However, there was a strong positive relationship between educational background and physical activity and the more educated a person was the more likely he was to achieve the recommended amount of daily physical activity. The Dubai Household Health Survey (Dubai Health Authority, 2012) found a direct link between education, income and the consumption of fruits and vegetables among adults. The highest prevalence of sufficient consumption of fruit and vegetable was among high-income groups and the lowest prevalence was among low-income groups.

Socio-economic status should be considered for future research in the United Arab Emirates. The participating schools for the current study was unfortunately not able to provide this information but considering the high tuition fees, it could perhaps be assumed that the students came from a more advantaged socio-economic background than schools with lower tuition fees. However, this is just an assumption so it would be important for future research to consider this. This type of background information could be gathered by asking the parents of the participants to complete self-reports regarding their educational background and household income (Drenowatz et al., 2010). This would also allow for a good opportunity to ask parents about their past health behaviours instead of using child-reported parental behaviour.

The participants' body mass index was not taken into account for the present study, which meant that body weight could not be examined. This has previously been considered as a possible predictor of health cognitions, intentions and behaviour (Fila and Smith, 2006; Gerrits et al., 2010). For the present study, the researcher wanted to measure Body mass index initially but the first school did not agree to have the children's weight and height checked for the purpose of the study, due to the sensitivity of the students and time constraints. Another option would have been to use self-reports of weight and height. This method was previously used by Gerrits et al. (2010) and the participants were asked to report their weight in kilograms and height in centimetres to calculate Body-mass index. Future research should examine whether social cognitions, behavioural intentions and physical activity/dietary habits are influenced by body weight. The ideal way to gather Body mass index data would be to include individual measurement of the participants' body mass index and/or body fat measurements.

Another major limitation with the current study was that ethnic background not was considered. The participants' nationalities, place of birth and parents place

of birth and religious background were considered, but not ethnicity. Taken the cultural diversity of Dubai into consideration, it became very difficult to analyse the data of children and parents' nationalities. Many children stated that their nationality was from one country, they were born in another country and their parents were born in different countries. An example was:

*"Where were you born?: Austria*

*Where were your father born?: England*

*Where were you mother born? Thailand*

*What is your religion: Muslim*

*What is your nationality: British"*

This complex data was therefore not tested as influencers of health behaviours in the analysis to avoid the risk of presenting inaccurate data. It would perhaps have been more useful to just ask the participants about their ethnic background. In other countries, there is links between health behaviours and ethnic background in adolescents. In England, Research showed that black girls and Asian girls and boys were less likely to participate in physical activity than Caucasian students (Brodersen et al., 2007) and sedentary behaviour was higher among black students than in white students. Sproston and Mindell (2004) found that children in a minority group (except Pakistani and Irish Boys) were less likely to achieve 60 minutes of physical activity daily in comparison to the general population. They also found that girls from all ethnic backgrounds were less physically active than boys although the physical activity levels of boys with an East Asian (Chinese), Black African and Irish background was similar to the girls. East Asian boys were least likely to be physically active in comparison to other groups of boys. No research has been found on ethnic differences in physical activity or dietary habits in children in the United Arab Emirates. A report from Dubai Health Authority (2009) on a study conducted with Emirati and Expat adults showed that European males were more physically active than the average (28 percent vs. 17 percent) and Phillipino females were more physically active than the average (41 percent vs. 25 percent). There is a strong



need for studies in this field in order to gain more comprehensive information on physical activity levels and dietary habits in the United Arab Emirates. However the population of Dubai is highly culturally diverse, with a majority of the population being expatriates. Many children living there are truly multicultural individuals, having developed a 'Third Culture', which is different from their home or host culture (Wilkins, 2013), which could make it difficult to take cultural/ethnic background into account when conducting research in the United Arab Emirates.

Another major limitation of the present study was that difficulty to get access to Emirati participants and gain access to local government schools. A majority of the alarming figures of obesity and the related health behaviours in the United Arab Emirates have been gathered from Emirati nationals (Junaibil et al., 2013; Ng et al., 2013) and it would therefore be important to target this population. It would be useful to conduct this type of research in the government schools where all the students are Emirati nationals (KHDA, 2015). Only 9.7 percent of the participants in the current study were Emirati. However, it could be argued that this is showing a good representation of the population of Dubai, where the population structure is built up with a population where 11 percent being local Emiratis and 89 percent being expatriates of varying nationalities (Ministry of foreign affairs, 2014).

One major limitation of Study 1 was that it failed to measure and control for past behaviour. Recent behaviour was measured (behaviour over the past week), however this could not be included as a control factor in the final analysis. Past behaviour (behaviour in the past 3-6months) should have been measured, instead of recent behaviour. Past behaviour would control for habitual effects outlined by Hagger et al. (2000), and allows for testing to predict recent behaviour. Unlike effects of past behaviour that reflect effects from innumerable behavioural antecedents, the effects of recent behaviour on future behaviour are

considered to represent biases that recent occurrences of an event exert on subjective evaluations, behavioural intentions and performance of behaviour (Bagozzi and Kimmel, 1995). Past behavioural engagement in behaviour influences current behaviour (Armitage and Conner, 2001; Godin et al., 1997; Hagger et al., 2001; Hagger, Chatzisarantis and Biddle, 2002a). Hagger et al. (2001) found that past behaviour (in regards to physical activity) significantly predicted the Theory of Planned Behaviour variables however, controlling for past behaviour did not attenuate the influence of the Theory of Planned Behaviour variables on intentions and suggested that would be necessary to consider social cognitive factors to turn past actions into behavioural intentions. Ouellette and Wood (1998) found that past behaviour, together with psychological variables explained behaviour intentions and suggested that past behaviour should be considered as a variable in behaviour change models. Past behaviour should also be controlled for in future studies.

The present study relied fully on self-reported measures from the participants. The use of self-report data may be limited and therefore problematic. Data may be limited due to individual recall and accuracy. Understanding of the questions may vary between participants. Participants are also likely to interpret rating scales differently (Krosnick and Presser, 2010). Another option would perhaps be to ask parents and teachers and children's health behaviours. However this may also be problematic as parents and teachers can often not accurately recall children's physical activity or eating habits (Sallis, 2010). Surveys that are relying on self-report questionnaires from parents and children reported higher levels of physical activity than when objective measures (using accelerometers to measure physical activity) were being used (British Heart Foundation, 2004; Sallis, 2010). The use of diaries to record physical activity (White et al., 2012) and food intake (Brower and Mousack, 2015) may also be useful even though chances are that the children forget to fill it out. Researchers should focus to develop better objective measures of physical activity and healthy eating.

As two health behaviours were measured at the same time for the Theory of planned behaviour and Prototype/Willingness Model, the questionnaire was relatively long and repetitive. This may have caused the participants to feel bored and lose focus while completing it. If time had allowed for it, it would have been ideal to let the students complete the questionnaires separate for each of the health behaviours. Furthermore, previous studies have sought to establish the worth of computer based surveys by comparing the data they obtain with data obtained from more traditional methods such as paper- and-pencil surveys (Griffiths, 2010). The questionnaire for the present study was pen-and-paper based. For future research it would therefore be useful to consider the use of electronic devices to complete questionnaires. It may be that the participants are very pro-Internet and would prefer such an option compared to paper-based methods (Griffiths, Farer and Christensen 2010).

The findings from Study 1 provide some directions for future intervention research of physical activity and fruit and vegetable intake. Social influences appeared to be important predictors of intentions and actual behaviour of physical activity and fruit and vegetable intake and it is therefore suggested to consider this as an ingredient for future interventions. This was addressed in Study 2, where an intervention based on social influences was implemented to promote physical activity and fruit and vegetable intake, in addition to an intervention based on implementation intentions. In order to get a deeper insight into the role of social influences in adolescents' physical activity and healthy eating habits, Study 3 of the current research programme studied this from a qualitative perspective.

### **5.8.6. Conclusion**

In conclusion, Study 1, demonstrated that both the Theory of planned and the Prototype/Willingness Model were successful in predicting physical activity and fruit and vegetable intake intentions among adolescents in the United Arab Emirates. Prototype similarity was the most successful predictor within the Prototype/Willingness Model and could be a valuable addition to the Theory of Planned Behaviour in order to better understand adolescents' health-related decisions. Further research will be valuable to further explain the processes by which health-enhancing prototypes impact adolescents' health enhancing behaviours. These findings provide a better understanding of the factors that motivates adolescents in the United Arab Emirates to be physically active and eat fruit and vegetables as part of a healthy diet. The rapid increase of obesity in the United Arab Emirates is a concern (AlNohair, 2014), and the findings gathered in the this study is therefore useful information for health promoters to increase their understanding of the influencing factors of physical activity and fruit and vegetable intake, in order to reduce the risk of obesity and related complications.

## **Chapter 6– Study 2:**

### *6.1. Literature review*

School-based interventions aimed at enhancing physical activity and healthy eating has the potential to reach a great amount of school aged children (Ploeg et al., 2014). Some of these interventions have been shown to be effective, however more research is needed to establish their effectiveness (Dobbins, Hussen, DeCorby and LaRocca, 2013; Evans, Christian, Cleghorn, Greenwood and Cade, 2012). Previous research and reviews of health behaviour change and methods of intervention design have acknowledged the importance of psychological theory in the development of health interventions (Bartholomew, Parcel, Kok and Gottlieb, 2001).

Theory can be the basis of interventions in a number of different ways, from identifying theoretical constructs to be targeted (e.g. attitude, norms, self-efficacy) or mechanisms underlying particular behaviour change techniques (e.g., vicarious learning in modelling) (Webb, Joseph, Yardley and Mirchie, 2010). Webb et al., (2010) conducted a Meta-analysis, which showed that health interventions could benefit from using behaviour change theory. They found that interventions based on theory were associated with larger effect size in comparison to interventions that were not based on theory. Painter, Borba, Hynes, Mays and Glanz (2008) also studied theory use in the health behaviour literature and found that only a small proportion of health interventions applied theory in interventions. It therefore remains a need for researchers to develop theory-based interventions and study its effectiveness in order to promote health behaviours as successful as possible. Interventions aimed to enhance health behaviours, including physical activity and fruit and vegetable intake in adolescents (as well as other populations) is discussed below.

### **6.1.1. Health promotion for preventing obesity in children**

As discussed in chapter 2, childhood obesity has become epidemic and this is a well-documented concern for public health (World Health Organization, 2014). Prevention of childhood obesity is a key strategy for controlling the obesity epidemic (Dehghan, Akhtar-Danesh, Merchant, 2005). Health promotion includes primary, secondary and tertiary prevention of obesity. Primary prevention efforts focus on reducing the risk factors (and new cases) of obesity, secondary prevention focuses on reducing further weight increase and helps with weight loss in established cases. Tertiary prevention focuses on the prevention of the consequences of obesity, which often is the treatment of obesity related ill-health (Nammi, Koka, Chinnala and Boini, 2004). The current study focused on the primary prevention by testing theory-based interventions to promote physical activity and fruit and vegetable intake in secondary school students.

According to Raine (2010), there are different approaches to obesity promotion. The downstream approach focuses on direct behaviour change, such as individual dietary education. The midstream approach to health promotion targets more undefined and larger numbers, such as the use of media campaigns for public health interventions promoting physical activity and healthy eating. The upstream approach addresses the problem at its source and aims to intervene before people become overweight. Zola (1970, cited by Tones and Tilford, 2001) explained this by using a 'river analogy' of medical care. This described a doctor that was too busy saving drowning people from a river and that he did not have time to stop them from falling in the river in the first place. The downstream approach 'pulls drowning people from the river' (i.e. people that already are obese) whereas the upstream approach to health promotion stops the people from falling in the river (i.e. target the cause of the obesity). Even though society needs both primary prevention and medical treatment,

public health initiatives should go upstream and identify the causes of the problems and intervene by addressing these causes, i.e. addressing the problem before it becomes a problem. Averting the problems before they begin is both cost-effective and humane (Dorfman and Wallack, 2007).

There are also different levels of interventions by targeting the environment, community, population, organisation and individual (Kelly, Charlton and Hanlon, 1993; Westmaas, Gil-Rivas and Silver, 2007). Five evidence-based approaches have been used for promoting health and wellbeing by the Ottawa health charter for health promotion (World Health Organization, 1988). This public health guidance described the levels of settings for health promotion as (1) developing people's personal skills (e.g. interventions aimed at changing individual behaviour), (2) strengthening community actions (e.g. media campaigns and school interventions), (3) creating supportive environments (e.g. enhance access to PA facilities), (4) building healthy public policy (e.g. planning for environmental enhancements) and (5) reorient health services (e.g. promoting healthy eating to young children and pregnant women by the health sector). Research has suggested that a combination of these approaches is more effective than implementing a single approach (Jackson et al., 2006). Interventions aimed at whole communities may implement media campaigns through TV, Internet and posters. Population based interventions are aimed at a whole population and often includes laws, such as no smoking in public areas and seatbelt use. Frieden (2010) suggested that interventions with the greatest potential impact address socio-economic determinants of health, because they reach broader segments of society and require less individual effort. Jackson et al. (2006) conducted a review of interventions targeting chronic diseases, determinants of health and other health issues. They found that building health public policies and creating supportive environments leads to the largest impacts on health. Relevant actions involved investment in government and social policy and implementation of legalisation of intersectional and inter-organisational collaboration guidelines.

### **6.1.2. School based interventions**

The factors influencing physical activity and vegetable intake are numerous and linked to each other in complex ways (Roberts, Cavill, Hancock and Rutter, 2013). Enhancing physical activity and healthy eating patterns therefore remains a challenge, particularly on larger scales (Draper et al., 2010; Roberts et al., 2013). Different intervention programmes addressing physical activity and fruit and vegetable intake have adopted different strategies, with a variety of outcomes. Some of these are discussed below.

Little is known about the effectiveness of school based health promotion on physical activity and healthy eating in the United Arab Emirates and the research in this area is almost non-existent. Details on specific school based programmes and interventions promoting physical activity or fruit and vegetable intake in Dubai have not been found up to this date. Schools are an ideal setting to promote physical activity and fruit and vegetable intake to children, namely through the provision of healthy snacks, education, playtime and physical education and school-based interventions have the potential to reach a great amount of school aged children (Fairclough, Beiglhe, Erwin and Ridgers, 2012; Roberts et al., 2013). Physical activity and healthy eating in the school setting have shown to directly influence academic performance, focus and self-esteem (Belot and James, 2009; Trudeau and Shephard, 2008).

In regards to physical activity, the school environment plays a central role to encourage students to participate in the recommended levels of physical activity (Pate, 2006). Various approaches to school based interventions has been studied and programmes are often deemed successful if the average physical activity level increases (Ploeg, Maximova, McGavock, Davis and Veugelers, 2014). However, it is not yet clear what the most effective strategies for school-based interventions really are (Dobbins, Hussen, DeCorby and LaRocca, 2013). Some



interventions were purely educational and focused on providing students with information about the benefits of physical activity and risks of physical inactivity (Bayne-Smith et al. 2004; Li, 2010). Education alone had no long-term effect on physical activity levels were noticed in the reviewed studies (Li, 2010). Providing people with information of the benefits physical activity is necessary, but not enough, to motivate behaviour change as previously suggested by Shepherd et al. (2006).

Dobbins et al. (2013) conducted a systematic review to summarise the evidence of 26 school-based interventions (minimum 12 week duration) in promoting physical activity and fitness in children and adolescents. They found some evidence that school-based physical activity interventions had positive effects on physical activity duration and television viewing although they generally had little effect on physical activity rates. Those studies that included a combination of printed educational materials and improvements of PE programmes resulted in the most positive effects. These interventions targeted school curriculums, including improvement of PE programmes, teacher training, social support, accessibility to exercise equipment, as well as educating students about the benefits of physical activity promoting it both in and outside of the school environment. This appeared to successfully increase children's physical activity levels (Colin-Ramirez, 2010; Verstrate, Cardon, De Clercq, Bourdeauhuij, 2007). Although all schools in Dubai require physical education as part of the curriculum (Dubai Health Authority, 2012), research from Western countries have shown that PE classes may occur infrequently and students are often inactive in them (Pate, 2006). The Dubai Health Authority (2012) is aiming to improve physical education programmes in schools and is implementing unified guidelines to encourage physical activity of students in all schools in Dubai. Dubai Health Authority has implemented the requirements of 150 minutes of PE per week for Primary school and 225 minutes (more than 4 lessons) for secondary school. However, a study by the Dubai Health Authority (2012) found that only 20

percent of schools adhere to these requirements. This suggests that there is a strong need to implement strict PE guidelines and standards across schools in the United Arab Emirates.

In regards to fruit and vegetable intake, a number of the determinants of fruit and vegetable intake have been incorporated into intervention programmes. Interventions have provided free fruits to increase the availability of fruits and vegetables in the school setting and other programmes have provided nutrition education, improvements of the school environment and increasing social support from family and peers (Evans et al., 2012; Gann et al., 2012). Many interventions have failed to increase vegetable intake by a useful amount, with most of the improvement made in fruit intake (Evans et al., 2012). This could perhaps be explained by the importance of enjoyment of vegetables, which is a key influencer of intake (Rasmussen et al., 2006).

In Europe, governments have set out requirements for public schools in countries such as England, Germany and Denmark (European Union, 2012). For lunchtime in England, the schools must provide 'Not less than two portions of fruit and vegetables/salad per day per pupil must be provided; at least one must be vegetables/salad and at least one must be fruit'. Fruit and/or vegetables must also be provided at all food outlets for school food other than lunch (such as breakfast clubs, tuck shops, break time and after school clubs) (Department of Education, 2012).

Details on school based healthy eating interventions in the United Arab Emirates have not been found. Research on interventions in low- and middle-income countries is warranted based on a limited existing knowledge base (Gann et al., 2012). On a government level, the Dubai Health Authority (2011) banned junk food in school cafeterias and encouraged servings of health meals, however it is not at all clear how well this has been implemented across schools in the

country. Understanding barriers to a healthy lifestyle among adolescents is important in any intervention to promote the nutritional and health status of the community (Musaiger, 2012). Up to date, no theory-based interventions have to the researcher's knowledge been implemented targeting physical activity and fruit and vegetable intake among adolescents in the United Arab Emirates. One intervention implemented in Middle East was the "Healthy-E-Pals" programme (Habib-Mourad, 2013). This was a 3-month multi-component school based intervention targeting healthy eating and physical activity, based on the Social Cognitive Theory. The intervention promoted positive behaviour habits through classroom curriculum, food services and family involvement. Questionnaire distribution and group interviews were carried out for evaluation pre and post intervention. The programme resulted in increased breakfast intake and reduced intake of junk food among the participants after a period of 3 months. There was also an increase in knowledge and self-efficacy. No differences were noted in the children physical activity levels.

Some school-based interventions of physical activity and fruit and vegetable intake have been shown to be effective, however more research is needed to establish their effectiveness (Dobbins et al., 2013; Ganann et al., 2012). Previous research and reviews of health behaviour change and methods of intervention design have acknowledged the importance of psychological theory in the development of health interventions (Bartholomew, Parcel, Kok and Gottlieb, 2001). However, up to date there is no single or universal psychological theoretical framework for a particular area of study and therefore a range or combinations of frameworks need to be used to guide interventions (Gibbs and Water, 2011). Interventions to improve health-related behaviours should be tailored to the most important determinants or mediators of these behaviours [Brug, Tak, de Velde, Bere and de Bourdeoudeaud, 2008].

### ***6.1.3. Designing theory based health promotion interventions***

In regards to individual and community based initiatives, those interventions based on behaviour change theory are more often successful and valued (Webb et al., 2010). As previously discussed health interventions designed and implemented based on theory improves the effectiveness and outcomes (Elder, Ayala and Harris, 1999). A number of psychological models have been used to explain health behaviour and guide health promotion and interventions such as the Theory of Planned Behaviour (Ajzen, 1991), Health belief model (Rosenstock, 1974) and Transtheoretical model of change (Prochaska and DiClemente, 1992). Theories such as the Health Action Process Approach (Schwarzer, 1992) and Implementation intentions (Gollwitzer, 1993) specifically attempt to explain individual health behaviour change.

Intervention mapping (IM) is a protocol for developing effective theory-based behaviour change interventions and was firstly developed by Barthomolew, Parcel and Kok (1998). This helps programme planners to make effective decisions by following specific steps in planning interventions. Barthomolew, Parcel, Kok and Gottlieb (2001) published an intervention-mapping model consisting of 6 steps for developing successful interventions. The first step was to conduct a needs assessment. The second step was to create a matrix specifying change objectives. The third step was to select theory-based methods and practical strategies and the fourth step was to develop intervention components. The fifth step was to specify adoption and implementation plans and the sixth and final step was to generate programme evaluation plans. Programme planning is not a straightforward process and using intervention mapping as a guide will guide intervention planners through the process of planning, implementation and evaluation. Intervention mapping has guided several types of health intervention targeting health behaviours such as physical activity (Taylor et al., 2013), fruit and vegetable intake (Reinaerts, De Nooijer and De Vries, 2008), alcohol consumption (Atwell, Abraham and Duka, 2011) and

sexual health (Mkumbo, Schaalma, Kaaya, Leerloijer, Mkwambo and Kilanzo, 2012).

When designing successful behaviour change interventions based on theory, it is crucial to improve the design and implementation of evidence based practice (Michie, van Stralen and West, 2011). Many interventions are unsuccessful, as they do not carefully consider theoretical background and a method of implementation (Campbell and Hesketh, 2007). It is therefore important to understand how the intervention was developed and what worked and how well it served its purpose. Michie et al. (2005) studied the implementation of evidence-based practice and developed strategies for effective implementation, linking theory to practice. Based on a number of psychological theories, twelve domains were identified to explain behaviour change: knowledge (do they know they should do it?), skills (do they know how?), social/professional role and identity (will it change who they are?), beliefs about capabilities (self-efficacy), beliefs about consequences (outcome expectations), motivation and goals (intentions), memory, attention and decision processes (will they remember?), environmental context and resources (what are the barriers and facilitators?), social influences (social norms), emotion regulation (how do they feel about it?), behavioural regulation (what are the steps included?), and nature of the behaviour (what do they need to change?) . Michie et al. (2005) suggested that implementation of interventions based on the applications of this list of theoretical domains will enhance the understanding of behaviour change processes. Later work by Abraham and Michie (2008) developed a theory linked behaviour change taxonomy of 26 generally applicable behaviour change techniques (BCTs) based on a systematic review in order to make it easier to replicate successful behaviour change interventions. These BCTs were drawn from models such as they Theory of Planned Behaviour (Ajzen, 1991), Social Cognitive Theory (Bandura, 1986) and Transtheoretical model of change (Prochaska and DiClemente, 1992) included: *information (general, consequences*

*and approval), prompt intention formation, specific goal setting, graded tasks, barrier identification, behavioural contract, review goals, provide instructions, model, demonstration, prompt practice, prompt monitoring, provide feedback, general encouragement, contingent rewards, cues, follow up prompts, social comparison, social support, role modelling, self-talk, relapse prevention, stress management, motivational interviewing and time management.* Abraham and Michie's (2008) taxonomy is a good step towards helping researchers and intervention designers to clearly specify the content of behaviour change interventions and also to facilitate the use of theory in intervention design. This 26-item taxonomy was further tested through a meta-regression of physical activity and healthy eating interventions (Michie, Abraham, Whittington, Mcteer and Gupta, 2009). The results showed that self-monitoring (combined with another technique) was most effective in physical activity and healthy eating in adults. The taxonomies were further successfully tested on healthy eating and physical activity (Michie et al., 2011). Davies, Martin and Foxcroft (2013) highlighted that there are some BCTs missing from well-known taxonomies. Even though BCTs exists for a number of domains (including role modelling), there is a lack of recognised effective BCTs for use for health interventions targeting young people clearly based on the prototype willingness model.

In intervention research, it is also important to choose a suitable intervention methodology (Chater and Cook, 2013). Nutbeam (1996, 1999) provided some guidelines on how to implement successful health promotion interventions. He suggested that interventions should be based on theory in order to be as efficient as possible. Interventions should be planned on the basis of epidemiological, behavioural and social research focusing on relationships between short-term and long-term effects of interventions, changes in determinants and health outcomes. The guidelines by Nutbeam (1996) also included the importance of carefully choosing the use of intervention methodology. The intervention should be efficient in size and duration and the

implementation of combined methodologies should be considered, as these are more likely to be successful. The intervention should also be appropriate for the target population. Furthermore, methodologies should include randomised controlled trials and pre and post-tests in order to measure behaviour change. However, according to Nutbeam (1999) and Green and South (2006), true random allocation of individuals to intervention and control groups may not be feasible and it is instead recommended to allocate naturally occurring units such as hospitals, schools and communities.

#### ***6.1.4. Theory based interventions in children and young adults***

Social cognition models can be of great importance when developing psychological interventions aimed at improving health in children (Sutton, 2005). As discussed in previous chapters of the thesis, factors that influence health related decisions have been previously explained through the Theory of Planned Behaviour (Ajzen, 1991), Social Cognitive Theory (Bandura, 1986) and Prototype willingness model (Gibbons and Gerrard, 1995). Research from chapter 5 showed that adolescents' behavioural intentions to be physically active and eat fruits and vegetables is a function of attitudes, perceived behavioural control, subjective norms and prototype perceptions.

The Theory of Planned Behaviour has been frequently implemented in intervention research on physical activity among children has been one of the most common models to predict health behaviour intentions (Armitage and Conner, 2001). Despite this, the majority of health interventions are not based on such rigorous theory, which perhaps could partly explain why the effects of interventions have been relatively modest in effecting health behaviour change (Chatzisarantis and Hagger, 2005). Chatzisarantis and Hagger (2005) studied the effectiveness of an intervention based on the Theory of Planned Behaviour promoting physical activity, intentions and attitudes in a sample of 83 students with a mean age of 14.2 years in the United Kingdom. The participants received

messages based on salient (group 1) and non-salient (group 2) beliefs regarding the benefits of physical activity (based on previous research by the authors). The participants that read the salient message showed an increase in positive attitudes towards physical activity 5 weeks post intervention in comparison to the participants that received the non-salient message. No difference was shown in actual physical activity levels pre and post intervention.

Another study by Hill, Abraham and Wright (2007) also implemented an intervention aimed at increasing PE participation among 503 secondary school students in the United Kingdom. A leaflet based on the Theory of Planned Behaviour, written to target potentially modifiable cognitive antecedents of exercise was given to the participants. The second part of the intervention used cognitive change techniques. Participants were divided into three groups (separate and combined activities). All three of the experimental groups had increased self-reported exercise behaviour at follow up 3 weeks later. Intentions and perceived behavioural control from the Theory of Planned Behaviour played an important role in actual behaviour. Furthermore, Chan and Tsang (2010) implemented an intervention based on the Theory of Planned Behaviour. With the aim to enhance attitudes about healthy eating, participants received print advertisements promoting healthy eating. Positive attitudes towards the healthy eating advertisement was linked to positive attitudes about healthy eating. Kothe and Mullan (2014) also used an intervention based on the Theory of Planned Behaviour to enhance fruit and vegetable intake in children. Participants in the experimental group received email messages aimed to increase fruit and vegetable consumption. The messages were based on attitude, subjective norm and perceived behavioural control from the Theory of Planned Behaviour. The intervention increased subjective norms and attitudes, however, perceived behavioural control and fruit and vegetable consumption did not change as a result of the intervention. The authors suggested that current



evidence does not support the use of the Theory of Planned Behaviour in the design of interventions to increase fruit and vegetable intake in this population.

A number of theory-based interventions have also targeted healthy eating in school children. “Gimme 5: Fruit, juice and vegetables for Fun and Health”, was a theory based intervention implemented in 16 elementary school children in the United States to promote fruit and vegetable intake, based on the Social Cognitive Theory (Baranowski et al. (2000). Children took part in various school-based activities to improve actual intake, availability, accessibility, preferences, goal setting and problem solving skills. Image was also considered in this intervention and teachers were also prepared and parents received newsletters and media messages emphasising on modelling and desired behaviour in order to increase knowledge, accessibility and availability of fruits and vegetables in the home environment. The intervention was assessed using questionnaires, food diaries, parental interviews and observation assessments. The intervention was successful and resulted in increased fruit and vegetable intake and improvement was also seen in students’ self-efficacy and social norms.

Another intervention aimed at promoting fruit and vegetable intake in children between the ages of 12 and 14 and their parents were piloted in the United Kingdom (Pearson, Atkin, Biddle and Gorely, 2010). The intervention was based on the Social Cognitive Theory and Behaviour change theory (Meyerhoefer, 2008). The experimental group received postal newsletters over a period of one month targeting normative beliefs, health and nutritional knowledge, tips on how to increase preferences and overcome barriers and improvement of behavioural skills. Questionnaires were used to measure outcome pre and post intervention (6 weeks later). The intervention appeared to be successful and the results showed an increase in fruit and vegetable intake among the participants in the experimental group in comparison to the control group. The authors

highlighted the short duration of the intervention programme and small sample size as limitations of the programme.

TEENS (Teens Eating for Energy and Nutrition at School) was a large intervention implemented in 16 middle schools in the United States in order to promote low fat foods, fruits and vegetables among the students (Lytle, Murray, Perry, Stay and Birnbaum, 2004). The intervention included three components: classroom, family and school wide. The classroom component focused on nutritional knowledge, self-monitoring, goal setting, snack preparation and skill development, based on the Social Cognitive Theory (Bandura, 1986). The family component included distribution of newsletters including behavioural tips and messages. Families also had the opportunity to take part in a prize draw and collect coupons for gift certificates. The school wide component included enhancing availability and accessibility of healthy foods across the schools. 640 children participated in the evaluation part of the programme, which showed a short-term effect of enhanced healthy eating habits across the schools. However, no long-term effect was found and the increases seen in the first year was not maintained into the second year of the programme.

A Dutch intervention study aimed at promoting both physical activity (60 minutes daily) and healthy eating (fruit and vegetable intake, low fat foods) was implemented on N=2991 seventh and eight graders (Haerens et al., 2006). The programme was based on the Transtheoretical model of change and Theory of Planned Behaviour. Data were collected over a period of two years using self-reported questionnaires. Accelerometers were used in a sub-sample of the participants. The participants received a computer-based intervention promoting different aspects of physical activity and healthy eating. Some schools also received a computer programme aimed at parents. The result showed an increase in both physical activity and healthy eating, however parental involvement did not increase intervention effects.

Up to date, no theory-based interventions have to the researcher's knowledge been implemented targeting physical activity and/or fruit and vegetable intake among adolescents in the United Arab Emirates. One intervention implemented in Middle East was the "Healthy-E-Pals" programme (Habib-Mourad, 2013). This was a 3-month multi-component school based intervention targeting healthy eating and physical activity, based on the Social Cognitive Theory. The intervention promoted positive behaviour habits through classroom curriculum, food services and family involvement. Questionnaire distribution and group interviews were carried out for evaluation pre and post intervention. The programme resulted in increased breakfast intake and reduced intake of junk food among the participants after a period of 3 months. There was also an increase in knowledge and self-efficacy. No differences were noted in the children physical activity levels. There is a great lack of research in the Middle-Eastern region and the current research programme took a first step in addressing this issue.

Research on physical activity and healthy eating in young people have led to a growing interest in developing theory based interventions aimed at targeting these behaviours. A majority of the reviews theory based physical activity and healthy eating interventions have used the Theory of Planned Behaviour and Social Cognitive Theory as framework for intervention design (Baranowski et al., 2000; Chan and Tsang, 2010; Chatzisarantis and Hagger, 2005; Habib-Mourad, 2013; Haerens et al., 2006; Hill et al., 2007; Kohte and Mullan, 2014; Lytle et al., 2004 and Pearson et al., 2010).

The current study implemented two interventions based on implementation intentions (Gollwitzer, 1993) and Prototype/Willingness Model (Gibbons and Gerrard, 1995) and the social modelling component from the Social Cognitive Theory (Bandura, 1986). A limited number of intervention studies have used

implementation intentions and image interventions to enhance physical activity or healthy eating in children (De Vet, Oenanna, Sheeran and Brug, 2009; Gratton et al., 2007; Roberts, Maddison, Magnusson and Prapavessis, 2010), and it would be interesting to study this further in order to see the importance of image and goal setting among adolescents. Intervention studies based on these models are discussed below.

#### ***6.1.5. Intervention research based on Implementation Intentions***

Models such as the Theory of Planned Behaviour (Ajzen, 1988) have been widely implemented in order to understand and predict health behaviours within the field of health psychology. If a health behaviour is valued positively by self and others and also if the person feels that he or she has the control to perform the behaviour, behaviour intentions are likely to increase (Sutton, 2005). The link between intention and behaviour suggests that people tend to engage in the behaviour they intend to perform i.e. intention is the immediate antecedent of behaviour (Conner and Sparks, 1995). However, research has also found that behavioural intentions do not reliably lead to changes in actual behaviour (Sniehotta, Scholz and Schwartz, 2005; Sheeran, 2002; Conner and Armitage, 1998; Godin and Kok, 1996). This is known as the 'intention-behaviour gap' and has become a major focus for research in the field of health psychology.

Interventions directed at the Theory of planned behaviour variables, behavioural, normative, or control beliefs may succeed in producing corresponding changes in attitudes, subjective norms, and perceived behavioural control. In turn, these changes may further influence intentions. According to Ajzen (Ed), the interventions will still be ineffective, unless people are capable of carrying out their newly formed intentions. The focus should therefore be on the link between intentions and behaviour and to strengthen this link.

Implementation intentions (i.e. *action plans* that specify when, where and how a person will act) were previously introduced in chapter 4. This model by Gollwitzer (1993) explains the gap between intentions and behaviour through two stages: motivational (intentions) and volitional (planning). In the motivational phase, intentions are formed based on the individual's perceptions of the advantages and disadvantages of the behaviour. The constructs from the Theory of Planned Behaviour (perceived behavioural control, attitudes and social norms) are a good example of a theory that attempted to explain this. The *volitional* phase refers to the planning phase on how to make the goal intention into an action. People then plan and specify what, when, where and how their intention will be implemented.

Through implementation intentions, the behaviour and situation is imagined and specified which often creates a commitment to perform the behaviour and is a powerful way to attain a goal (Gollwitzer, 1993). Planning how to implement physical activity and healthy eating intentions often seems to increase actual behaviour and help close the intention-behaviour gap. Implementation intentions have been frequently implemented in health intervention research in both adults and adolescents. This technique has successfully enhanced behaviours in adolescents such as: academic performance (Duckworth, Grant, Loen, Oettingen and Gollwitzer, 2011), smoking (Conner and Higgins, 2010), alcohol consumption (Armitage, 2009) and safe sex practices (de Vet et al. (2011). Gollwitzer and Sheeran (2006) conducted a large Meta-analysis of 94 interventions studies implementing implementation intentions. The technique was effective in promoting the influence of goal setting across a range of different behaviours such as breast self-examination, alcohol consumption, recycling etc.

The technique has also been applied to physical activity and healthy eating in both children and adults. The role of implementation intentions in these

behaviours has been supported by a number of studies, although the number of studies in the adolescent population is limited. For instance in regards to health eating, a British study by Gratton et al. (2007) tested implementation intentions on a group of 198 secondary school students (mean age=13.1) as an attempt to enhance fruit and vegetable intake (5 portions daily) over a period of 3 weeks. Two interventions were tested: a motivational intervention targeting salient beliefs (based on the Theory of Planned Behaviour) and a volitional intervention (implementation intentions) to see its effect on fruit and vegetable intake as well as perceived behavioural control, subjective norms and attitudes from the Theory of Planned Behaviour. The results of this study showed that both interventions successfully increased fruit and vegetable intake, the volitional intervention being the most powerful intervention. The volitional intervention also increased all the variables from the Theory of Planned Behaviour. The motivational intervention did not significantly influence perceived behavioural control, subjective norms and attitudes, although a positive increase (however not significant) in attitudes and subjective norms over time was noted.

In similarity to Gratton et al.'s study (2007), Kellar and Abraham (2005) tested the effectiveness of implementation intentions on fruit and vegetable intake by also looking at relationships between the Theory of Planned Behaviour constructs and fruit and vegetable intake. They used persuasive communication by giving out a research-based leaflet and an implementation intention activity to promote fruit and vegetable intake in 218 university students (mean age 21.3) in the United Kingdom. The group that took part in the implementation intention activity showed a significantly increase in fruit and vegetable intake post intervention.

Armitage (2004) evaluated the effectiveness of an implementation intentions intervention for reducing fat intake in 264 adults in the United Kingdom. Participants took part in either an intention implementation group or a control

and its effect on dietary behaviour was measured over a period of 1 month. Fat intake decreased significantly in the experimental group over time, in comparison to the control group. Verplanken and Faes (1999) conducted research on adults in Holland where they used an implementation intention activity to plan for a day of healthy eating by specifying a menu for breakfast, lunch and dinner that was evaluated and rated by a dietician. The result showed that implementation intentions increased healthy eating, however it failed to decrease unhealthy eating habits. This would show how difficult it is to break existing habits, even after using tools to enhance healthy eating habits.

A limited number of studies have examined the effect of implementation intentions on physical activity, especially in adolescents. Prestwich, Lawton and Conner (2003) conducted their research on a group of 457 university students (mean age 21.3) in the United Kingdom using a motivational versus an implementation intention intervention to promote physical activity. Data were collected over a four-week period. The group that received the implementation intention activity spent greater time in exercising post intervention, in comparison to the motivational intervention. However, the intervention group that received a combination of both interventions showed the greatest increase in exercise behaviour. Research conducted in Scotland studied the effectiveness of two types of Internet based planning interventions (action and coping planning) in increasing physical activity and constructs from the Theory of Planned Behaviour in 1,273 undergraduate students. Self-reported physical activity and a Theory of Planned Behaviour questionnaire were completed. Both interventions appeared to be ineffective and did not enhance physical activity or health cognitions (Skar, Sniehotta, Molloy, Prestwich, and Araujo-Suarez, 2011).

A larger study on 709 Dutch adults tested the impact of an implementation intervention on increasing daily physical activity (De Vet et al., 2009). Data were collected at four time points, at baseline, 2 weeks, 3 months and 6 months post

intervention. The result showed that implementation intentions did not significantly enhance physical activity in the participants. Further implementation intention intervention research was conducted with children from New Zealand (Roberts et al., 2010) studied exercise behaviour in a group of 72 adolescents, with a mean age of 16.92. Physical activity was measured using a pedometer and an activity diary over a period of 7 days. Perceived behavioural control, subjective norms and attitudes from the Theory of Planned Behaviour was also measured. Perceived behavioural control was correlated with successful implementation intentions and successfully predicted subjectively measured physical activity.

A recently published study (Epton et al., 2014) assessed the efficiency of a theory based online health behaviour intervention based on the Theory of Planned Behaviour and implementation intentions. The sample consisted of 1,445 university students (mean age=18.9) in the United Kingdom. Five health behaviours: fruit and vegetable intake, physical activity, smoking and alcohol consumption were measured over a period of 6 months, implementing an intervention using Theory based messages (based on the TPB), Self-affirmation tasks and an Implementation intention activity. The result indicated that a significant effect was only found in smoking behaviour and no significant effect was found in physical activity and fruit and vegetable intake. Further research is needed in order to test the effectiveness on implementation intentions on both physical activity and fruit and vegetable intake in children. The current study also aimed at testing the effectiveness of an image based intervention on physical activity and fruit and vegetable intake. This will be discussed below.

#### ***6.1.6. Intervention research based on Prototype/image***

In practice, the uses of appealing images are used frequently in advertisements and the media to promote a range of products such as food, cars, cosmetics, clothes and so on. The concept of image in adolescents' health behaviours is



founded from the Social Cognitive Theory (Bandura, 1986). An image prototype refers to an individual's view of the typical person that engages in a specific behaviour, explained by the Prototype/Willingness Model (Gibbons and Gerrard, 1995). This model was introduced in chapter 3 of the current research programme and studied from a qualitative perspective in chapter 5 and a quantitative perspective in chapter 6. A number of studies of both health risk and enhancing health behaviours such as smoking (Gerrard et al., 2005; Ravis et al., 2006), condom use (Blanton et al., 2006), alcohol consumption (Gerrard, Gibbons, Reis-Bergen, Trudeau and Buunk, 2002; Ravis et al., 2006), dietary behaviours (Beaulieu and Godin, 2011; Gerrits et al., 2009), and physical activity (Lazura et al., 2013) found that prototype/image played an important role in adolescents' intentions to engage in a behaviour and suggested could be an important ingredient for health promotion in adolescents.

Majority of research using the Prototype/Willingness Model are focusing on health risk behaviours such as smoking, unsafe sex practices and alcohol consumption (Gerrard et al, 2005). A number of intervention studies have been conducted on health risk behaviours using the Prototype/Willingness model among children and adults. This includes alcohol use (Gerrard et al., 2006; Litt and Stock, 2011; Lane, Gibbons, O'Hara and Gerrard, 2011), tanning bed use (Gibbons, Gerrard, Lane, Maher and Kulik, 2005), smoking (Andrews et al., 2011) and unsafe sex practices (Murry et al., 2011). However, a limited number of studies have used interventions based on prototype/image to promote health behaviours in both adults and children. Matteredne, Diepgen and Weisshaar (2011) implemented a series of intervention strategies to enhance sun protection behaviour among a sample of adult females. Their findings indicated that interventions should place a strong focus on the development of favourable attitudes, perceptions of a high prevalence of skin protection behaviour, prototypes one can easily identify with, and high behavioural control/SE. They

also incorporated planning techniques, however this appeared to not mediate any effects.

Among adolescents, Ravis et al. (2006) found that prototype perceptions and descriptive norms predicted both health risk and health enhancing behaviours in adolescents in the United Kingdom. Based on their findings they suggested that both positive and negative health images should be considered as targets for interventions to promote health behaviours and reduce health risk behaviours. In similarity to the findings from Study 2 of the current research programme, Ravis et al. (2006) also found that prototype similarity played an important role. It would therefore be interesting to attempt to enhance people's perceived similarity to similar people that engage in health enhancing behaviours, which then hopefully would enhance people's perception of the prototype and increase positive health behaviours.

According to Ravis et al. (2006), it would also be useful to target health risk behaviours by enhancing people's perceived dissimilarity to people that engage in health risk behaviours. This was also suggested by Gerrits et al. (2009) who argued that it would be effective for health promotion campaigns to focus on the image of unhealthy eaters to promote healthy eating in adolescents. According to the findings of their study, only unhealthy eater prototypes were linked to actual food consumption. However, according to Werch (2007) a limitation with assessing prototype perceptions of risk behaviours is that the thinking process involved when considering unhealthy prototypes can actually influence health risk behaviours. The focus of the present study is therefore to focus on health enhancing behaviours rather than risk behaviours and asking participants to consider a specific prototype and describe them will hopefully influence enhanced engagement in physical activity and fruit and vegetable intake.

In regards to image intervention research targeting risk behaviours, Rivas et al. (2011) studied drink-driving behaviour in male drivers. They suggested that interventions should emphasise on significant others approval (subjective norms). According to them, social motivation appeared to be formed by images of socially important others that drive (or refrains from driving) intoxicated. Their findings indicated that using negative images of drink drivers would be effective in reducing drink driving behaviour in older male drivers who drive while intoxicated. Gerrard et al. (2006) conducted longitudinal research targeting preadolescents and their families in order to reduce alcohol intake in parents and delay onset of alcohol intake in children from both a reasoned and a social reaction path. The intervention was based on the Prototype/Willingness Model and focused on making images of drinkers less favourable. The results showed that a decrease in children's willingness to drink and the authors suggested the combined assessment of both intentions and willingness would be more successful in interventions than either of the approaches alone.

Some studies have also targeted health-enhancing behaviours when using image to promote health behaviours. Kulik, Butler, Gerrard, Gibbons and Maher (2008) examined the effectiveness of an appearance based sun-protection intervention based on descriptive norms from the Prototype/Willingness Model. 125 female university students in the United States received an activity where they looked at a UV photograph showing underlying sun damage of the skin. They later received information on how to prevent sun damage (based on injunctive norms) and details about a number of peers who engaged in sun protective behaviours (based on descriptive norms). The results of the study showed that the experimental group increased their intentions to protect their skin in the sun after receiving the first interventions, in comparison to the control group. The addition of both descriptive and injunctive norms further increased these intentions.

Young people's health images can also have an important influence on other health behaviours such as physical activity. Ouelette, Hessling, Gibbons, Reis-Bergen and Gerrard (2005) studied the impact of health related prototypes and possible selves on exercise behaviour in 152 undergraduate students in the United States. Interventions including health images had significant effects on exercise behaviour. Social comparison (prototype similarity) to exercise prototype increased exercise behaviour. Both prototypes of exercisers and non-exercisers were included in the intervention as well as images of future self.

The Prototype/Willingness Model was considered in the design of a campaign to prevent drug use or early onset of drug use in 11-14 year olds in the United Kingdom (Darnton, 2005). The risk image factor from the model was part of the intervention in order to change children's image of people who use drugs. Perceptions of risk images were examined pre and post intervention. The result showed that the campaign managed to reduce drug use among the target group and is a good example of a successful campaign aiming to change drug use in children. Werch et al. (2010) studied the effectiveness of an image intervention to prevent substance use among 416 high school students (majority females), between the ages of 15 and 17 years in the United States. The intervention group received scripted messages about a socially desirable person with a positive image, engaging in health promoting behaviours. Health risk behaviours were illustrated as a person with a negative image. At the end they were given a goal plan to plan out their intentions. Data were taken at two time points over a period of 3 months. The effects of the intervention on substance use were small but significant.

Eggleston (1997) focused on both health risk and protective behaviours in her study. An intervention attempting to alter young people's images of people that use condoms and people with multiple sex partners was implemented among 230 undergraduate students in the United States. Participants in one of the

experimental groups received an intervention where they listened to a anecdotal audiotape conversations of females talking about their attitudes and behaviour towards sex. The participants in the second group listened to a statistical audiotape recording talking about statistics of campus sexual attitudes and behaviour. In similarity with Kulik et al.'s (2008) study, this study based their interventions on descriptive and injunctive norms. The results showed that condom users became more favourable and people with multiple sex partners became less favourable after receiving the interventions among the participants in the experimental groups. No differences were found between interventions.

A way to establish a descriptive norm of a health behaviour may be to draw attention to others that perform the behaviour. Prentice and Miller (1993) found that young males' drinking attitudes were effected by their own perceptions of the average male students' drinking attitudes and habits and it seemed like the participants' creation of healthy images of people that perform certain health behaviours (positive descriptive norms) had a positive effect on the behaviour itself. This technique was used in the current study. The proposed use of descriptive norms to enhance physical activity and fruit and vegetable intake based on the Prototype/Willingness Model, represents a novel intervention approach for the current research programme.

In summary, there are many factors to consider in the design of successful health promotion programs. Intervention research greatly supports the use of behaviour change theory in the design of health promotion programs (Michie et al., 2011). Despite this, a great proportion of health promotion campaigns fail to apply theory in health promotion (Painter et al., 2008). Many programs also focus "downstream" by targeting people that already are suffering, however it is also very important to also look at health promotion from an "upstream" approach and target the factors that are causing people to suffer. Effective planning is key and using strategies such as Intervention Mapping (IM;

Barthomolew et al., 1998) will help with successful planning, implementation and evaluation of programs.

Implementation (planning) was one of the behaviour change techniques in Abraham and Michie's (2008) behaviour change taxonomy and was considered for the current study. A limited number of intervention studies have targeted physical activity and fruit and vegetable intake based on this technique (De Vet et al., 2009; Gratton et al., 2007; Kellar and Abraham (2005); Roberts et al., 2010) so it therefore remains a need to study this further in order to see if this would be a successful component in health promotion in children. The second intervention was based on Gibbons and Gerrard's (1993) Prototype/Willingness Model. Limited research (Ouellette et al., 2007) using this model promoting physical activity and fruit and vegetable intake has been found and therefore it is a novel component in the current study.

Result from Study 2 of the current research programme showed that descriptive norms (prototype similarity in particular), was an important influencer of behavioural intentions. Testing an intervention aimed at enhancing children's descriptive norms will hopefully successfully add to the field of theory based health promotion of physical activity and healthy eating in children.

## **6.2. Aims and objectives**

The overall aim of the second part of the research programme was to test the effectiveness of two interventions on physical activity and fruit and vegetable intake in secondary school children, based on health psychology theory. The first intervention was a planning intervention, based on Gollwitzer's (1993) model of implementation intentions. The second intervention was an image intervention, based on the Prototype/Willingness Model developed by Gibbons and Gerrard (1995). These two interventions were implemented and tested to establish any intervention effects on physical activity and fruit and vegetable actual behaviour,

intentions and health cognitions (components from the Theory of Planned Behaviour and Prototype/Willingness Model), in comparison to a control intervention. Differences in the study variables were studied between time points and between intervention groups. The findings of the current study will hopefully add to the literature of health promotion in relation to physical activity and fruit and vegetable intake in school children.

Overall, there were six objectives to this study. The first three objectives were looking at intervention effects across time. Specifically, the first objective was to test the effectiveness of an image intervention and a planning intervention (distributed separately for each health behaviour) on children's physical activity and fruit and vegetable intake across four time points. The second objective was to test the effectiveness of the image intervention and planning intervention on behavioural intentions across the two time points. The third objective was to test the effectiveness of the interventions on health cognitions (attitudes, subjective norms, perceived behavioural control, prototype evaluation and prototype similarity) across the two time points.

The remaining three objectives were looking at intervention effects between experimental and control conditions. The fourth objective was to see whether the experimental interventions (planning and image) would have a greater impact on actual behaviour in comparison to the control intervention. The fifth objective was to see whether the experimental interventions would have a greater impact on behavioural intentions over the control intervention. Finally, the sixth objective was to examine whether the experimental interventions would have any greater effects on health cognitions in comparison to the control intervention. We also specifically wanted to see if the Image intervention would have a significant increased effect on prototype perceptions, in comparison to the planning intervention and the control intervention.

### 6.3. Research Questions

With the above aims and objectives in mind, Study 3 seeks to address the following research questions:

1. Can theory based interventions enhance children's intentions towards physical activity and fruit and vegetable intake and if so which one of the implemented interventions works best?
2. Can theory based interventions enhance children's physical activity and fruit and vegetable intake behaviours and if so which one of the implemented interventions works best?
3. Can theory based interventions enhance children's health cognitions of physical activity and fruit and vegetable intake behaviours and if so which one of the implemented interventions works best?

### 6.4. Hypotheses:

- **Hypothesis 1a:** The experimental interventions will have a significant effect on physical activity across two (or more) of the time points.
- **Hypothesis 1b:** The experimental interventions will have a significant effect on fruit and vegetable intake across two (or more) of the time points.
- **Null Hypothesis 1a:** The experimental interventions will not have a significant effect on physical activity across two (or more) of the time points.
- **Null Hypothesis 1b:** The experimental interventions will not have a significant effect on fruit and vegetable intake across two (or more) of the time points.
- **Hypothesis 2a:** The experimental interventions will have a significant effect on physical activity behavioural intentions across the two time points.
- **Hypothesis 2b:** The experimental interventions will have a significant effect on fruit and vegetable behavioural intentions across the two time points.



- **Null Hypothesis 2a:** The experimental interventions will not have a significant effect on physical activity behavioural intentions across the two time points.
- **Null Hypothesis 2b:** The experimental interventions will not have a significant effect on fruit and vegetable behavioural intentions across the two time points.
- **Hypothesis 3a:** The experimental interventions will have a significant effect on physical activity health cognitions across the two time points.
- **Hypothesis 3b:** The experimental interventions will have a significant effect on fruit and vegetable health cognitions across the two time points.
- **Null Hypothesis 3a:** The experimental interventions will not have a significant effect on physical activity health cognitions across the two time points.
- **Null Hypothesis 3b:** The experimental interventions will not have a significant effect on fruit and vegetable health cognitions across the two time points.
- **Hypothesis 4a:** The experimental interventions will increase physical activity significantly over the control intervention.
- **Hypothesis 4b:** The experimental interventions will increase fruit and vegetable intake significantly over the control intervention.
- **Null Hypothesis 4a:** The experimental interventions will not increase physical activity significantly over the control intervention.
- **Null Hypothesis 4b:** The experimental interventions will not increase fruit and vegetable intake significantly over the control intervention.
- **Hypothesis 5a:** The experimental interventions will increase physical activity behavioural intentions significantly over the control intervention.
- **Hypothesis 5b:** The experimental interventions will increase fruit and vegetable intake behavioural intentions significantly over the control intervention.
- **Null Hypothesis 5a:** The experimental interventions will not increase physical activity behavioural intentions significantly over the control intervention.

- **Null Hypothesis 5b:** The experimental interventions will not increase fruit and vegetable intake behavioural intentions significantly over the control intervention.
- **Hypothesis 6a:** The experimental interventions will increase physical activity health cognitions significantly over the control intervention.
- **Hypothesis 6b:** The experimental interventions will increase fruit and vegetable intake health cognitions significantly over the control intervention.
- **Null Hypothesis 6a:** The experimental interventions will not increase physical activity health cognitions significantly over the control intervention.
- **Null Hypothesis 6b:** The experimental interventions will not increase fruit and vegetable intake health cognitions significantly over the control intervention.
- **Hypothesis 7a:** The Image intervention will increase physical activity prototype perceptions significantly over the action planning intervention and the control intervention.
- **Hypothesis 7b:** The Image intervention will increase fruit and vegetable intake prototype perceptions significantly over the action planning intervention and the control intervention.
- **Null Hypothesis 7a:** The Image intervention will not increase physical activity prototype perceptions significantly over the action planning intervention and the control intervention.
- **Hypothesis 7b:** The Image intervention will not increase fruit and vegetable intake prototype perceptions significantly over the action planning intervention and the control intervention.

## **6.5. Methodology**

### **6.5.1. Research design**

This study employed a longitudinal, randomised controlled questionnaire design, using the questionnaire looking for influences on physical activity and fruit/vegetable intake between an action planning intervention group (A), a prototype intervention group (B) and a control group (C) over a period of 6 months, involving 4 waves of data collection. Influences on behavioural intentions and health cognitions (attitudes, subjective norms, perceived behavioural control and prototype perceptions) were assessed over a period of 1 week, involving two waves of data collection. The IVs were the three interventions (image, action planning and control) and the DVs were behavioural intentions, actual behaviour and health cognitions.

### **6.5.2. Participants**

The participants in Study 2 compromised a subsample of Study 1. This sample was from the first three schools that participated in Study 1 and was therefore chosen and included in Study 2 as well. The data from school I was collected at a later stage and not included in Study 2 as the desired sample of participants already had been achieved. The sample from school I was the only sample that was included in the time 2 follow up analysis for Study 1 as these participants did not receive an intervention.

The schools presented with similar characteristics and belonged to the same fee category and received a rating of 'good' from the Dubai School Investigation Bureau (DSIB). An overview of each school and the recruitment process can be seen under the methodology section in chapter 5. Each school was randomly assigned by random number draw to participate in one intervention group,

either an action planning intervention group (A), a prototype intervention group (B) or a control group (C). The schools were unaware of the interventions undertaken in the other experimental groups.

N=61 from school D, N=67 from school R and N=60 from school E participated in Study 2. The participants were aged between 11 and 14 years old ( $M=12.4$ ,  $SD=0.75$ ) and N=103 (53.3%) were males and N=85 (44.3%) were females. At time 2, 1 week later N=172 out of the participants from Time 1 completed the questionnaires (health cognitions, actual behaviour). N=177 answered questions about actual behaviour only at time 3 (2 weeks after baseline) and at time 4 (6 approximately 6 months after baseline). A majority of the participants had a British nationality (40.6 percent), 18.2 percent were 'other westerner', 16.4 percent were South Asian, 12.1 percent were Middle Eastern, 6.8 percent were Emiratis, 2.1 percent were 'others' and 1.0 percent were 'other Asian'. 36.5 percent were Christian, 30.7 percent were Muslim, 16.7 percent were Hindu or Sikh, 9.9 percent did not belong to a religion, 2.1 percent belonged to 'other' religion and 2.1 percent were Buddhist.

#### School D:

School D was the first school to participate in the collection of data in October, 2010. This was secondary school starting from year 7 until year 12. N=61 (40 male and 21 female) from three year groups (7, 8 and 9) in school D took part in the study. N=10 of the participants were 11 years old, N=26 were 12 years old, N=21 were 13 years old and N=4 were 14 years old. This difference in age between the schools would be expected due to the time of year data were collected. School D received an implementation intention intervention.

#### School E

School E took part in the study in October 2010, included year groups 7, 8 and 9 and was the second school to take part in the data collection. This was a

combined secondary and 6<sup>th</sup> form school starting from year 7 until year 12. A total of N=60 (29 male and 31 female) participated. N=10 of the participants were 11 years old, N=23 were 12 years old, N=24 were 13 years old and N=3 were 14 years old. School E was the control group and received a control non-health related intervention.

#### School R

School R was the third school to participate in the study in February 2011. This school offered both primary and secondary education. Out of the 60 participants (36 male and 24 female) were N=27 12 years old, 37 were 13 years old and 3 were 14 years old. Out of the 67 participants, were N=44 male and N=23 female. N=32 were male and N=28 were female. School R received an Image intervention.

### **6.5.3. Materials**

#### *6.5.3.1. Measures*

##### *Theory of Planned Behaviour (TPB)*

Items based on Ajzen's (2006) TPB questionnaire were used to measure the TPB components in relation to physical activity and fruit/vegetable intake. Wordings and response formats for the items were developed using examples from Conner and Sparks (1995) and has been previously used by Chater et al (2007). Seven components of the Theory of Planned Behaviour were used, however only four of the components: intentions, attitudes, subjective norms and perceived behavioural control were used for data analysis. TPB scales in relation to both physical activity and fruit/vegetable intake showed an internal consistency using Cronbach's Alpha scores ranged from  $\alpha = .70$  (subjective norms) to  $\alpha = .93$  (behavioural intentions). See chapter 6 for a detailed overview of all alpha scores. Subjective norms (with items such as "*People who are important to me approve of my eating 5 portions of fruit and vegetables each day next week*"), Perceived behavioural control (with items such as: "*It would be easy for me to do*

60 minutes of physical activity next week”), Behavioural intentions (with items such as “ I intend to eat five portions of fruit and vegetables each day next week”), Behavioural beliefs (with items such as “Getting the energy I need is very important to me” and “Staying healthy and fit is very important to me”, Normative beliefs (with items such as: “My parents want me to eat 5 portions of fruit and vegetables each day next week”) and Control beliefs (with items such as: “I have a lot of school work to do at the moment which would make it more difficult for me to do 60 minutes of physical activity daily”) were all measured on 5-point scales ranging from strongly disagree to strongly agree, with two questions for both health behaviours. Attitudes were also measured on a 7 point scale. Including one item for each behaviour such as “For me, to do 60 minutes of physical activity would be . . . ,” participants are asked to rate on six bipolar (-3 to +3) semantic differential scales, using the adjectives *bad–good*, *harmful–beneficial*, *unpleasant–pleasant*, *unenjoyable–enjoyable* and *foolish–wise*. Low scores indicated a negative attitude and high scores positive attitudes towards the respective health behaviour.

#### *Prototype/Image*

The following definition of a prototype (Gibbons et al., 1995) was presented to the participants: ‘*The following question concerns your images of people. What we are interested in here are your ideas about typical members of different groups. For example, we all have ideas about what typical movie stars are like or what the typical grandmother is like. When asked, we could describe one of these images – we might say we think the typical movie star is pretty or rich, or that the typical grandmother is sweet and frail. We are not saying that all movie stars or all grandmothers are exactly alike, but rather that many of them share certain characteristics*’. Prototype evaluation was assessed by asking participants how favourable their impression is of the type of person their age that engage in daily physical activity/eat fruit/vegetable intake on a 7-point scale (extremely unfavourable to extremely favourable). Participants are asked to think about the

adjectives that describe a person who engaged in the behaviours. The sixteen adjectives are; healthy, exciting, popular, immature, “cool” (sophisticated), unattractive, independent, careless, glamorous, dull (boring), good looking, dirty, successful, unhealthy, uncool, and leader. This was rated on a 7 point scale, ranging from “Not at all-Extremely”. These items are based on research conducted by Chater et al. (2007). Prototype similarity are assessed by the response to ‘*In general, how similar are you to the type of person your age who engage in physical activity/fruit and vegetable intake?*’ on a 7- point scale (not at all similar to me, to very similar to me). The reliability for these scales was found to be high: .77 for physical activity and .82 for fruit and vegetable intake.

#### *Parental Behaviour*

Parental behaviour was measured by 2 items: ‘How many days did your mum/dad or other caregiver engage in 60 minutes of physical activity/ eat 5 portions of fruit and vegetable during the last week?’. This is assessed on an 8 point scale ranging from 0 day to 7 days.

#### *Recent behaviour*

Self-reported behaviour is measured at time 1, 2, 3 and 4 using two questions asking participants ‘How many days did you engage in 60 minutes of physical activity/ eat 5 portions of fruit and vegetable during the last week?’. This is assessed on an 8 point scale ranging from 0 day to 7 days. Portion sizes (Department of Health, 2010) and examples of physical activities (British Heart Foundation, 2004) were also provided.

#### *Demographics*

Respondents were asked to fill in their age, gender, nationality, country of birth, father/mother’s country of birth and religion. This was not taken into account for Study 2 and was only considered for Study 1.

### *6.5.3.2. Interventions*

#### *Experimental group A: Action planning intervention*

Participants in this group were asked to form an implementation intention. This was based on work by Park-Stamm and Gollwitzer (2006). For physical activity: participants wrote down a specific goal on how they were planning to engage in 60 minutes of physical activity over the next week, including what they would do, when they would do it, where they would do it and how they would do it. Examples were given and participants were also informed that they could break the 60 minutes up to shorter periods. The participants were then asked to form 'If-Then' plans. Examples were given and it was explained that the 'If' stands for a situation, which will 'Then' lead to a behaviour. They were then asked to map the if-then plans onto a weekly timetable, specifying what type of physical activity they will be doing, when, where, how long and with whom. For the fruit and vegetable action planning participants were asked to make a specific goal on how they are planning to eat 5 portions of fruit and vegetables each day over the following week. They were asked to answer what, when and where they would eat portion 1, 2, 3 etc. based on a typical day. Examples of fruit and vegetable portions were provided. The participants were then again asked to form 'If-Then' plans and map them into the timetable. Participants were asked to keep hold of their plans and put them into action during the week. A few samples were photocopied for the researcher to keep. This activity was given after the questionnaire at time 1.

#### *Image Intervention (B)*

Participants were given a written activity where they were be asked to think of two people who they admire who eat a lot of fruit and vegetables and write them down on their sheet (examples was provided). They were then asked to explain what they liked about them and how they would describe them. Same activity was then completed on physical activity. This is based on unpublished



research conducted by Chater et al. (2007) and prototype evaluation from the Prototype/Willingness Model (Gibbons and Gerrard, 1995).

#### *Control Intervention (C)*

The participants in the control group participated in a written non-health related 7 item quiz about Dubai, including multiple choice questions such as: '*How many Emirates are there in the UAE?*' and '*What colour is the UAE flag?*'. The answers were given to them at the end.

#### **6.5.4. Procedure**

The overall development of the interventions for the current study were based on the six steps of Barthomolew et al. (1998) intervention mapping protocol: (1) needs assessment, (2) formulation of change objectives, (3) selection of theory-based methods and practical strategies, (4) development of the intervention program, (5) development of an adoption and implementation plan, and (6) development of an evaluation design.

Intervention data were gathered at four time points over periods of six months between October 2010 and September 2011 in three schools in Dubai, United Arab Emirates. The schools and their staff received information about the study. After approval had been given from the schools, a parental consent form was sent out to all the parents. The nature of the study was described on these sheets and the parents were instructed to read the consent form, including ethical guidelines. Overall in the school, parent and student information sheets, schools, students and parents were informed that the participation was voluntary and they could withdraw from the study at any time. They were also informed about the aim of the study, that they were taking part in psychological research and that all information given by the students was strictly confidential and anonymous and that they were not be at any risk to their psychological well-being and physical health. The researcher's contact details were provided and

they were encouraged to contact her if they have any further questions. If the parents gave consent for their child to participate the child was then asked to participate in the study. Completed consent forms were given to the researcher during the first point of data collection.

Data were collected at four time points over a period of 6 months. These data collection time points had been previously considered by Araújo-Soares et al. (2009) and were chosen to see whether any intervention effects on the study variables were maintained over a period of time. The full questionnaire (including all measures) was distributed to the participants at time 1 and time 2 only. At time 3 and 4, only actual behaviour and intentions were measured with four items. It would have been ideal to give the students the full questionnaire at each time point but due to scheduling and organisation difficulties the schools requested not to do this as it would be too time consuming. See table 14 below for an overview of the time points of Study 2:

*Table 14: Data collection time points for Study 2*

Time 1	Full questionnaire followed by intervention activity	Baseline
Time 2	Full questionnaire	7 days past baseline.
Time 3	Actual behaviour - brief questionnaire	14 days past baseline.
Time 4	Actual behaviour - brief questionnaire	5 months past baseline.

At time 1, the participants were gathered together in the exam halls and stayed together as a group throughout and all data for each time point were collected at the same time. The researcher began with briefing the participants and distribute the questionnaires. The participants were asked to carefully read the questions and select the answers that best described themselves. Lesson slots between 60 and 80 minutes were allocated for data collection. No time limit was given, although data collection never exceeded 60 minutes. Participants were instructed to write the first letter of their name follow by birth month at the top

right corner of the questionnaire. The purpose with this was to code each questionnaire in order to be able to match it with the measures from the later time points. The participants were then asked to return questionnaires when completed. The participants in each intervention group were then given their intervention activities to complete.

For the intervention A and B, activities were given separately for physical activity and fruit and vegetable intake. For the action planning intervention (A) the participants were asked to form an implementation intention for when and where they would be physically active for 60 minutes/ eat 5 portions of fruit and vegetables in the following week. Participants in the Prototype intervention (B) were asked to think of two people who they admire who eat a lot of fruit and vegetables and write them down on their sheet (examples were provided). They were then asked to explain what they liked about them and how they would describe them. Participants in the control group (C) were asked to complete a short non-health related quiz. They were provided with the correct answers after completing the activity.

At time 2 (7 days past baseline) the participants were asked to complete and then return the exact same questionnaire that was completed at time 1, including all the measures. The students were gathered in the same exam hall as during time 1 and the same procedure was followed. No intervention activities were given at the end.

At time 3, (14 days past baseline), and time 4 (5 months past baseline) the participants were asked to complete two questions regarding their physical activity and fruit and vegetable intake for the past week. This was due to organisation difficulties from the schools' behalf that requested not to do consume any more time than already required for the study. At these times, the researcher distributed and collected the short questionnaire measuring

behaviour and intentions to the participants during a lesson. The procedure for time 3 and 4 was quick and did not exceed more than 5 or 10 minutes.

#### **6.5.5. Statistical analysis**

SPSS version 19.0 was used to compute the statistical analysis for this study. Physical activity and Fruit and vegetable intake were tested and presented separately.

Hypotheses 1-3 predicted that there would be significant effects of the experimental interventions (planning and image) on behaviour, behavioural intentions and health cognitions across time. Any changes in health cognitions, behavioural intentions and actual behaviour between time 1 and time 2 were assessed with a series of univariate within-subjects T-tests. Changes in actual behaviour across 4 time points were assessed with within subject ANOVA. Hypotheses 4-6 predicted that there would be significant effects of the experimental interventions (planning and image) on behaviour, behavioural intentions and health cognitions in comparison to the control intervention. Multivariate analysis of variance (MANOVA analysis) was computed to identify any differences in attitudes, subjective norms, perceived behavioural control, prototype perceptions, intentions and actual behaviour between each of the experimental conditions and the control group. The results for physical activity and fruit and vegetable intake was studied and presented separately in the results section of this report.

## **6.6. Results**

### **6.6.1. Physical activity**

#### **6.6.1.1. Description of sample**

This study tested the effects of two interventions on children's actual behaviour, behavioural intentions and health cognitions across time and experimental condition. A total of N=188 completed baseline measures and received the information at time 1. 4 were excluded due to missing data and a total of N=184 went in to final analysis. Out of these participants, N=59 was part of the action planning intervention group, N=65 were part of the image intervention group and N=60 were part of the control group. A total of N=162 completed all measures at both time 1 and 2, which gave a good retention rate of 88 percent. Physical activity behavioural data were collected over four time points: baseline, 1 week, 2 weeks and 6 months post intervention. A total of N=161 participants completed behavioural measures at all four time points given a final retention rate of 87.5 percent.

#### *6.6.1.2. Physical activity Baseline measures*

Before running the analyses, it was important to look for any possible significant differences between the studied variables between the three groups as this could influence the overall results of the intervention effects. A One way Multi analysis of variance (MANOVA) was run to determine any differences in behaviour, intentions and health cognitions between the intervention groups. The result showed no significant differences in physical activity past behaviour, intentions, attitudes, perceived behavioural control, subjective norms, prototype perceptions and prototype similarity between the three intervention groups at time 1 (baseline): ( $F [14, 350] = 1.541, p > .05; \text{Wilks' } \Lambda = .887; \eta^2 = .058$ ). Full details of these tests can be found on the appended disk.

### 6.6.1.3. Intervention Effects on physical activity study variables

Multivariate ANOVA was computed to look for effects of the interventions on the physical activity study variables (PA actual behaviour, intentions, attitudes, perceived behavioural control, subjective norms, prototype perceptions, prototype evaluation), testing hypotheses 4-7a.

Table 15: Means for physical activity study variables by Intervention group and Time

Group	Physical activity variables	Time 1	Time 2	T-value	Mean difference
Implementation intentions	Behaviour	4.62 (1.27)	4.34 (1.67)	1.20	- 0.28
	Intentions	5.31 (1.08)	5.52 (1.13)	-1.10	+ 0.21
	Attitudes	4.70 (0.41)	4.70 (0.05)	-0.36	0
	Perceived beh. control	4.13 (0.98)	4.24 (0.70)	-.96	+ 0.11
	Subjective norms	3.76 (0.89)	4.12 (0.73)	-2.94**	+0.36
	Behavioural beliefs	4.76(0.63)	4..72(0.72)	0.83	-0.04
	Normative beliefs	3.52(1.03)	3.72 (0.95)	-1.87*	+0.20
	Control beliefs	3.08(0.78)	3.25 (0.89)	-1.55	+0.17
	Prototype evaluation	4.12 (0.65)	4.07 (0.61)	0.73	- 0.03
Prototype similarity	4.71 (1.32)	4.63 (1.22)	0.62	- 0.07	
Image	Behaviour	4.80 (1.94)	4.41 (2.01)	0.94	- 0.39
	Intentions	5.32 (1.48)	5.33 (1.52)	-0.62	+ 0.01
	Attitudes	4.63 (0.68)	4.62 (0.88)	0.09	- 0.01
	Perceived beh. control	4.22 (1.14)	4.21 (1.21)	0.08	- 0.01
	Subjective norms	3.97 (1.02)	4.18 (1.00)	-.1.60	+ 0.21
	Behavioural beliefs	4.72 (0.50)	4.68 (0.60)	0.53	-0.04
	Normative beliefs	3.98 (1.07)	3.86 (1.02)	0.80	-0.13
	Control beliefs	4.08(0.98)	4.05 (1.18)	0.17	-0.03
	Prototype evaluation	4.18 (0.92)	5.01 (1.19)	0.73**	+ 0.83
Prototype similarity	4.22 (0.84)	4.49 (1.78)	0.62	+ 0.27	
Control	Behaviour	4.48 (1.61)	4.31 (2.20)	0.51	-0.17
	Intentions	5.17 (1.31)	5.38 (1.25)	-1.51	+ 0.21
	Attitudes	4.71 (0.44)	4.62 (0.75)	0.89	- 0.09
	Perceived beh. control	3.96 (1.17)	4.07 (0.99)	-0.85	+ 0.11
	Subjective norms	4.02 (1.01)	4.12 (0.88)	-1.04	+ 0.10
	Behavioural beliefs	4.68(0.35)	4.57 (0.76)	1.67	-0.11
	Normative beliefs	3.91 (1.05)	4.01 (1.00)	-0.42	+0.10
	Control beliefs	3.43(0.99)	3.51 (1.03)	-0.62	+0.08
	Prototype evaluation	4.34 (0.93)	4.67 (1.07)	-1.02	+ 0.33
Prototype similarity	4.15 (1.78)	4.35 (1.48)	-0.76	+ 0.20	

\* $p < .05$  \*\* $p < .01$ ; \*\*\* $p < .001$

MANOVA revealed significant differences in physical activity study variables between the intervention groups at time 2: ( $F [16, 304] = 2.047, p < .05$ ; Wilks'  $\Lambda = .815$ ;  $\eta^2 = .097$ ) which suggested that the interventions had significant impact on the study variables. Table 15 shows the influence of the three interventions on the study variables across time.

#### 6.6.1.4. Cognitive differences between intervention conditions

Further univariate ANOVA analysis showed that Prototype evaluation scores were significantly different between intervention groups:  $F(2,180) = 14.313, p < .001$ . Post hoc analysis revealed that the increase in prototype evaluation scores at time 2 in the image intervention group ( $M = 5.01, SD = 1.19$ ) was significant ( $p < .001$ ), over and beyond the planning group ( $M = 4.07, SD = 0.61$ ), thus hypothesis 7a was accepted. The action planning and image interventions did not increase health cognitions over the control group, which rejected hypothesis 6a. In fact, the prototype evaluation scores in the control group ( $M = 4.67, SD = 1.07$ ) were significantly higher than in the action planning group ( $p < .01$ ). The results indicated that the participants in the image group and control group rated physical activity prototypes more favourably over and beyond the action planning group 1 week post intervention. There were no significant differences in attitudes, subjective norms, perceived behavioural control and prototype similarity scores between the intervention groups ( $F [2, 172] = .445, p > .05$ ; Wilks'  $\Lambda = .979$ ;  $\eta^2 = .010$ ).

Results from univariate repeated measures T-tests showed that the Image intervention had a significant effect on prototype evaluation scores ( $t(64) = 3.288, p < .01, d = -.4$ ) between time 1 ( $M = 4.47, SD = .092$ ) and time 2 ( $M = 5.02, SD = 1.19$ ) which meant that the participants' prototype evaluation scores increased post image intervention, partly accepting hypothesis 3a. Further T-tests showed no significant effect ( $p < .05$ ) of the Image intervention on

physical activity attitudes, perceived behavioural control, subjective norms and prototype similarity scores. The image intervention had no significant effects on physical activity behavioural, control or normative beliefs across the two time points ( $p < .05$ ).

T-tests also revealed that the action planning intervention had a significant effect on the mean scores of subjective norms ( $t(58) = 2.936, p < .01, d = .7$ ) between time 1 ( $M = 3.73, SD = .89$ ) and time 2 ( $M = 4.04, SD = .73$ ) which indicated that the participants' subjective norms scores increased post action planning intervention. The action planning intervention did not have a significant effect on attitudes, perceived behavioural control, prototype evaluation or prototype similarity scores (all  $p > .05$ ). Even though a positive effect was noted on subjective norms, the action planning intervention had no significant effects on physical activity behavioural, control or normative beliefs across the two time points ( $p < .05$ ). Furthermore, the control intervention did not have any significant effects on any of the study scores (all  $p > .05$ ).

#### ***6.6.1.5. Behavioural differences between intervention conditions***

Univariate analysis also showed that there were no significant differences in physical activity behavioural intentions between the intervention groups:  $F(2,184) = .109, p > .05$ , thus hypothesis 5a was rejected. Univariate T-tests revealed that the intervention groups had no significant effect on physical activity behavioural intentions across the two time points, rejecting hypothesis 2a.

In regards to actual behaviour, examination of the univariate F-values showed no differences in actual physical activity between the intervention groups post intervention:  $F(2,169) = .111, p > .05$ , rejecting hypothesis 4a. Physical activity was measured at 4 times, over a period of 6 months. Hypothesis 1a was also rejected as repeated measures ANOVA showed no significant differences in physical



activity over time within the Image intervention group ( $F [3, 48] = 1.300, p > .05$ ; Wilks'  $\Lambda = .925; \eta^2 = .075$ ), Planning intervention group ( $F [3, 53] = 1.476, p > .05$ ; Wilks'  $\Lambda = .923; \eta^2 = .054$ ) and the Control intervention group ( $F [3, 51] = .963, p > .05$ ; Wilks'  $\Lambda = .946; \eta^2 = .054$ ).

## **6.6.2. Fruit and vegetable intake**

### *6.6.2.1. Description of sample*

A total of  $N=188$  completed baseline measures on fruit and vegetable intake and received the interventions at time 1. 4 were excluded due to missing data and a total of  $N=184$  went in to baseline analysis. Out of these participants,  $N=59$  was part of the action planning intervention group,  $N=66$  were part of the image intervention group and  $N=59$  were part of the control group. A total of  $N=159$  completed all measures at time 1 and 2, which gave a good retention rate of 86 percent. Fruit and vegetable intake behavioural data were collected over four time points: baseline, 1 week, 2 weeks and 6 months post intervention. A total of  $N=155$  participants completed behavioural measures at all four time points given a final retention rate of 84 percent.

### *6.6.2.2. Fruit and vegetable intake Baseline measures*

Prior to running any tests on the fruit and vegetable variables, another one way Multivariate analysis of variance (MANOVA) was run to determine any differences in behaviour, intentions and health cognitions between the intervention groups. The result again showed no significant differences in fruit and vegetable past behaviour, intentions, attitudes, perceived behavioural control, subjective norms, prototype perceptions and prototype similarity between the three intervention groups at time 1 (baseline): ( $F [14, 350] = 1.544, p > .05$ ; Wilks'  $\Lambda = .885; \eta^2 = .059$ ).

### 6.6.2.3. Intervention Effects on the study variables.

Another MANOVA test was run to look for differences in the study variables (FVI actual behaviour, intentions, attitudes, perceived behavioural control, subjective norms, prototype perceptions and prototype evaluation) between the intervention groups at time 2, 7 days post intervention.

Table 16: Means for fruit and vegetable intake study variables by Intervention group and Time

Group	Fruit and vegetable intake variables	Time 1	Time 2	T-value	Mean difference
<i>Implementation intentions</i>	Behaviour	3.95 (2.12)	3.89(2.17)	0.12	- 0.06
	Intentions	4.92 (1.71)	5.10(1.50)	-1.09	+0.18
	Attitudes	4.40 (0.52)	4.40 (0.72)	0.09	0
	Perceived beh. control	4.25 (0.78)	4.24 (0.89)	0.12	- 0.01
	Subjective norms	3.95 (0.82)	4.17 (0.80)	-2.10*	+ 0.22
	Behavioural beliefs	4.54 (0.82)	4.66 (0.90)	-0.62	+0.12
	Normative beliefs	3.40 (0.85)	3.68 (0.82)	-3.23**	+ 0.28
	Control beliefs	3.03 (0.85)	2.89 (0.70)	1.03	-0.17
	Prototype evaluation	3.90 (0.58)	3.99 (0.51)	-1.08	+ 0.09
	Prototype similarity	4.47 (1.16)	4.42 (1.16)	0.28	- 0.05
<i>Image</i>	Behaviour	3.92 (2.25)	4.10 (2.23)	-0.43	+ 0.18
	Intentions	4.40 (1.95)	4.61 (1.92)	-1.06	+ 0.21
	Attitudes	4.22 (0.57)	4.13 (1.00)	- 0.67	- 0.09
	Perceived beh. control	4.01 (1.06)	4.26 (1.16)	-1.65	+ 0.25
	Subjective norms	3.64 (1.12)	3.87 (1.71)	-1.12	+ 0.23
	Behavioural beliefs	4.72(0.50)	4.68 (0.60)	0.53	-0.04
	Normative beliefs	3.98 (1.07)	3.86 (1.02)	0.80	-0.13
	Control beliefs	4.08(0.98)	4.05 (1.18)	0.17	-0.03
	Prototype evaluation	4.31 (1.12)	4.79 (1.17)	-3.13***	+ 0.48
	Prototype similarity	3.95 (1.80)	4.42 (1.88)	-1.57	+ 0.47
<i>Control</i>	Behaviour	4.18 (1.92)	3.52 (2.33)	1.78	- 0.66
	Intentions	4.82 (1.77)	4.69 (1.70)	0.85	- 0.13
	Attitudes	4.34 (0.53)	4.19 (0.97)	1.37	- 0.15
	Perceived beh. control	3.96 (1.17)	4.07 (0.99)	-0.85	+ 0.11
	Subjective norms	3.90 (1.03)	4.05 (0.98)	-0.02	+ 0.15
	Behavioural beliefs	4.38 (0.64)	4.40 (0.76)	-1.88	+ 0.02
	Normative beliefs	3.40 (1.10)	3.69 (1.00)	-1.82	+0.29
	Control beliefs	3.45 (1.10)	3.89 (1.18)	-1.59	+0.43
	Prototype evaluation	4.23 (0.82)	4.40 (1.24)	-0.87	+ 0.17
	Prototype similarity	4.29 (1.34)	4.37 (1.62)	-0.33	+ 0.18

\* $p < .05$  \*\* $p < .01$ ; \*\*\* $p < .001$

The MANOVA revealed significant differences in the study variables between the intervention groups: ( $F [14, 316] = 2.190, p < .01$ ; Wilks'  $\Lambda = .831$ ;  $\eta^2 = .088$ ) which suggested that the interventions had significant impact on the study variables. Table 16 above shows the influence of the three interventions on the fruit and vegetable study variables between time 1 and 2.

#### **6.6.2.4. Cognitive differences between intervention conditions**

Univariate analysis of the F-values revealed a strong statistically significant difference in fruit and vegetable prototype evaluation scores between the intervention groups: ( $F [2, 181] = 10.387, p < .001$ ). Post hoc analysis indicated that the Image intervention ( $M=4.79, SD=1.17$ ) had a significantly stronger ( $p < .001$ ) effect on prototype evaluation scores in comparison to the planning intervention ( $M=3.99, SD=0.51$ ), thus hypothesis 7b was accepted. Again, the action planning and image interventions did not increase health cognitions over the control group, which rejected hypothesis 6b as the control group ( $M=4.40, SD=1.24$ ) had a significantly stronger ( $p < .01$ ) effect on prototype evaluation scores in comparison to the Planning intervention.

Hypothesis 3b was partly accepted, as there appeared to be some intervention effects on health cognitions across time. Results from repeated measures t-tests, ( $t(64)=3.131, p < .01, d = -.4$ ) showed that the image intervention group had a statistically significant effect on the prototype evaluation scores between time 1 ( $M=4.31, SD=1.12$ ) and time 2 ( $M=4.79, SD=1.18$ ). The image intervention did not have a significant effect ( $p > .05$ ) on attitudes, perceived behavioural control and prototype similarity scores between time 1 and time 2. Nor did the image intervention have any significant effects on behavioural, control or normative beliefs across the two time points ( $p > .05$ ).

Further t-tests showed that the planning intervention group had a significant (but weak) effect on subjective norms ( $t(58)=2.101, p < .01, d = .3$ ) between time 1

(M=3.95, SD=.82) and time 2 (M=4.17, SD=.80) which indicated that subjective norms scores increased after the participants received the planning intervention. The planning intervention also had a significant increase in normative beliefs across the two time points (time 1 M=3.40 and time 2 M=3.68,  $p < .01$ ). No other significant effects were found on the fruit and vegetable study variables ( $p > .05$ ), hence why hypothesis 3b only was partly accepted.

The control intervention did not have any significant effects on any of the study scores (all  $p > .05$ ).

#### **6.6.2.5. Behavioural differences between intervention conditions**

Univariate ANOVA analysis showed that there were no significant differences in fruit and vegetable behavioural intentions between the intervention groups:  $F(2,184)=1.426$ ,  $p > .05$ , thus hypothesis 5b was rejected. Univariate T-tests revealed that the intervention groups had no significant effect ( $p > .05$ ) on fruit and vegetable behavioural intentions and actual behaviour across the two time points.

Further univariate analysis showed no differences in fruit and vegetable intake between the intervention groups were observed post intervention:  $F(2,170)=1.145$ ,  $p > .05$ , also rejecting hypothesis 4b. Fruit and vegetable intake was measured at 4 time points over a period of 6 months. Hypothesis 1b was also rejected as repeated measures ANOVA showed no significant differences in fruit and vegetable intake over time within the Image intervention group ( $F [3, 47] = 2.060$ ,  $p > .05$ ; Wilks'  $\Lambda = .884$ ;  $\eta^2 = .116$ ), Planning intervention group ( $F [3, 57] = 2.188$ ,  $p > .05$ ; Wilks'  $\Lambda = .890$ ;  $\eta^2 = .110$ ) and the Control intervention group ( $F [3, 51] = 2.363$ ,  $p > .05$ ; Wilks'  $\Lambda = .878$ ;  $\eta^2 = .122$ ). This showed that none of the interventions had significant effects on fruit and vegetable intake across the time points.

## **6.7. Discussion**

Study 2 of the current research programme examined the effectiveness of two interventions: an action planning intervention (based on implementation intentions, Gollwitzer, 1993) and an image intervention (based on the Prototype/Willingness Model, Gibbons and Gerrard, 1995) on physical activity and fruit and vegetable intake among secondary school children in the United Arab Emirates. The aim was to see whether there were any effect of the interventions on behavioural intentions, actual behaviour and health cognitions (attitudes, subjective norms, perceived behavioural control, prototype evaluation and prototype similarity), across time and type of intervention. The action planning intervention asked the participants to form specific plans on when, where and how they would be physically active for 60 minutes and eat 5 portions of fruit and vegetables daily. The image intervention asked participants to consider a specific prototype (of physical activity and fruit and vegetable intake) and then describe them. The image intervention implemented for the current research was a novel ingredient to intervention research based on descriptive norms and has been previously considered by Chater et al. (2007).

### ***6.7.1. Intervention effects on behavioural intentions and actual behaviour***

The results indicated that there were no significant effects of either of the experimental interventions on physical activity or fruit and vegetable intake, across time and conditions. This meant that hypotheses one and four were rejected and the null hypotheses accepted. These findings are in line with previous research that found no significant effect of interventions based on implementation intentions (De Vet et al., 2009; Skar et al., 2011; Epton et al., 2014) on physical activity and fruit and vegetable intake levels. The second hypothesis of the study was also rejected as the results showed that there were no significant effects of the action planning and image interventions on behavioural intentions across time and conditions, rejecting hypothesis 2 and 5.

There are a few possible reasons for the non-significant results found in the current study. The study programme targeted two health behaviours simultaneously. Epton et al. (2014) and Webb et al. (2010) found that interventions targeting more than one health behaviours had smaller influence on health behaviour than those targeting a single health behaviour. There is an on-going debate whether it is realistic to target more than a single health behaviour at a time (Sweet and Fortier, 2010). The focus on two health behaviours at the time may have diluted the intervention effect and the participants in the current study may have been confused felt overwhelmed about increasing both physical activity and fruit and vegetable intake. This has been previously observed in research by Nag, Alegrante and Or (2002) and Sweet and Fortier, 2010). This is an important point to consider for future researches and it would be worthwhile to target physical activity and fruit and vegetable intake on separate occasions. However, this may not be a valid explanation as health promoting behaviours linked to the same health issue (obesity) may be as effective that intervention targeting single health behaviours. Multiple behaviours such as smoking, alcohol and healthy eating is likely to have smaller effect size than single behaviours (Epton et al., 2014).

Gibbons et al. (1998) suggested that health behaviours among young people tend to be more irrational rather than planned and intentional. According to the Prototype/Willingness Model, much health risk behaviour is volitional and not intended or planned and many health behaviours are therefore not intentional but instead a reaction to social events and circumstances. Behavioural willingness is what an individual would be willing to do under certain circumstances and is different to intentions as it is not planned. According to Sheeran and Orbell (1998), intentions are less effective in predicting health behaviours in adolescents. It therefore would have been useful to assess behavioural willingness in addition to behavioural intentions for the current study. Gerrard et al. (2006) conducted research targeting both a reasoned path

(intentions) and a social reaction path (willingness), which appeared to be successful and it was suggested target both willingness and intentions for future studies. It would therefore have been useful to measure behaviour willingness in addition to intentions in order to see if the children in the current study would have been willing to be physically active and eat fruit and vegetables, even though did not intend to do so.

### ***6.7.2. Intervention effects on health cognitions***

This study also examined the effects of the image and action planning interventions on physical activity and fruit and vegetable intake health cognitions (attitudes, perceived behavioural control, subjective norms and prototype perceptions). The experimental interventions did not have any significant effects on physical activity or fruit and vegetable intake health cognitions over and beyond the control intervention, rejecting hypothesis 6 and suggested that the action planning intervention was not more effective than the image intervention and vice versa. However there were strong significant effects of the image intervention on prototype evaluation scores over and beyond the action planning and control interventions and hypothesis 7 was therefore accepted. This suggests that those participants that received the image intervention evaluated prototypes that engage in physical activity and fruit and vegetable intake more favourably in comparison to those that received the action planning intervention. It was also found that the image intervention had a significant effect on prototype evaluation scores across the two waves of data collection and scores increased significantly post intervention. However, the intervention did not alter prototype similarity. Findings from Study 2 showed that Prototype similarity influenced behavioural intentions to a greater extent than prototype evaluation, which perhaps could explain why there were no significant effects on behavioural intentions. Thus, it would be both important and interesting to design an intervention to enhance children's social comparisons to how they

identify themselves with people, who eat healthy and are physically active, to see if this successfully would influence physical activity and health eating.

Furthermore, the action planning intervention had a significant effect on subjective norms across time 1 and time 2 at seven days later, supporting research by Gratton et al. (2007) who found that a volitional intervention (based on implementation intentions) successfully enhanced subjective norms and perceived behavioural control between points of data collection. This indicated that the participants perceptions of the expectations of others were influenced when they developed their plans to engage in physical activity and fruit and vegetable intake. It is unclear why there were significant effects on subjective norms but not the other cognitions. Even though this is only an assumption, there is a possibility that the participants in the action-planning group discussed their plans with each other after the intervention. Hearing about their peers' plans could perhaps have increased the perceived behavioural pressure to be physically active and eat fruits and vegetables. It would be interesting to study this further to see what the influence of sharing one's behavioural plan would have on the behaviour. One way to do this could be to create a group discussion after the intervention where participants can share their plans with others. This could then be compared to a group where the participants are asked not to share their plans with others. A similar technique has been previously studied by Gollwitzer, Sheeran, Michael ski and Seifert (2009). They looked at the social recognition of implementation intentions of academic performance, in a group of law students. They grouped participants into a social reality condition group where participants shared their plans after making them, and a no social reality condition group where plans not were shared with others. No differences were found between the groups' implementation intentions. It would be interesting to study this further and apply the technique on physical activity and healthy eating.



Even though the experimental interventions showed limited effects on the study variables both across conditions and time, the findings of the current study were rather interesting. It was not surprising that the experimental interventions had no significant effect on actual behaviour as there were no effect on behavioural intentions, nor perceived behavioural control, components that are proposed to be determinants of behaviour (Ajzen, 1991). The current findings indicated that the use of action planning and image strategies alone might strengthen intention but not translate into behaviour change. Even studies with larger effect size on health cognitions did not change behaviour. Fife-Schwa, Sheeran and Norman, 2007, found that a substantial minority of students (26%) did not change behaviour in the presence of large effects on several TPB cognitions simultaneously. Furthermore, the influence of the image intervention on prototype perceptions was particularly noteworthy. These results are further discussed below.

### ***6.7.3. Action planning intervention***

There were no significant effects of the action planning intervention on physical activity and fruit and vegetable intake, contrary to previous findings who found positive effects of this technique on fruit and vegetable intake (Gratton et al., 2009; Kellar and Abraham, 2005) and physical activity (Prestwich et al., 2003) in young people. Participants were asked to form implementation intentions of specific actions (e.g. go for a walk) by making specific plans on how, when and where they should do it. The results had no effect on behavioural intentions either.

Gollwitzer (1993) explained the gap between intentions and behaviour through two stages: motivational and volitional. Intentions are formed at the motivational stage and then planned out at the volitional stage. It may therefore be more effective to combine interventions targeting both motivational and volitional stages in order for participants to increase their motivation for an

action and then plan how to perform it. De Vet et al. (2009) found in their study that the formation of implementation intentions had a positive effect on physical activity in participants with strong intentions to be physically active. Previous studies considered the combined approach of motivational and volitional interventions. Milne, Orbell and Sheeran (2002) augmented a motivational intervention by a volitional intervention using implementation intention techniques. They found that the combined approach had a significant effect on physical activity, whereas the volitional intervention alone had no significant effect. Gratton et al. (2007) also found that motivational and volitional interventions both increased fruit and vegetable intake. It is therefore suggested for future interventions using implementation intentions to also target motivation in order to increase both motivation and volition.

#### ***6.7.4. Image intervention***

There were no significant effects of the image intervention on physical activity and fruit and vegetable intake, however there appeared to be significant effects on the participants' prototype evaluation levels. It seemed that encouraging children to create healthy cognitive images of people that perform the respective health enhancing behaviours influenced their perceptions of these people and seemed to be evaluating these prototypes as more favourably, by using more positive descriptors than they did before they received the intervention.

According to the Prototype/Willingness Model (Gibbons and Gerrard, 1995) there are two variables of prototype perceptions: prototype evaluation and prototype similarity. Previous findings of the second study of the current research programme indicated that the first and most influencing factor on behavioural intentions was prototype similarity. This can possibly also explain why the image intervention did not have a positive effect on behavioural intentions. The intervention may significantly have increased prototype evaluation, however it can be assumed that because prototype evaluation does

not seem to be a powerful influencer of intentions, the image intervention also was not as effective in enhancing intentions. One explanation to why prototype evaluation appears to be less important than prototype similarity may be that identification plays a more important role than liking, in adolescents' health decisions (Rivis et al., 2006). It may therefore be more useful for future interventions to target prototype similarity, or a combination to both prototype similarity and evaluation, in order to enhance behavioural intentions in young people. Ouellette et al. (2005) implemented their successful intervention based on prototype similarity on exercise behaviour and found that people that showed high levels of social comparison tended to increase their physical activity levels. The authors suggested that this has an important impact on health behaviours.

#### ***6.7.5. Limitations and practical implications of Study 2***

The present study has several methodological strengths and limitations that must be considered in the interpretation of findings. One major limitation of Study 2 was that only actual behaviour was the only variable that was measured over a longer time period (6 months). All other variables were only measured over a period of 7 days. Measuring data over a longer period of time would perhaps discover changes that would allow the researchers to draw more firm conclusions on effective relationships. It would have been ideal to measure or constructs across 6 months, however this was not possible as some schools did not approve for the researcher to return to gather follow up data. It would have been ideal to gather data over a longer period of time. Previous intervention research (White et al., 2012) has implemented supplement interventions with "booster" reminders after the completion of intervention programmes in order to maintain and promote health behaviour change.

In regards to the Action planning intervention, it is also important to acknowledge that the lack of significant intervention effects may be due to improper formation of participants' implementation intentions. Even though the activity instructions were clear and presented with concrete examples, the participants did not have the opportunity to form their implementation intention plans in a more structured and controlled setting. The researcher was present during the activity and encouraged the participants to ask for help if needed, however the actual plan was not reviewed to see whether it was completed properly and plans may not have been specific or realistic enough. This concern was also highlighted by De Vet et al. (2009) who found no intervention effect on physical activity in a sample of adults. They argued that the formation of implementation intentions outside controlled settings (such as individual or group counselling) might be feasible although this has not yet been established. Even though successful outcome of implementation intentions has been seen in informal settings (Gratton et al., 2007; Kellar and Abraham et al, 2003; Prestwich et al., 2005) it may be more effective for implementation intentions to be formed in smaller structured groups to avoid the risk of plans being ambiguous or unrealistic.

Another limitation with the action planning activity itself was that it did not specifically encourage participants to form if-then plans for any of the barriers that may occur and how to overcome them. This would be an important part of the intervention and has been recommended by previous researchers (De Vet et al., 2009; Sheeran and Orbell, 2000). When unexpected barriers are experienced (such as lack of motivation, time or environmental changes) it would help to have a plan on how to overcome these barriers and this should be considered in future research using implementation intentions as a technique. It would have been interesting to collect feedback from the participants on how well they managed to follow their plans.

The lack of empirical evidence investigating prototype image within adolescents' health promoting behaviours as well as interventions based on this construct, created an inevitable limitation for the current study. A majority of research using the Prototype/Willingness Model has focused on health risk behaviours (Gerrard et al., 2005) and there is lack of intervention research on both health protective and health risky behaviours using the Prototype/Willingness model. Without sound evidence from previous research, Study 2 generated assumptions based on a limited amount of studies (Lazura et al., 2011; Ravis et al., 2006) of Prototype and image on health promoting behaviours among adolescents. Future intervention research in the area of image/prototype on health enhancing behaviours is therefore encouraged. To our knowledge there are no such interventions for children or adults.

Overall practical implications of these findings include interventions that target both motivation and volition. Researchers who implements studies based on implementation intentions should test the target sample to ensure that their intentions to perform the targeted behaviour are high. If their intentions are low, the participants should receive a motivational intervention designed to increase their behavioural intentions and goal attainment. The influence of social images on children's health behaviours should also be further explored in intervention research and this is suggested to be part of motivational interventions. Recent research by Lettow et al. (2015) combined a prototype similarity strategy followed by an action planning strategy to enhance young adults drinking behaviours in the Netherlands. They found this to be relevant in the explanation intentions to consume alcohol. The findings of prototype similarity in Study 1; lead us to suggest that it would be worthwhile to enhance people's perceived similarity to people that are physically active and eat healthy for future intervention research.

#### **6.7.6. Conclusion**

The study is one of the first of its kind in the United Arab Emirates, which makes it unique. Even though the implemented interventions showed no significant effect on physical activity or fruit and vegetable intake, there appeared to be some significant effects on health cognitions. Findings showed that the image intervention enhanced children's image of socially important people that are physically active and eat plenty of fruits and vegetables. Further research would be valuable to further the use of image and action plans upon adolescents' healthy eating and physical activity habits in the Middle East but also other parts of the world. The next step of the current research programme was to study children's physical activity, fruit and vegetable intake and its influences from a qualitative perspective. This would allow us to get a deeper understanding of the influences of physical activity and healthy eating in adolescents in the United Arab Emirates, which can help inform future health promotion initiatives and interventions.

## **Chapter 7– Study 3:**

### **7.1 Introduction**

As previously discussed in chapter 4, the Theory of Planned behaviour does not sufficiently capture environmental factors such as the barriers and facilitators of health behaviours. As an effort to gain as much insight as possible into physical activity and fruit and vegetable intake in children, the aim of Study 3 was to study some of the constructs from the from the Social Cognitive Theory in addition to some of the constructs from the Theory of Planned Behaviour (Ajzen, 1991) and Prototype/Willingness Model (Gibbons and Gerrard, 1995), which previously were studied in Study 1 and Study 2. Qualitative data follows from or connects to the quantitative data from the previous studies and is used to explain or expand on the initial quantitative results. It also allows for Social Cognitive Theory on physical activity and healthy eating to be explored through the research participants own experiences, views and perceptions of physical activity and healthy eating (Thomas et al., 2005; Mulvihill et al., 2000). Dixon-Wood and Fitzpatrick (2001) suggested that this type of research method could be an important research tool in developing the evidence base for health initiatives. Study 3 therefore conducted focus group interviews with adolescents between the ages of 11 and 15 years. Studying this from a qualitative perspective, allows for a more comprehensive picture of adolescents' perceptions of physical activity and fruit/vegetable intake and a better understanding of the influencing factors of physical activity and fruit and vegetable intake.

### **7.2. Literature review**

The literature review of this chapter will assess adolescents' understanding of healthy eating and physical activity and the recommended guidelines. This will be followed by the perceived benefits and costs of physical activity and fruit and vegetable intake. The literature on the perceived facilitators and social

influences of physical activity and fruit and vegetable intake will also be further considered. Several researchers have examined adolescents' knowledge, attitudes and motivation towards physical activity and healthy eating and their reasons for participation or non-participation from a qualitative perspective. This is discussed below.

### **7.2.1. Knowledge**

Bandura (1986)'s Social Cognitive Theory suggests that children need to have the ability and knowledge, to know what to do and how to do it. Studying adolescents' knowledge of physical activity and healthy eating, including the different methods and the recommended guidelines is a first step to understand their views and attitudes towards these health behaviours. Asking adolescents about their knowledge would improve our overall knowledge about physical activity and health eating in this age group. It is particularly important to gain an understanding of what they know about the terminology, for effective promotion of these behaviours within this age group. When for example asking children to recall their past physical activity, it is especially important that children have an accurate and mutual understanding of the term as they may only be considering sports types of physical activities.

#### *7.2.1.1. Knowledge of physical activity*

For children and adolescents, physical activity does not only have to be structured exercise but can also includes physical transportation, games, chores, recreation, PE lessons and physically activities at home and in the community (World Health Organization, 2011). A Meta-analysis by Weise-Bjornstal (2007) found that despite the wide range of physical activities available for adolescence; a lot of the research on physical activity among adolescence has been conducted within organised sport settings.



So what do children actually know about physical activity and what do they consider as physical activity? The literature presents different findings. Trost et al. (2000) suggested that due to the prominent role of individual fitness activities and organised sports in schools, homes, and the mass media, it could be assumed that many children would associate the term physical activity with participation in organised sports such as swimming, football and gymnastics. This has also been noted in adults (Wilcox, Richter, Henderson, Greaney and Ainsworth, 2002) and adolescents (Mulvihill, Rivers and Aggleton, 2000), through focus group discussions to examine perceptions of physical activity in the United States and the United Kingdom. Findings showed that people often perceived physical activity in terms of structured exercise and rarely considered unstructured (lifestyle) physical activity. However, other studies found that adolescents had a broader and more accurate understanding of physical activity. Pearce, Harrell and McMurray (2008) conducted a qualitative study in the United States where they interviewed adolescents between the ages of 11 and 15. The participants had an accurate understanding of physical activity and considered physical activity as body movement across different activities and settings. A majority of the participants also had the correct understanding about the daily recommendations of physical activity.

Physical Education programmes at school have emphasised on lifetime exercise habits and enhanced knowledge about physical activity and this would have led to an improvement on children's overall knowledge (Bayne-Smith et al. 2004; Li, 2010). No studies have acknowledged adolescents knowledge of the meaning of the term physical activity in the United Arab Emirates, or in the Middle Eastern region and this will therefore be addressed in the current study.

#### *7.2.1.2. Knowledge of physical activity recommended guidelines*

Positive correlations between knowledge of physical activity guidelines and actual behaviour were found among adolescents (DiLorenzo, Sticky-Ropp,

Vander and Gotham, 1998; Sallis, Prochanska, Taylor, Hill and Gerari, 1999), which suggests how important this is. The World Health Organization's (2011) physical activity guidelines for children, states that they should be physically active at least 60 minutes daily. These activities should be moderate to vigorous in intensity and muscle and bone strengthening.

But what knowledge do adolescents have of these guidelines? The literature presents conflicting findings. In Roberts and Marvin's (2011) report on physical activity and healthy eating for the UK's National Obesity Observatory, it was presented that only 32 percent of children between the age of 11 and 15 believed that they should take part in physical activity every day of the week and 37 percent believed that 60 minutes of physical activity was beneficial for their health. Only 10 percent of the 15-year-old boys and 7 percent of girls thought that the recommended levels of physical activity were 60 minutes daily for young people. 79 percent of boys and 91 percent of girls thought that the daily recommendation was less than this. Rawlins, Baker, Maynard and Harding (2012) conducted 13 single gender focus groups focus in the United Kingdom to explore perceptions of physical activity and healthy eating in low minority males and females between the ages of 8 and 15 years. Their findings indicated poor knowledge of the national physical activity guidelines. Parents' knowledge of the recommended physical activity guidelines for children was also poor. A recent study conducted in a non-Western country (Guatemala) studied 10 to 13 year old children's understanding of health enhancing behaviours for chronic disease prevention using focus groups (Letona, Ramirez-Zea, Caballero and Gittleschon, 2014). The participants knew that it was beneficial for health to be physically active but they did not have knowledge about the recommended guidelines of the amount of daily physical activity, which influenced their actual behaviour.

#### 7.2.1.3. Knowledge of healthy eating

Adults often describe healthy eating based on their own eating habits, often related to specific food groups. A common understanding is that healthy eating includes foods that are low in fat, high in fibre and plenty of fruits and vegetables and unhealthy eating includes foods that are greasy and high in fat (Povey, Conner, Sparks and James, 1998). Among adolescents, the definition of healthy eating has often been explained as eating fruit and vegetables and not eating too much fat (Velaquez, Pasch, Ranjit, Mirchandani and Hoelscher, 2011; Roberts, Maxwell, Bagnell and Bilton, 2001; Lytle et al., 1997). This is also how adolescents often define dieting (Roberts et al., 2001; Oakes, 2005).

In an Irish study on adolescents by Stevenson et al. (2007), focus groups participants were asked about their views on food and eating. When they were asked to define healthy eating, the majority of the participants mentioned the exclusion of unhealthy foods such as crisps, chocolate and fast food. Participants described healthy eating as 'a balanced diet', 'a piece of vegetable and fruit each day' and also 'less of the bad stuff and more of the good stuff'. McKinley et al (2005) did a focus group study on adolescents in the United Kingdom and found that the children associated the term 'healthy eating' with fruit, vegetables and salads. Healthy eating and physical activity together was also often perceived to be part of a healthy eating 'package'. In line with this, O'Dea et al. (2003) reported that older children's perceptions of healthy eating generally included eating fruits and vegetables.

#### *7.2.1.4. Knowledge of the recommended guidelines of fruit and vegetable intake*

The international recommended guidelines of fruit and vegetable intake is at least five portions of fruit or vegetables per person per day (World Health Organisation, 2003). The Health Survey for England (Craig and Shelton, 2007) indicated that many adults seemed to be aware of the national health eating

recommendations, including reducing fat and salt intake and eating five portions of fruits and vegetables daily. Contrary to this, Pollard, Daly and Binns (2009) did a large questionnaire study in Australia and found that approximately 42 percent of participants (adults and older adolescents) knew that serving size was one piece of fruit and not even 15 percent knew that also was a handful (1/2 cup). Herbert, Kennedy, Lobb and Butler's (2010) focus group study on young adults (16-23 years) in the UK, indicated that there was lack of understanding in both males and females when they were asked about what counted as 5 portions of fruit and vegetables per day. They did not consider fruit juice or beans as part of their 5 a day even though this is included in the recommendations from Department of Health (2010). They also found that some thought potatoes could be included in their 5 a day.

To what extent are adolescents aware of these guidelines? The results from a systematic review on studies from various countries, mainly conducted in the United States and using focus group interviews, found that the adolescents generally had low awareness of the national guidelines of fruit and vegetable intake (Krolner et al., 2011). Through focus group interviews with adolescents in the United States (Campbell, 2009), it was found that the participants had good knowledge of the recommended guidelines of fruit and vegetable intake. Furthermore, a study from the Netherlands found that majority of the participating adolescents were under the impression that they consumed a lot of fruit and vegetable but this was often not the case (Wind et al., 2005).

The knowledge of physical activity guidelines in children seems to be limited and they often have an incorrect understanding of the amounts of the recommended guidelines. There have been no known studies examining this in the United Arab Emirates and it therefore remains a need to explore this. Accurate understanding of adolescents' knowledge of physical activity and healthy eating could help inform future health promotion initiatives and encourage physical

activity participation. Knowledge alone is insufficient to behaviour change (Howard, 1988), however it is an important first step to changing behaviours. Providing children with information on how to perform and how much they need would be an important step towards success, but education alone is not sufficient and social and cognitive factors are crucial. According to Bandura (1986), people do not only need the skills and knowledge to perform an action but also a strong belief in their own capability to perform.

### **7.2.2. Outcome expectations**

Social Cognitive Theory (Bandura, 1986) specifies that the knowledge of health benefits and costs of health behaviours create the precondition to change behaviours. It is important that people have the knowledge about how health behaviours affect their health in order for them to improve lifestyle habits. Peoples' outcome expectations about the costs and benefits of health behaviours is also important (Bandura, 1997). Based on previous experiences, people tend to have fundamental beliefs about the consequence of the behaviour. Outcome expectations are important constructs in the Social Cognitive Theory (Bandura, 1986) and also through attitudes in the Theory of Planned Behaviour (Ajzen, 1991) by looking at peoples attitudes about the likelihood that the intended behaviour will the expected outcome. These beliefs can be both positive (perceived benefits) and negative (perceived costs) and are presented below. Bandura (1977) suggested that if the outcome of the behaviour is perceived as positive, physical activity is more likely to be practised regularly.

Motivation is very important and powerful for adolescents and they perceive immediate rewards as more rewarding than adults (Galván, 2013). Galván (2013) argued that the adolescence is characterized by heightened reward sensitivity. This has been accumulated by evidence, which suggested that this behaviour is associated with neurodevelopmental changes in reward-related neural circuitry. During adolescence, there is an increase in the neural circuits

using dopamine, which is central in creating peoples drive for rewards. It is therefore important to study the factors that motivate adolescents to participate in health behaviours and take these into account for future interventions.

#### *7.2.2.1. Positive outcome expectations of physical activity*

The benefits of physical activity are well known and documented (Biddle et al., 2010), but to what extent are adolescents aware of the advantages and disadvantages of physical activity and what are their attitudes towards this? Adolescents' perceptions of the outcomes of physical activity have been previously examined, both through qualitative and quantitative studies. Tergerson and King (2002) found that 'staying in shape' was the most common benefit mentioned by females and 'becoming strong' was the most mentioned benefit by males. O'Dea (2003) conducted a large focus group study on 213 children between the ages of 6 and 16 years in the United States. She asked a about the perceived benefits of physical activity and it was stipulated that social benefits, enhancement of psychological status, physical sensation and sport performance was perceived as benefits of physical activity. Furthermore, positive mental and physical health have been identified as benefits of physical activity and was cited as motivation for participation in in focus group studies with adolescents in Canada (Belanger, Casey, Cormier, Laflamme and Martin, 2011; Gavin, McBrearty and Harvey, 2013) and Scotland (Inchley, Kirby and Currie, 2008). Boys have mentioned having more energy, keeping in shape and staying healthy as important benefits of physical activity and girls often thought that physical activity was fun and social and it also helped them keep in shape and stay healthy. Girls also mentioned emotional wellbeing as a benefit (walking could for example be relaxing) and they also said that physical activity often gives you a sense of achievement (Inchley et al., 2008). Gavin et al. (2013) found that the most common themes that emerged were 'Positive health and Physical changes', 'Activity related positive emotions' and 'Personal learning'. Others have described the benefits of physical activity as 'keeps the body in shape' and

'away from bad influences (Letona et al., 2014). Mulvihill et al. (2000) found high levels of awareness of the benefits of physical activity among children between the ages of 11 to 15 years. The advantages were described as beneficial to physical and mental wellbeing, in particular weight management and beneficial for health. This is similar to findings by Loman (2008) where the most frequently mentioned benefits of physical activity were positive physical attributes (losing weight, looking good, being slim), mental health (relieving stress, improving self-confidence) and staying healthy (reducing the risk of certain diseases).

Adolescents are concerned about their physical appearance and they often believe that others are concerned too (Croll, 2005). According to Allender et al. (2006), they often have a desire to improve physical appearance and physical activity can help with weight control, which therefore acts as a motivating reward. The desire to achieve or maintain a desirable body shape can be a motivation to participate in physical activity and one of the facilitators of physical activity in adolescents is body image and shape, especially if the person already is active. There is a lot of researching supporting this. Cockburn and Clarke (2002) and Allender et al. (2006) found that weight control and body shape were the main facilitators to physical activity among young females and participants reported that they often felt pressure to exercise to live up to popular beauty ideals. Biddle et al. (2005) found that females were often motivated by weight loss and other beneficial effects on body type but tended to be more affected by social influences. The results from Thompson et al's (2003) focus group interviews indicated that concerns about body weight and shape often increased with age and were more common among the older participants, which often acted as a facilitator to physical activity. Weight concerns during adolescence often turned into a strong facilitator of physical activity during adulthood.

It is not surprising that the positive expectations often strongly associate with physical appearance. Improved physical appearance can be a positive

consequence of physical activity (Loman, 2008). However, concerns about own physical appearance (body dissatisfaction) have been pointed out as possible barrier to physical activity, especially among adolescent females (Pate et al., 2007). This is further discussed below.

#### *7.2.2.2. Positive outcome expectations of fruit and vegetable intake*

It can be assumed that it is important that adolescents are aware of the long term and also the short term benefits of fruit and vegetable intake on health in order to attempt to increase their understanding and facilitate intake. The literature shows a general good understanding of the benefits of fruit and vegetable intake in adolescents.

Herbert et al. (2010) conducted a focus group study on older adolescents and young adults in England and found that a majority of the participants (both males and females) mentioned health benefits to be a major benefit of fruit and vegetable consumption due to the high content of fibre and vitamins. They also mentioned disease prevention, especially the female participants. Females also thought the consumption of fruit and vegetables would have a positive impact on physical appearance as in terms of improving their skin and weight loss. Fruit and vegetable intake is a health enhancing behaviour, but having the knowledge doesn't always necessarily mean that it will have an impact of the behaviour. Hill et al. (1998) found that adolescents generally had a good understanding of the health benefits of eating fruit and vegetables and generally had the perception that it was 'good for you'.

A diet containing plenty of fruit and vegetable intake often has a positive influence on physical appearance in terms of weight management, skin etc. The literature has shown that adolescents are aware of this and this often acted as a facilitator to fruit and vegetable intake, especially among females (Shepherd et al., 2006; Rasmussen et al., 2006; Krolner et al., 2011; Neumark-Sztainer et al.,



1998). According to a review by Shepherd et al. (2006), many adolescents, especially females expressed concerns about their physical appearance and this often acted as a facilitator to fruit and vegetable intake as part of a healthy diet. They found that adolescent females often were concerned about their diet and the effect it will have of on their physical appearance. In Stevenson et al.'s (2007) study, female focus groups participants reported that social media messages encouraged them to eat healthy, to live up to the image of thinness as the attractive ideal and they often expressed a desire to look like models and celebrities seen in the media. Some participants expressed their concerns about these social pressures by stating that 'you don't want to be fat' and 'there is a lot of pressure by society to stay thin'.

#### *7.2.2.3. Negative outcome expectations of physical activity*

Researchers have also studied how adolescents perceive the negative outcome expectations, or costs/disadvantages, involved in participating in physical activity and eating fruits and vegetables. Research by Tegerson and King (2002) indicated that males often did not find physical activity motivating enough to prioritise it over other more preferred activities and the females thought that it could be time consuming. O'Dea (2003) asked adolescent participants in focus group interviews about the perceived disadvantages of physical activity and the most commonly mentioned factors were a lack of motivation and time constraints (O'Dea, 2003). Mulvihill et al. (2000) found that participants sometimes described physical activity as 'hard work' and 'boring'. Negative aspects of physical activity also included feelings of self-consciousness during participation and also the financial cost of certain activities. These feelings often become more evident during the transition to secondary school and an increase in self-consciousness of physical appearance often occurs, especially among females. They also found that the participants also reported that physical activity could be time consuming and often acted as a time restraint due to their increased amount of academic schoolwork in secondary school. Further studies have also

identified feelings of self-consciousness (Cockburn and Clarke, 2002; Tegerson and King, 2002) and time restraints (Tegerson and King, 2002; Mulvihill et al., 2000) as commonly mentioned disadvantages to physical activity in the reviewed literature. A qualitative study in the UK examined females (between the ages of 12 and 14) motivation and experiences of physical activity.

Physical appearance concerns can therefore act as a barrier to physical activity as research has also shown that females often perceived participation in sports as detrimental to maintain a feminine body shape and often had a negative association with sports with being sweaty, developing muscles and 'becoming bulky' (Toscos, Faver and Connolly, 2008; Dwyer et al., 2006). In males, body size and maturation also plays an important role as a support of physical activity, especially sport activities but this can also act as a barrier (Claessens, Beunen and Malina, 2000). In Thompson's (2003) study, all participating physically active males referred to their body size at some point, and did not perceive this as a barrier, even if they were tall and big or small and light (Thompson et al., 2003). However, males that were not physically active often considered their body size as a barrier to participate in sports. They also found that physical ability played an important role in both the facilitator and barriers to physical activity and many males thought that their lack of physical ability acted as a barrier to physical activity/sports during their adolescence years.

Musaiger et al. (2012) conducted a large quantitative study across 7 Arab countries (Algeria, Jordan, Kuwait, Libya, Palestine, Syria and the United Arab Emirates), studying adolescents' perceived barriers to physical activity and healthy eating. In line with previous studies from western countries, participants did often not find physical activity motivating (the reason was not specified) and also reported that it was time consuming. The results indicated that females, in general faced more barriers to physical activity than males in all of the countries included. Musaiger et al. (2012) argued that women in the Middle East often

find it more difficult to be physically active due to certain religious and social norms, which makes it difficult for women to be physically active in public. Further studies within the United Arab Emirates are needed, as it could provide important knowledge for future research and health promotion. It is very important for health promoters to be aware of adolescents' negative outcome expectations of health behaviours and this is likely to hinder engagement.

#### *7.2.2.4. Negative outcome expectations of fruit and vegetable intake*

Taste appears to be an important factor for fruit and vegetable consumption, in both directions. Enjoying the taste of fruits and vegetables can act as a facilitator and disliking the taste is often mentioned as one of the main cons of eating fruits and vegetables and the research has shown that this often acts as a barrier to consumption among adolescents, especially the taste of vegetables (Krolner et al., 2011; Neumark-Sztainer, Story, Perry and Casey (1999); Stevenson et al., 2007; Wind et al., 2007; Zeinstra, Koelen, Kok and Graaf, 2007).

Neumark-Sztainer et al. (1999) and Stevenson et al. (2007) found that taste and appearance of fruits and vegetables was often not appealing to adolescents, and this was linked to daily intake. The authors therefore suggested that healthy foods need to taste and look better in order for it to be appealing to adolescents. High prices were also highlighted as a disadvantage to fruit and vegetable intake, but have been more commonly mentioned among adults. Furthermore, the participants in a Guatemalan study expressed that they liked the taste of fruits but not vegetables. Some described it as 'lack of flavour' and 'it has a bitter taste' (Letona et al., 2014).

Negative views of the presentation and appearance of fruits and vegetables has also been frequently mentioned as a disadvantage to intake. Adolescents often expressed that they did not want to eat fruit and vegetables that did not look

appealing to them and if it, for example was bruised or looked soggy and boring (Krolner et al., 2011; McKinley et al., 2005; Stevenson et al., 2007; Neumark-Sztainer et al., 1999). Krolner et al. (2011) found that adolescents were reluctant to spend money on fruits and vegetables in case it tasted bad, and would rather spend their money on something like a chocolate bar, which would guarantee a pleasant taste. The participants in Chambers, Lobb and Butler's (2008) focus group study on younger adults in the UK also expressed that the disadvantages of healthy eating, including fruit and vegetable intake, was restricting enjoyment and also the social pressure from friends, family and media.

Insights into the barriers and facilitators of physical activity and healthy eating can guide intervention to successfully address behaviour change and this will be further discussed below. It is important to study this further, especially in countries in the Middle East, where a limited amount of research has been conducted.

### ***7.2.3. Perceived facilitators***

There is a growing interest in adolescents' physical activity levels and healthy eating habits from a psychological perspective (Clark, Spence and Halt, 2011). Identifying the facilitating factors to physical activity and healthy eating from a qualitative perspective would increase our knowledge and help us understand more how these factors facilitate and motivate adolescents' participation in physical activity. Perceived facilitators of health behaviours are also strong determinants of behaviour, according to the Social Cognitive Theory (Bandura, 2004).

#### *7.2.3.1. Perceived facilitators of physical activity*

*As previously introduced in chapter 3, a majority of the facilitators of physical activity been identified as enjoyment and social influences (Biddle et al., 2005). Social influences from family members and peers have been directly linked to*

*physical activity in adolescents (Biddle et al., 2005). In particular social role modelling act as a social influencer to physical activity and the pressure to live up to social stereotypes can act as a key facilitator to physical activity among adolescents (Allender et al., 2006). According to the Social Learning Theory (Bandura, 1977) observing influential people's behaviour through modelling has an impact on children's behaviour. Role models by nature, provide positive (or negative) examples for individuals' behaviours and beliefs (Fielden, Sillence and Little, 2011). Role modelling promotes self-efficacy and shows the child what is important or valued. The efforts of important people, such as parent, peers and teacher are significant as they often act as role models for their children and much of what a child learns is through observation and imitation of others (Bandura, 1997).*

Role models of physical activity were considered in this chapter and it often seems to be a perception that celebrities that are famous for being active in a sport have a positive impact on older and younger children and also the broader community in general (Payne, Reynolds, Brown and Fleming, 2003). However a role model does not only have to be a celebrity and there is a wide range of role models including family members, peers, teachers, or famous people etc. Research suggests that physical education teachers modelling a physically active lifestyle can exert similar positive influence over adolescents (Payne et al., 2003). They can also serve as role models for colleagues and parents of the students they teach (Chodzko-Zajko, Zhu, Bazzarre, Castelli, Graber and Woods, 2008). Payne et al. (2003) conducted focus group interviews on adolescents in Australia and found that boys were more likely to consider sport stars as role models for physical activity whereas females considered family members as more important role models for physical activity. These findings were in line with a study by Fielden et al. (2011) with children in the UK. They found a difference between the genders and boys often looked up to football players and other sport stars whereas female participants looked up to physically active family members.

Celebrities were also mentioned as role models for females but these role models were not explicitly seen as following a healthy lifestyle other than that they were slim and looked good according to the participants.

Gender differences in role models supports early research by French and Pena (1991), who found that females tended to identify actresses, singers and family members as role models, while males often identified athletes and actors. The low interest in female sports stars can also be linked to femininity. Findings from qualitative studies have shown that girls often do not perceive sports stars as feminine and often associate sports with developing muscles and becoming sweaty and dirty (Cockburn and Clarke, 2002; Dwyer et al., 2006). Fielden et al. (2011) suggested that the low interest in female sports stars as role models can perhaps be due to a relatively smaller number of female sports stars. Only 25 percent of the adolescent females in a focus group study thought it was important to be good at a sport and considered it 'cool' to be sporty (Gorely et al., 2010). Physically active girls suggested in focus group discussions by Whitehead and Biddle (2008) in the UK, that it would be useful to identify female role models in the media who are perceived as attractive and feminine but also physically active. The participants believed that this would encourage less active females to look up to physically active celebrities who they also perceive as attractive.

Fielden et al. (2011) suggested that positive role models need to have a close and active relationship with the children, allowing them to see the steps towards the health behaviour. This could explain why children often look up to family members as role models for health behaviours. The result from the focus group discussions also showed that role models were very often defined as parents and acted as facilitators to both physical activity and healthy eating. Anderson and Cavallaro (2002) in New Zealand asked adolescents through focus group interviews to name role models for physical activity. Their responses indicated

that parents were the most common role models (34 percent), followed by celebrities (20 percent) and peers (14 percent).

Physical activity is a good way for adolescent to maintain a good health and have fun with their peers. Friends play an important role in adolescents' lives and it was not a surprise that a theme that often appeared as a facilitator for physical activity in the qualitative literature was 'social interactions' or 'socialisation' (Allender, Cowburn and Foster, 2006; Coleman, Cox and Roker, 2008; Cox et al., 2006; Yungblut et al. 2012). Social interactions with peers (same and opposite gender) and family members are important for adolescents (Furman and Buhrmester, 1993). Social interactions are important facilitators of physical activity, particularly in team sports. Social interactions are linked to enjoyment, as having fun was often correlated to enjoying physical activity together with friends, according to research (Allender, Cowburn and Foster, 2006; Coleman, Cox and Roker, 2008; Cox et al., 2006; Yungblut et al. 2012). Enjoyment acts as an important facilitator to physical activity and will be discussed further below. Brooks and Magnusson (2007) described that physical activity can be used for positive social interactions with peers and provides important opportunities for engagement with existing peers but also a way to create new friendships based on a shared interest in a particular type of physical activity. Cox et al. (2006) and Belanger et al. (2011) found that participants in focus group interviews valued physical activities in friendship groups and this acted as a strong motivator for participation in physical activity. Being physically active with a friend was also an important influencer to participation in physical activity for female adolescents (Biddle et al., 2005). *Belanger et al. (2011) also reported that socialisation can contribute to negative experiences of physical activity (often performance based physical activity), due to many sports competitive nature and the authors therefore put emphasise on the promotion of activities that are not focused on competition.* After reviewing the qualitative literature, it was evident that enjoyment and taking pleasure in the activity was important and reoccurring

among the factors influencing adolescents' physical activity levels. Enjoyment often occurred as a common theme in focus group studies conducted on this age group and participants often described enjoyment as the main reason of participating in physical activity (Biddle et al., 2005; Whitehead and Biddle, 2008).

#### *7.2.3.2. Perceived facilitators of fruit and vegetable intake*

Social influences and support from family members and peers are also important influences of fruit and vegetable intake (Fulkersen, 2005). The importance of having positive role models for adolescents' physical activity was previously discussed in this chapter. Parents, teachers and peers as role models appear to facilitate fruit and vegetable intake (Brug et al., 2008). The role modelling of adults also increased the likelihood of fruit and vegetable intake, in Fulkersen's (2005) study. The authors suggested that fruit and vegetable promotion interventions should focus on social norms, role models and social support to increase intake among older children. Frequent relationships between unhealthy eating and social influences among adolescents were identified in a systematic review by Krolner (2011). Participants received negative comments from peers if they brought fruit and vegetables to school and did not consider eating fruits and vegetables in school as a 'cool' behaviour although they ate it at home.

Studies by Kristjansdottir et al. (2009) and Brug et al. (2008) found that family modelling, social support and availability of fruit and vegetables at home were important influences of intake. Groeschell (2006) found in their focus group study that females valued their mothers' opinions regarding healthy eating. Participants in a focus group study by Kubik et al. (2005) and Molaison et al. (2005) expressed that family members were the best influencers and role models for fruit and vegetable intake. It was motivating for participants to see that fruit and vegetable intake improved these people's health. It makes sense that parents were the most important influences as they are more likely to provide



“proof” of good health, rather than role models they do not know personally. It was also interesting to find that adolescent females thought that many celebrities acted as negative role models for health eating, as they often felt the need to be skinny to live up to media’s beauty ideal (Stevenson et al., 2007). Participants in a social media intervention aimed to fight obesity in the United States, expressed that they would be positively influenced to eat more fruit and vegetables if role models (rap musicians, athletes and peers) were involved. They thought that the use of media to promote these messages would be highly successful (McDermott, 2005).

Being a role model can also act as a facilitator to eat healthy. A recent focus group study by Tiedje et al. (2014) found that it was important for some participants to eat healthy so they could act as a role model for other family members. For example, some adult participants reported wanting to be a role model for their children to eat healthier. Similarly, several adolescents talked about wanting to positively influence their parents’ eating practices, which they described as unhealthy.

A majority of qualitative studies have indicated that availability of fruit and vegetables is also an important facilitator (Krolner et al., 2011; Neumark-Sztainer et al., 1999; O’Dea, 2003), which suggests that in order for adolescents to increase their fruit and vegetable intake, it is important that they had it available to them in school, at home and in the community. Kubik et al. (2006) noted that participants often reported that it was difficult to access fruit and vegetables in schools and making this accessible in the school environment would likely increase intake. Also, if the options available to them were not appealing they would not buy fruit and vegetables in school (Neumark-Sztainer et al., 1999). Some participants in Neumark-Sztainer et al’s (2005) study stated ‘If it is out – I will eat it’. The authors also emphasised on family dinners as this showed to facilitate vegetable intake among adolescents.

#### **7.2.4. Conclusion**

Social influences of people that are physically active and eat healthy were previously explored in Study 1 and 2 of the current research programme, by drawing from the Theory of Planned Behaviour (Ajzen, 1991) and Prototype/Willingness Model (Gibbons and Gerrard, 1995). The third step was to further explore this in detail by taking on a qualitative approach using focus group discussions looking at role modelling (drawing from the Social Cognitive Theory, Ajzen, 1986). Taking in to account that no research has explored this in Arab countries, emphasising on role modelling in physical activity and healthy eating among adolescence could strengthen the literature and hopefully guide future interventions. Findings from the first study of the current research programme showed that attitudes, control and social influences accounted for a significant part of behaviour intentions. However, there were still some gaps in regards to the influences of physical activity and fruit and vegetable intake that needed to be addressed. Listening to adolescents talk about their understanding of physical activity and fruit and vegetable intake will help us understand more about their attitudes, knowledge and motivation and will hopefully be helpful and guide future directions of community and school based physical activity interventions.

#### **7.3. Aims and objectives**

The overall aim of the third study in the research programme was to gain a better understanding of physical activity and healthy eating in children by exploring some of the factors that influence secondary school children's intention and behaviour of physical activity and fruit and healthy eating from a qualitative perspective. Expanding on some of the findings from Study 1 and exploring children's knowledge, perceived influencers and outcome expectations of physical activity and healthy eating, will hopefully be useful for future studies and interventions. The first objective of this part of the research programme was

to explore individual, social and psychological factors that would influence physical activity and healthy eating. The second objective was to evaluate socio-cognitive theoretical concepts to better understand children's perceptions of physical activity and healthy eating.

#### **7.4. Research Questions**

With the above aims and objectives in mind, Study 3 seeks to address the following research questions, based on the Social Cognitive Theory (Bandura, 1986):

1. What are adolescents' understanding and knowledge of physical activity and healthy eating?
2. What are their perceived outcome expectations of physical activity and healthy eating?
3. What facilitates their physical activity and fruit and vegetable intake?
4. What are the roles of social role modelling in their physical activity and healthy eating?

## **7.5. Methodology**

### **7.5.1. Research design**

This part of the research programme implemented a qualitative research design using narrative data gathered from semi-structured focus groups exploring participants' views on physical activity and fruit/vegetable intake. This allowed for an in depth examination of the participations views and opinions on physical activity and fruit/vegetable intake. There are a few reasons to why focus group methodology was chosen over individual interview methodology. Firstly, the support offered to the individuals within a focus group allows for greater openness and interaction in their responses (Vaughn, Schumm and Sinagub, 1996). Secondly, Lewis (1992) pointed out that unlike in individual interviews, focus group discussion does not have to be terminated when one individual does not respond. Focus groups also reduce the pressure on individuals to respond to each question. They are also more time and cost effective over individual interviews with the same amount of individuals (Basch, 1987). According to Mauthner (1997), focus groups have shown to be effective with children as they often feel safe in a peer environment and small group settings that they are familiar with from their classroom work and support from peers also reduce the power imbalance between the child and the adult that occurs in individual interviews.

### **7.5.2. Participants**

Following ethical permission from the University of Bedfordshire's Ethical Advisory Committee, sampling for Study 3 was considered in two stages, firstly by selection of the school and secondly the selection of the focus group participants.

Schools were considered for inclusion in the study if a) they offered a British Curriculum b) they received a rating of 'good' from the Dubai School

Investigation Bureau (DSIB) c) and the school fees was approximately £12,100 for each academic year. School fees in Dubai range from £850 to AED £17,000 (KHDA, 2015), and the participating school was on the mid-range of the overall fee scale. The reason for using this criteria for recruitment was to ensure that the schools for Study 3 was of similar characteristics as the schools that participated in the quantitative parts of the research programme (Study 1 and Study 2). For Study 3, three schools were contacted and invited to take part in the qualitative part of the research programme. These schools were additional to the schools invited to participate in Study 1 and Study 2 of the current research programme. Only one out the three schools agreed to participate in Study 3 and this school is referred to as School A.

School A was a British curriculum school (fees approximately £12,000) and agreed to take part this part of the study in September 2011 and was located in the Meadows in Dubai, United Arab Emirates. Participants for the focus groups were selected according to which class they belonged to. The head of year groups selected these classes and all the pupils in those classes received an invitation letter and consent form to participation in the study. One class from each year group (Year 7,8,9 and 10) were selected to participate. Those pupils that agreed to participate in the study were encouraged to bring their consent forms with them on a specific day when they were attending their annual health check up at the schools clinic. The researcher employed a convenience sampling method by selecting between four to six participants that were in the clinic with their consent forms. The sampling size of the focus groups was chosen, as the optimum size of a focus group with children is generally smaller than focus groups including adults (Hoppe, Wells, Morrison, Gillmore and Wildson, 1995). According to Hoppe et al. (1995), it is preferable to have between four and six participants in the group to ensure that at least three talks.

Overall, forty participants (N=21 females and N=19 males) between the ages of 11 and 15 years participated in the focus groups. Single gender focus groups were formed, separating males and females. This has been frequently recommended when conducting focus groups with children (Mauthner, 1997; Vaughn et al., 1996). According to Greenbaum (1988), younger children often dislike members of the opposite sex while adolescents may show high levels of interest in the opposite sex and this may detract from the flow of discussion. The researcher also received the information that males and females are segregated for Physical Education, and it therefore made sense to do this for the focus groups as well.

Group 1 consisted of 6 females and group 2 consisted of 4 males between the ages of 11 and 12 years old. Group 3 consisted of 4 females and group 4 of 4 males between the ages of 12 and 13 years old. Group 5 consisted of 5 females and group 6 of 5 males between the ages of 13 and 14 years old. Group 7 consisted of 6 females and group 8 of 6 males between the ages of 14 and 15 years old. A majority of the participants were 'British' (45 percent), 23 percent were 'Other western', 18 percent were 'Indian/Pakistani/Bengali' and 15 percent were 'Middle Eastern'. The school could not provide any information regarding the socio-economic status of their students. Considering the high tuition fees, it could perhaps be assumed that the students came from a more advantaged socioeconomic background than schools with low tuition fees. School statistics from the clinic showed that 15.1 percent of the students in the secondary school were overweight (BMI above the 85th percentile) and 1.3 percent were underweight (BMI below 16, 5th percentile).

Table 17: Demographics of focus groups participants

		G1	G2	G3	G4	G5	G6	G7	G8	Total
<b>Age</b>	11-12 years	6	4							10
	12-13 years			4	4					8
	13-14 years					5	5			9
	14-15 years							6	6	12
<b>Gender</b>	Male		4		4		5		6	19
	Female	6		4		5		6		21
<b>Nationality</b>	British	1	2	1	3	2	2	4	2	17
	Other Western	2	1	0	0	2	2	1	2	10
	Middle Eastern	1	0	2	0	1	0	1	1	6
	South Asian	2	1	1	1	0	1	0	1	7

The reason why adolescents were targeted is because adolescence is a time when people start becoming more independent and peers have more influence than parents, which offers a partial explanation why many health damaging behaviours starts here (Thompson et al., 2003). Many health behaviours are also established during adolescence and follows into adulthood (Mikkila et al., 2004). The significance of the age differences between the groups is due to the possibility of differences in views on physical activity and fruit/vegetable intake between age groups. There is a significant change in physical activity and

fruit/vegetable intake from 11 and 15 years old as discussed earlier in the chapter and behaviours and views are likely to change with age.

### **7.5.3. Material**

A focus group interview manual was developed prior to the group discussions after a review of the literature. The approach was based on the Social Cognitive Theory (Bandura, 1977) and considered knowledge, outcome expectations, facilitators and modelling of physical activity and fruit and vegetable intake. The interview manual included an introductory statement that was read out to the participants (appendix 4d) and then the questions and session plan (appendix 6). The participants were also given a consent/ information sheet with the relevant details about the study, including the researcher's contact details (appendix 5c). A recording device was used to record the group discussions.

The questions discussed focused on perceptions of physical activity and fruit and vegetable intake. To assess the participants' *perceived knowledge* the following questions were included:

- What does physical activity/ healthy eating mean to you? (Perceived knowledge of the terms)
- How much PA/FV is good for you/recommended each day? (Perceived knowledge of the recommended guidelines)

Positive and negative outcome expectations were assessed through including questions such as:

- What are the benefits of physical activity and fruit and vegetable intake?
- What are the costs of physical activity and fruit and vegetable intake?

Perceived facilitators was assessed through including questions such as:

- What would help you to eat well and be physically active?
- How can you make it enjoyable?



Role modelling was assessed through including questions such as:

- Can you think about some that you admire who engages in the behaviour?
- What is the image of someone who does engage in these behaviours? (Role models)
- How would you describe this person?

Questions were asked twice, once for each health behaviour. The completed set of questions can be found in the appendix 6.

#### ***7.5.4. Procedure and ethical considerations***

Following the approval of University of Bedfordshire's research committee, schools in Dubai were contacted and invited to participate in the study and the aim and procedure of the study was explained. The invitation letter sent out to the schools can be found in appendix 5a. Out of three schools, only one school agreed to participate. In the school consent letters, the schools was informed that the participation was completely voluntary and they could withdraw from the study at any time. The researcher contacted the year group leaders of the secondary school who randomly identified classes of students to participate in the group discussions. The school was informed that they would receive information on the findings and results specific to their school, if they wished, after the completion of the research programme.

An invitation letter, describing the aim of the study, including a research consent form was sent out to all pupils in the allocated classes (see appendix 5b). This letter was sent out to the parents from the schools' email address and the parents were asked to print the consent form and return it to school. The researcher's contact details were included in the letter.

The researcher set a suitable time frame for the group discussions, together with the head of year groups. The group discussions took place in October and November 2011. The parental consent forms were sent out to the parents a few days prior to the scheduled interview timings. The researcher approached the classes, while they were waiting for their annual health check-up near the doctor's office, and invited 4-6 participants that showed interest to participate and had the signed parent consent form with them. The students had to hand the parental consent form to the researcher. Written consent to participate was sought from all participants prior to the focus group discussions (appendix 5c). These sheets provided the researcher's contact details and they were encouraged to make contact if they had any questions or concerns. Verbal consent was also obtained from all focus group participants before the group discussions (appendix 5d). Both parents and children were briefed on the study and agreed to participate in the discussion before joining the groups and were informed that their participation would not cause any risk to their psychological wellbeing and health. They were also informed that all information given by them was strictly confidential and anonymous, outside the discussion group and that real names were not used in the analysis, which kept the participants anonymous. They had also been informed that the participation was voluntary and they could withdraw from the study at any time. There was no need for deception, and both parents and participants were briefed on the aim of the study.

The group discussions took place in a school classroom. Participants were allocated into groups according to age and gender and the group discussions (4-6 participants per group) took place in an area in the school near the doctor's office. They were informed that the interviews would be tape-recorded but all information shared was confidential and they could leave the room at any time if they did not wish to continue the discussion. All participants were asked to read and sign the consent/instruction sheet (appendix 5c) and the researcher then

asked facilitated questions to create a discussion on the topic of fruit/vegetable intake and physical activity. Questions concerning views and perceptions of physical activity and healthy eating were discussed in a roundtable format to maximise discussion and interaction. Each group discussion lasted for approximately 30 to 40 minutes. The researcher then thanked participants both verbally at the end. Any questions were also answered. Participants were also encouraged to bring home the consent letter, which included the researcher's contact details. They were encouraged to contact the researcher if they had any additional questions or concerns.

#### ***7.5.5. Data analysis***

Thematic analysis was chosen for data analysis (Braun and Clarke, 2006). This theme centred approach allows for an analysis of the data, without any pre-existing themes and can be either inductive or theory driven (Joffe and Yardley, 2004) which was suitable for this study. This study was theory driven, based on Bandura's Social Cognitive Theory (1977) and looked at knowledge, outcome expectations, facilitators and modelling of physical activity and fruit and vegetable intake. The aim was to see what qualitative research would add to the existing theory based on quantitative research on the topic.

Following the guidelines for conducting thematic analysis by Braun and Clarke (2006), for the first step of the analysis, each transcript was read and reread carefully. Meaningful quotes were then identified and noted. Quotes with the same meaning were clustered together and assigned with a code. All transcripts were then initially coded and a list of different codes was created. All codes were then clustered and organised until only a few remained which were then integrated into themes. The themes were then defined and refined in order to identify what each theme was about. Each theme was then labelled and named.

## 7.6. Results

Nine main themes emerged consistently from the transcripts of eight focus group interviews that were related to adolescents' perceptions of physical activity and healthy eating and encapsulated the thoughts raised by the participants. Each of these main themes analysed and associated sub-themes emerged within each main theme that was linked to it. These findings heavily relied on the narratives within the group interviews, which were conducted to give a deeper insight into the participants' views. In addition to this, any differences in participant perceptions based on gender and age were also noted.

The four main themes for physical activity were identified as: a) 'Knowledge of physical activity', b) 'Impact on health, wellbeing and physical appearance', c) 'Having fun together', and d) 'Important role models'. Furthermore, five themes emerged related to fruit and vegetable intake as part of healthy eating were identified as e) 'Knowledge of healthy eating', f) 'Physical and psychological rewards', g) 'Availability and appearance' and h) 'Sometimes yummy and sometimes yucky' and i) 'Important role models'. The data were further analysed and sub-themes emerged within the main themes. These sub-themes were labelled and discussed separately under each main theme. A summary of themes can be found in appendix 6. Where data allowed, attention was paid to differences linked to gender and age.

### 7.6.2. Main themes of Physical activity

#### *7.6.2.1. Knowledge of physical activity*

This theme was linked to knowledge. Participants' perceptions of the term physical activity and the recommended daily intake were discussed in all the interviews. The data were analysed and the two sub-themes that emerged were: '*Structured and unstructured activities*' and '*Frequency and duration*'.

### *Structured and unstructured activities*

When the participants were asked about their understanding of physical activity, both structured and unstructured activities were mentioned. The majority of the activities that were mentioned during the interviews were however structured and these types of activities were considered by all groups. The structured physical activities were mainly activities such as: Physical Education, team sports (football, basketball etc.), gymnastics, running and jogging. Unstructured activities often included walking, climbing stairs, dancing and playing. One participant talked about physical activity as a way of getting to one place from another. She suggested that physical activity could be: *'walking to places or riding your bike instead of taking the car'* (Female 3, group 5, year 10).

A noticeable difference between males and females and their perceptions of physical activity appeared in the transcribed data. Males defined physical activity as participation in sports and other structured activities to a higher extent than the females.

*Interviewer: Can you think of different ways to be physically active?*

*Male 1: Exercise, like running, jogging and swimming.*

*Male 2: Sports.*

*Male 3: Football, basketball and all kinds of sports.*

(Group 8, Boys year 11)

Unstructured activities were also mentioned by the males, but structured activities such as different types of sports, seemed to be what they initially thought of when they were asked about their perceived understanding of physical activity.

*Male 2: Getting exercise (pause), like running, jogging, stretches...*

*Male 1: Karate!*

*Male 4: Different sports.*

*Interviewer: Anything else?*

*Male 2: Walking up and down the stairs, it's like three floors here!*

*Male 3: Yeah like walking to different places in school.*

*Male 4: You know when you shop in the mall, it's like a kilometre between one shop and the other.*

*(Group 6, year 10)*

Females on the other hand, often mentioned both structured unstructured activities during the discussion of the meaning of physical activity.

*Interviewer: Can you think of different ways to be physically active?*

*Female 1: Sports, dance, PE, running*

*Female 6: Taking the stairs*

*Female 2: Baby sitting*

*Female 3: Music, I guess that's a type of physical activity.*

*Female 5: Just playing around*

*(Group 1, year 8)*

### *Frequency and duration*

The second theme that emerged as a sub-theme of perceptions of physical activity was related to the participants' understanding of recommended physical activity frequency and duration. The recommended guidelines for children and adolescents include 60 minutes of physical activity each day. The participants were asked how long they thought they should be physically active for on a weekly basis and their understanding was often accurate and in line with the recommended guidelines. The majority of the participants thought they should be physically active every day between one and two hours every day. One

participant suggested that the daily recommendations should take into account the type of activity one is engaged in:

*'It depends on the sport you play or whatever you do. Because the easier it is, the longer you can do it for. But if it's hard, like rugby or something you shouldn't do it for too long because then you can sprain your ankle or something.'*

*(Female 5, Girls year 8)*

Not all participants had the impression that they should be physically active on a daily basis. A couple of boys in group two suggested that they should be physically active between three or five days each week (male 3 and 5, group 2, year 8). This was also evident in one of the female discussion groups:

*Interviewer: How often and for how long do you think you need to be physically active for on a weekly basis?*

*Female 4: 3-4 times, for like an hour*

*Female 2: Every day. Half an hour everyday maybe.*

*Female 3: I think every day. For more than one hour.*

*(Group 5, year 10)*

However, the majority of the participants did not have this impression. In contrary, participants' understanding of the daily recommendations were sometimes over-estimated and some participants thought they should be physically active for two hours, or even more, each day.

*Male 1: I say 8 hours!*

*Male 2: 8 hours?*

*Male 1: Well you are awake 14 hours in one day, so you are pretty much moving all the time.*

*Male 2: But you don't have to exercise you can just be moving around.*

*Male 4: And we sit for like 7 hours in school!*

*(Group 6, Boys year 10)*

Overall, the participants had a fairly good understanding of the recommended guidelines, even though some thought that you should only engage in physical activity a few days per week. It is important to mention that it was not always clear what type of activities the participants referred to (unstructured or structured) when they discussed the daily recommendation. However, it can be assumed that many of the participants would have referred to structured physical activities, as this is what many of them had perceived as physical activity as discussed within the previous sub-theme.

#### *7.6.2.2. Impact on health, wellbeing and physical appearance*

The second theme that emerged in the transcribed data were related outcome expectations to the perceived costs and benefits of physical activity.

*Interviewer: What are the positive things about being physically active?*

*Male 1: You become fit. You build up all the muscles in your body that will stand out more and you look fit.*

*Male 4: Yea and maybe that you are not at any risk of getting a heart disease. Like if you are doing exercise you will be healthier and less risk of getting sick.*

*Male 3: and you won't get chubby. You have a good health.*

*(Group 2, Boys year 8)*

The data were further analysed and categorised in to the following sub-themes: 'Physical fitness', 'Improved looks', 'Enjoyment', 'Positive health', 'Pain and injuries' and 'Beyond the limit'. The sub-theme *positive health* was not only



related to outcome expectations, it was related to knowledge as well as it referred to the knowledge of the health benefits related to the behaviours.

### *Physical fitness*

The most frequently mentioned sub-theme related to the benefits of physical activity was fitness and the phrases *'build up stamina'*, *'become fit'*, *'good shape'* and *'better in sports'* were frequently mentioned across all ages and genders.

One participant said:

*'Yea and you get better in PE and stuff. You will be better at that sport as you are physically active and you get bigger stamina.'*

*(Female 3, Group 3, year 9)*

In the discussion on the physical fitness related benefits of physical activity, this appeared to be the most important sub-theme. Some of the participants in the male discussion groups thought these benefits were perceived as positive, especially since it was likely to influence their performance while playing team sports. One boy explained:

*'If there are different teams and you have to be really fit to play on the team then it is really good if you are fit. You will get on the team that you really want. And you keep doing the sport you want.'*

*(Male 4, Group 4, year 9)*

### *Improved looks*

Concerns about looks and weight were also a common sub-theme that emerged within the data and it became evident that improved looks and weight management was perceived as important benefits of physical activity. Females perceived weight control as a benefit more often than the males however, this

theme was apparent across both males and females. Improved looks were also related to weight loss among the females, to a higher extent than among the males. Some of the participants explained:

*'It stops you from becoming overweight. Not that you have to be completely skinny at this age but at least you don't get over weight.'*

*(Female 2, Group 7 year 11)*

*'If you do sports and stay physically active you will be skinnier, happier and yes exactly your muscles stay in shape and you look fit.'*

*(Female 3, Group 5 year 10)*

*'It helps you as a person sort of. It helps you body wise. It makes it a lot better. It helps socially because you will be more attractive body wise than if you are large.'*

*(Male 2, Group 8 year 11)*

### *Enjoyment*

After the sub-themes *'Physical fitness'* and *'Improved looks'*, *'Enjoyment'* appeared to be a common perceived benefit of physical activity. Participants often used the phrases *'It's fun'* and *'I really like it'* to describe the benefits of physical activity. This theme also reoccurred as a common motivational factor to participate in physical activity and will be discussed further below under the theme *'Having fun together'*.

### *Positive health*

The fourth most common sub-theme related to the benefits of physical activity was related to positive impacts on physical health such as: reduced risk of getting sick, good health and being healthy. One boy said:

*'Yea and maybe that you are not at any risk of getting a heart disease. Like if you are doing exercise you will be healthier and at less risk of getting sick.'*

*(Male 4. Group 2 Year 8)*

Mental health benefits were also mentioned, such as happiness, feeling fresh and good:

*'You feel happy and good about yourself and you don't feel bad or lazy.'*

*(Female 3, Group 5 Year 10)*

The perceived mental and physical benefits of physical activity were mentioned more frequently as a benefit only, but that did not seem to act as a motivator of physical activity. However, fitness, enjoyment and improved physical appearance were all mentioned as both benefits and motivators of physical activity.

#### *Beyond the limit*

Related to the costs of physical activity, the sub-theme 'beyond the limit' emerged from the transcribed data. This referred to the participants perceptions about the risks of '*pushing yourself too hard*' and '*over doing it*' during physical activity after they were asked about the negative things related to physical activity. Participants frequently mentioned that physical activity can make you tired and you work too hard. '*Lose energy*', '*getting dizzy*' and '*faint*' were phrases discussed during the interviews. One girl even said: '*You can die*' (Female 1, group 1 year 8), however this was not supported by the others in the group. Another girl in the same group explained:

*'Like my sister she was trying to do 20 laps in 1 day without a break and then she nearly fainted in the pool*

*shower thing. So the bad thing is if you work too hard then you can faint.'*

*(Female 5, group 1 year 8)*

The discussion continued:

*Female 6: Also if you push yourself too hard it can get bad and you start going on a strict diet.*

*Female 1: and you wear clothes that make you look thinner, and it can affect more than just your health.*

*Female 6: Like you can get an eating disorder.*

*(Group 1, year 8)*

The perception of the risk of overdoing it was mentioned within all groups, among both males and females across all ages but was discussed more detailed in the youngest groups (11 and 12 year olds). One boy said:

*'It could be if you are exercising too much and eat small portions of food. Maybe you eat just lunch and dinner and not breakfast. And then you exercise every day then you can start getting dizzy.'*

*(Male 1, Group 2 year 8)*

### *Pains and injuries*

Another sub-theme that emerged was labelled 'pains and injuries' and was mentioned as another perceived cost of physical activity. The participants often suggested that physical activity could lead to injuries and cause pain and achy muscles.

*Interviewer: What are the negative things about being physically active?*

*Female 3: If you overdo it it's unhealthy.*

*Female 4: If you overdo it you can stretch muscles or you can faint.*

*Female 1: If you do something and you are not really use to it then you can get hurt.*

*(Group 7, year 11)*

*Male 1: Your muscles become aching and it can really hurt. Sometimes if you do exercise and it can go wrong your limbs can start aching and it can take really long to get fixed.*

*Male 3: Like you are going to be sore the next day.*

*(Group 4, Year 9)*

Some students also mentioned that they disliked physical activity and struggled to find time to be physically active. However, these perceptions were not emerged as a theme as it was not mentioned frequently across the data in comparison to the previously mentioned sub-themes.

#### *7.6.2.3. Having fun together*

The theme 'having fun together' was a common main theme that arose in all the interviews, often as motivators of physical activity. This theme was related to perceived facilitators of physical activity. The data showed that it was important to like a physical activity and also that the participants enjoyed being physically active together with friends. One boy explained:

*'Don't keep trying new stuff, it's better to do something that you like and are used to do. You got to choose something and concentrate on that fully.'*

*(Male 6, Group 8 year 11)*

Being part of a team and doing physical activity together with friends appeared to be an important motivator for physical activity and a major reason for feeling enjoyment in a physical activity. This theme appeared across the data, within all ages and genders. Many of the participants perceived socialisation as an important factor that would increase their participation in physical activities.

*Interviewer: What would motivate you to be physically active more often?*

*Female 6: Maybe if you were put in to classes or something. Because I wouldn't tell myself that I want to run today or so but if my friends would do it would become a routine.*

*Female 1: Yea then you have committed to do it so it becomes a routine. Then you would enjoy it more.*

*(Group 7, year 11)*

Enjoyment appeared as a sub-theme in relation to the benefits of physical activity and was also mentioned frequently when participants were asked about the motivating factors related to physical activity. The data showed that participants would feel motivated to be physically active if they did something they enjoyed and were interested in.

*Interviewer: What would motivate you to be physically active?*

*Male 3: If you do something you are interested in.*

*Male 6: It depends on what you like. If a guy likes a sport he will do it. If he likes videogame he will he will sit there and do that.*

*Male 1: Like if you do it with your friends and do something you are interested in.*

*(Group 8, year 11)*

*Male 2: Maybe if you try something different and you like it.*

*Male 1: When you exercise with your friends.*

*Male 4: and you do something that you really like.*

*Male 3: yea something you are interested in.*

*(Group 2, year 8)*

Factors that would influence enjoyment if physical activity was doing something you like and are interested in, like favourite sports, play based physical activity and activities that were free choice. Participants were also asked how they could make physical activity fun and one boy in year 8 answered: *'If you do sports that you like to do. And if you do it with people that you like'* (Group 2). A couple of girls said:

*Female 2: Well it's so much better if you do something you like.*

*Female 3: With people you like!*

*(Group 5, Year 10)*

It was also suggested that socialisation could also make an un-preferred activity enjoyable as one girl explained: *'Maybe doing something you don't like but you can do it with a group of friends and it will be more fun'* (Group 3, year 9). The data clearly showed that enjoyment and socialisation together, acted as a strong motivator for physical activity, across age and gender.

#### *7.6.2.4. Important role models*

'Important role models' was related to role modelling of physical activity. This theme also appeared in the data on fruit and vegetable intake and will be presented in the second part of the result section. The participants were asked

to mention a physically active person that they admire and in relation to role modelling of physical activity, three sub-themes emerged: *'My family'*, *'Male athletes'* and *'Reasons for admiration'*. Friends and teachers (PE) were also briefly mentioned in the data but not as frequent as family and sports stars.

### *My family*

The most powerful sub-theme that emerged in the data of all the group discussions on role modelling was *'My family'*. Both immediate family and extended family often acted as role models for physical activity. The most frequently mention role models were parents (mothers appeared slightly more frequent than fathers), siblings, grandparents, aunts and uncles. Family members appeared to act as role models throughout the data across both gender and age. However, the female discussion groups mentioned family role models to a greater extent than the males – almost twice as often. All female groups and three out of four of the male groups discussed family as role models. There appeared to be no gender differences between role models within their families, and both the female and male participants talked about female and male family members.

*'My grandmother. Because she is 64 but she can still run laps. And she had 4 kids!'*

*(Female 6, Group 1, Year 8)*

*'Hmm I would say my little brother. He always moves and plays a lot with his friends. He runs a lot and is always moving around.'*

*(Male 2, Group 2, Year 8)*

*'My brother because he is doing stuff like basketball and he gets really stuck on it. He also do other stuff like ping*



*pong but he is really stuck on basketball. He goes to every match and when he is up there he works really, really hard even if he gets really tired. The next one is my grandmother because she is 62 and you know the Tour of France, the bicycle tournament when they go round and round. Well she wasn't in the competition but she was right behind them and cycling with them even if she wasn't in the competition.'*

*(Female 3, Group 1, Year 8)*

*'Both my parents. They exercise almost every day.'*

*(Female 1, Group 3, Year 9)*

*'My granddad wakes up early in the morning and walks. He lives in an apartment complex and he walks really far.'*

*(Female 5, Group 7, Year 11)*

*'My grandpa, he is old but he still plays sports and he always exercises. He used to be in the army. Also my aunt. She likes to walk a lot. (Laughter) She likes to walk a lot. (Laughter)'*

*(Male 4, Group 8, Year 11)*

### *Male athletes*

Not only family members appeared as important role models for the participants. Football, basketball and other sports players were frequently mentioned as role models across the transcribed data. It is important to mention that all of these sports stars were male, not one single female sports star was mentioned. However, sports stars were sometimes mentioned without

specifying their gender: *'Yea probably like the big tennis players'* (Female 6, Group 7 Year 11).

Some of the male sports stars that were mentioned as role models were: Roger Federer (one boy said *'Federer is really good and he is fit'* – Male 3, Group 2 year 8), Cristiano Ronaldo (football), Mohammed Ali (boxing) and Kobe Bryant (basketball). The participants did not always agree on each other's choices, and it is likely that the preferences for a team or specific person influenced that:

*Interviewer: Can you think about a person that you admire that is physically active?*

*Male 1: Cristiano Ronaldo*

*Male 2: Nooooo*

*Male 1: Of course he is fit.*

*Male 4: and Wayne Rooney*

*Male 3: Is Wayne Rooney physically active?*

*Male 4: Of course he is!*

*Male 3: He is fat!*

*Male 4: He is NOT fat*

*Male 3: He is, he is*

*Male 4: That doesn't make any sense!*

*Male 3: All the Man U players are so ugly.*

*(Males, Group 6 year 10)*

A majority of the participants that perceived male sports stars as role models were male. The male groups discussed male sports stars as role models more than thrice as often as the female groups. Specific male sports stars were only mentioned by females as role models in group number 5. These two were football players: Cristiano Ronaldo and Fernando Torres. When the girls were asked to describe why they liked them, they answered giggling: *'He is fit'* (Female 5) and *'He looks good'* (Female 1).

### *Reasons for admiration*

This sub-theme emerged through the participants' descriptions of their role models. The participants were asked to explain the reasons for admiring the people they mentioned as role models. These two boys had said that they admired a boxer and rugby players and this is how they described them:

*Interviewer: Why do you like the people you mentioned?*

*Male 6: They are willing to try new stuff. And they keep working hard.*

*Male 1: and they teach you sort of inspiration. It's great to have someone that can always keep you going. That can motivate you.*

*(Group 8, Year 11)*

The main reasons explained were often related to physical fitness, lifestyle routines, physical and mental health. The role models were often described as fit, good stamina, energized and to be in good shape. These descriptors were used between family members and sports stars. Sports stars were often described the following way:

*Interviewer: Why do you like the people you just mentioned?*

*Male 2: Because they can keep going for a long time without collapsing.*

*Male 3: Stamina*

*Male 4: They are really fit. They give all they have for a really long time,*

*Male 2: Ronaldo for example: he is in really good shape with good stamina.*

*(Group 2, Year 8)*

*Male 4: because they are good at the game and they are fit.*

*Male 2: Yea*

*Male 1: and they can play for hours.*

*(Group 4, Year 9)*

*Male 1: They are good at what they do.*

*Male 3: They are cool!*

*Male 1: Yea*

*Male 2: They are good example for people who need to exercise.*

*Male 4: Yea, yea, yea they are good to look up to.*

*(Group 6, Year 10)*

Family role models were often admired for routines related to their healthy life styles and the participants often thought it very good that they prioritised physical activity in their daily lives and was physically active on a regular basis.

*'Before we moved to Dubai, my mum and my dad always smoked. They were really unfit and they really had problems doing stuff (laughter) and then when we moved here my mum and my dad started playing golf. I think it's good that they changed their lives.'*

*(Male 4, Group 4, Year 9)*

*'My mum she likes exercises every morning, and I admire that because in the morning I don't feel like doing anything. (Laughing). She has willpower to do it!'*

*(Female 1, Group 5, year 9)*

The participant often described family role models as being strong-minded, hardworking, and determinant. They also often had the perception that these mentioned people valued their own health. They also showed enjoyment and interest in specific physical activities, which also were considered as something positive.

*Female 2: My brother, even if he gets injuries he just keeps going and he has such a passion for it. And he never gets tired of it, they are always practicing and they never give up.*

*Female 5: My mum always tries really hard. Even if she gets discouraged she keeps trying and doesn't give up. She basically does anything to keep her family happy.*

*Female 3: My grandma has this motto that we may not live forever but I want to live as long as we can. That's why she walks and jogs and stuff.*

*Female 1: Because they are strong, don't give up and have a lot of fun. They enjoy it.*

*Female 3: Yea same they don't give up at all. Even when it's really, really hard with my grandma she really push it and does it anyway.*

*Female 4: If they can't make it one day, they try the next day, and try again and again until they make it right.*

*Female 5: And if they are in a race or something they just keep going and going even if they are really tired. They just keep going until the end.*

*(Group 1, Year 8)*

These participants repeatedly admired the role models for 'not giving up'. Clearly, what they described was that they had a lot of respect for these role models' willpower to continue participating in physical activities.

### ***7.6.3. Main themes of fruit and vegetable intake:***

The themes that emerged from the data on fruit and vegetable intake were identified as 'Knowledge of healthy eating', 'Physical and psychological rewards', 'Availability and appearance', 'Sometimes yummy and sometimes yucky' and 'Important role models'. Sub-themes also emerged within the data and these will be discussed below.

#### *7.6.3.1. Knowledge of healthy eating*

Participants' perceptions of healthy eating and the recommended fruit and vegetable intake were discussed in all the interviews and this could be related to knowledge. Two sub-themes emerged within this theme: '*Everything in moderation*' and '*Weekly intake*'.

#### *Everything in moderation*

The participants were asked to define healthy eating by asking them what they should eat or not eat to stay healthy. The most common phrases to describe this were: a balanced diet and everything in moderation.

*Male 3: A balanced diet.*

*Male 4: Like you eat foods from different food groups.*

*Male 2: Yes a good amount from each.*

*(Group 2, year 8)*

*Male 4: Eat a balanced diet.*

*Male 5: A good amount of carbohydrates, protein, fat and vegetables.*

*Male 6: Vitamins*

*Male 3: Eat based on the food pyramid.*

*(Group 7, year 11)*

However, it appeared to be some gender differences in the participants' perceptions about healthy eating. The perception of healthy eating as eating a balanced diet emerged in all male discussion groups, apart from one (group 8) and only in one of the female discussion groups (group 7). Eating a balanced diet was mentioned twice as often in the male group discussions in comparison to the female group discussions.

Healthy and unhealthy foods were sometimes considered together and a diet including different foods in moderation contributing to a balance was valued.

*Male 1: You should skip Mc Donald's*

*Male 4: No carbs.*

*Male 3: No junk food*

*Male 2: No, you have to eat balanced. You can't just quit bad food all together.*

*Male 4: Yes you can!*

*Male 2: You should eat vegetables, meat, protein...*

*Male 1: Yea you actually need a bit of everything.*

*(Group 6, year 10)*

All the group participants associated healthy eating with the exclusion of unhealthy foods. Avoiding 'junk food' was a common perception of healthy eating, both among males and females in all the groups. The importance of being physically active was also considered:

*Interviewer: What are the positive things about being physically active?*

*Female 4: Erm... I guess you can eat anything.*

*(Laughing)*

*Female 1: yea like cake!*

*(Group 7, Year 11)*

Another boy explained:

*'If you go to the mall to get junk food, it all really depends on if you should work it off by doing the exercises you do. Because if you do exercise it's going to burn off really quick.'*

*(Male 3, Group 4 year 9)*

While the male groups discussed the importance of a balanced diet, the female groups tended to describe healthy eating in more detail with reference to eating fruit and vegetables and cutting down on fats, sugar and carbohydrates.

*Female 4: Not too many sweets.*

*Female 5: Yea exactly*

*Female 1: and not too many carbs or junk food*

*Female 2: Fat*

*Female 5: You should eat like vegetables and fruit every day.*

*(Group 7, Year 10)*

All female groups often considered eating more fruits and vegetables as part of a healthy diet, twice as often as the male groups considered it.

### *Weekly intake*

The transcribed data from the focus group interviews showed that the participants had a poor understanding of the recommended guidelines of daily



fruit and vegetable intake. Eating 5 portions of fruit and vegetables daily was only mentioned twice in the female discussion groups and not at all among the males. The participants both overestimated and underestimated the recommended daily intake.

*Interviewer: How much fruit and vegetable do you think you should eat on a weekly basis and how often?*

*Male 4: I'm not sure...*

*Male 1: Erm I think you should eat it every day. Maybe 2-3 times per day.*

*Male 3: Yea I think so too.*

*Male 2: As much as you can, with every meal maybe.*

*(Group 2, year 8)*

*Female 1: Every day it should be about 6.*

*Female 4: I think you should eat 5 to 8 servings per day because you have breakfast, snack, lunch, snack and dinner.*

*Female 6: I think that every day you should have a bowl of fruits and vegetables and eat it.*

*(Group 1, year 8)*

Some of the female participants in group 1 seemed to have received different messages regarding the recommended fruit and vegetable intake from teachers. They explained:

*Female 2: I have a teacher who said that we should have 6 to 9 servings per day, I don't know how to do that.*

*Laughter*

*Female 3: Our science teacher said 2 to 4 servings of vegetables and 3 to 5 servings of fruit.*

*(Group 1, year 8)*

A few participants (both males and females) also stated that they did not know how much and how often they should eat fruit and vegetables on a daily basis, which further indicated that the participants' knowledge about the recommended guidelines, were low.

#### *7.6.3.2. Physical and psychological rewards*

Another main theme that emerged in the transcribed data were related to the benefits of fruit and vegetable intake. The data were further analysed and the following sub-theme emerged: 'An apple a day keeps the doctor away' (related to knowledge and perceived outcome expectations), and 'Impacts on physical appearance' (related to outcome expectations).

#### *An apple a day keeps the doctor away*

When the interviewer asked about the benefits of eating fruit and vegetables one boy answered: '*An apple a day, keeps the doctor away!*' (Male 6, Group 8 year 11). This recognised expression described the participants' perceptions of fruit and vegetable intake very well: as beneficial for health and wellbeing. This appeared as a common understanding throughout the interviews:

*Interviewer: What are the positive things about eating fruit and vegetables?*

*Male 4: That you get healthy.*

*Male 2: Mostly that than you don't eat unhealthy food. It's like easy to eat and it makes you feel good too.*

*Male 4: You feel good about yourself and you get more energy. It sometimes tastes good too.*

*(Group 2, year 8)*

Fruit and vegetable intake was often associated with a positive impact on physical health and maintaining a diet, which includes plenty of fruits and vegetables, was often described as good for health and reduce the risks of getting sick.

*Interviewer: What are the good things about eating fruit and vegetables?*

*Male 2: You don't get diabetes.*

*Male 1: Or you got a lower chance of getting diabetes.*

*(laughter)*

*Male 4: You don't get sick so often.*

*(Group 6, Year 10)*

Fruit and vegetable intake was described as 'good for you' and 'healthy' (female 6, Group 7, year 11). Another female described it as 'strong' (Female 2, Group 7, year 11). Fruits and vegetables were also perceived as a high vitamin food:

*'It's better to eat that than sweets. It's good for you and has a lot of vitamins.'*

*(Female 1, Group 3 year 9)*

The participants also seemed to value family members that ate plenty of fruit and vegetables, as it would lower the risk of them falling ill. It appeared to be important to the participants that their family looked after themselves and valued their own health:

*Male 4: It's good that they eat healthy so they don't get any disease.*

*Male 2: yes they will stay healthy.*

*Male 1: Because if they do get a disease we get in to trouble. Good that they think about their health.*

*Male 3: Yea it's good to be healthy.*

*(Group 2, Year 8)*

The positive impact of fruit and vegetable intake on physical health would often be described as a benefit of fruit and vegetable intake; however it would not necessarily act as a motivator to actually eat more. Other factors such as taste played a particularly important. One boy said: *'It is very, very healthy to eat but sometimes it will taste ugly'* (Male 2, Group 2 year 8.) The enjoyment of fruit and vegetable intake will be further discussed under the theme 'Yummy or yucky' below.

#### *Improved looks*

The sub-theme 'Improved looks' that emerged in the data of physical activity, also emerged in the data of healthy eating. Many of the females also acknowledged the impact fruit and vegetables would have on their physical appearance:

*Interviewer: What are the positive things about eating fruit and vegetables?*

*Female 2: Good skin*

*Female 5: Beauty. Best thing is not having to eat gum after.*

*Female 1: You don't get over weight.*

*(Group 1, Year 8)*

This sub-theme mainly emerged in the data from the female focus group discussions. All the female groups brought up physical appearance as a benefit of fruit and vegetable intake however; this was only mentioned in one out of four male focus group discussions. The concerns mentioned by females were mainly weight related. One girl said:

*'This would definitely make you eat more fruits and vegetables: Imagine yourself as you are going obese and then tell yourself you're not going obese. And you will eat more healthy.'*

*(Female 2, Group 1, year 8)*

Another girl explained:

*'Sometimes when you are ugly, it's better to eat a vegetable than a sweet as that can make you gain weight.'*

It was clear that weight concerns were an important motivator for fruit and vegetable intake. The same girl later continued discussing weight concerns. She explained why she looked up to two of her family members for eating healthy:

*'My mum never wants to eat sweet because she says that than you will gain weight. My aunt eats really healthy. It's good that they are careful with their weight and don't want to get fat. My auntie lost a lot of weight before.'*

*(Female 3, Group 3 year 9)*

#### *7.6.3.3. Sometimes yummy, sometimes yucky*

A theme related to perceived facilitators of fruit and vegetable intake that emerged from the data were related to the participants' perceptions of the taste of fruits and vegetables. The participants often stated that taste and enjoyment was an important benefit and motivator to fruit and vegetable intake. If they liked the taste, they were more likely to eat it. However, taste also appeared as a perceived cost of intake and if they disliked the taste they were less likely to eat it.

*Female 1: It's not always nice to eat either and there are tastier things to eat.*

*Female 3: Some fruits are really nice.*

*(Group 3, year 9)*

Participants often reported that they enjoyed eating certain types of fruits and vegetables and disliked others.

*'Some vegetables are nice. Some aren't. I like broccoli'*

*(Female 5, Group 7, year 11)*

*'Some things are easier to eat. Like apples are a lot easier to eat than pickles. Depends on what you like but it all doesn't taste good.'*

*(Male 1, Group 8, year 11)*

Taste acted as an important motivator to fruits and vegetable intake. Taste was an important influencer when the participants were asked what would help them to eat more fruits and vegetables. One boy said: *'If you like it then you will eat more'* (Male 3, Group 2, and year 8).

Participants in both the female and male discussion groups talked about fruit and vegetables as *boring, taste bad, not likable and difficult to eat*. One participant described it like this:

*'I'm just saying it's really hard to eat vegetables, it's really hard. I need to eat meat and don't like vegetables that much.'*

*(Male 4, Group 8, year 11)*

It was recognised that fruits and vegetables were often not a preferred option among participants' food preferences even though it were considered as healthy. One boy explained: *'Fruits are not as good as a chocolate bar'* (Male 1, Group 4,

year 9) and taste was often more important than healthfulness even if the tasty food was considered unhealthy.

*Interviewer: What are the negative things about eating fruit and vegetables?*

*Female 5: Well you don't always like it!*

*Female 3: If you have fruit next to a chocolate, I would not choose the fruit! (Laughter)*

*Female 4: Fruits are not that yummy*

*Female 5: Healthy food is not that yummy.*

*(Group 5, year 10)*

*Female 6: Erm it's not always nice.*

*Female 5: Sometimes it's easier and more tempting just to buy a yummy muffin. Depends on how you feel that day.*

*(Group 7, Year 11)*

Participants were more likely to eat fruits and vegetables if they enjoyed the taste. One of the focused questions for the interviews was therefore related to how to make fruit and vegetables enjoyable. The participants had some good ideas and suggested different ways to make it more enjoyable.

*Interviewer: So how can you make fruit and vegetables enjoyable?*

*Female 5: To eat stuff you like.*

*Female 6: Make it more fun and make something out of it like in the oven, or smoothie or so.*

*Female 2: Yea eat it with dark chocolate.*

*Female 5: But eat fruit and vegetables you like and if you don't like it eat it with something that you do like. Like with pasta.*

*(Group 1, year 8)*

*Female 6: It's always good to make fresh juices.*

*Female 5: Yes that is really nice.*

*Female 2: You can also put some nice spices on vegetables so it will taste really nice.*

*Female 4: My sister likes to cook apples in the oven and eat it with condensed milk. It tastes so yummy.*

*(Group 7, Year 11)*

*Male 5: Eat them in a way you like them.*

*Male 6: Yea and you can choose to eat the ones you like.*

*Like I like apples and oranges but I don't like water melons.*

*Male 2: Yes exactly.*

*(Group 8, year 11)*

The participants suggested making fruits enjoyable by making smoothies, fruit salads and juices. Fruits and vegetables could be mixed with something enjoyable and cooked in a desirable way to make it more likeable.

Even if it was not related to taste, it can be valuable to note that a couple of participants suggested other ways to make fruit and vegetable intake enjoyable. A few participants suggested the use of positive reinforcement strategies to increase fruit and vegetable intake among children. Two boys explained:

*'First you eat something that you don't like but it's good for you. And you get something, like a prize or something.'*

*(Male 1, Group 2, Year 8)*



*'You can reward them for eating fruit and vegetables.  
Like say you can do this if you eat this.'*

*(Male 2, Group 6, year 10)*

Another participant reported that she had experienced the use reward systems in relation to fruit and vegetable intake. This system seemed to be successful with a smaller child in kindergarten:

*'My little sister, last year she had this unit about food that is healthy and they had to inspect their food to see what they keep in their lunch boxes. Then if it is healthy they give you medals or whatever. For about 2 weeks when my mum asked what she wants in her lunch box and she would always say I want fruit and vegetables. But then when the unit was over she wanted chocolate!'*

*(Female 4, Group 1, Year 8)*

#### *7.6.3.4. Availability and appearance*

The availability and appearance of fruits and vegetables also emerged as a theme related to perceived facilitators of fruit and vegetable intake and this seemed to have an important impact on intake.

Having a good and appealing selection of fruits and vegetables available to student in school appeared to be important. The price of healthy and unhealthy foods was also mentioned:

*Male 4: They have the fruit thingy in the cafeteria but it's not very good.*

*Male 3: If it would be more fresh you would like to eat it more. Like fruit salad that looks fresh.*

*Male 1: They probably charge 4 dirhams for an apple its stupid.*

*Male 4: Greasy things like burgers and that are pretty cheap but when it comes to healthy eating that is way more expensive.*

*Male 3: Apples are so expensive in the supermarket.*

*(Group 6, Year 10)*

Some of the participants (all males) also suggested that if they had no other options than fruits and vegetables then they would have to eat it. One boy explained: *'Only buy fruit. Then you have to eat it. Don't buy anything else'* (Male 4, Group 6, Year 10). Another boy suggested: *'Maybe if there are no other options? Then you have to eat it.'* (Male 2, Group 2, Year 8).

One girl thought it would be a good idea to be reminded in school to eat fruit and vegetables. She said: *'I always forget, so maybe a reminder, if you have a huge poster to say 'Don't forget to eat!'* (Female 6, Group 1, year 8). Another boy also suggested that it would be beneficial to introduce fruit and vegetable breaks in school. He said:

*'So at 9 o'clock you have a break for eating vegetables then again another break at 12 o'clock, in school.'*

*(Male 3, Group 6, year 10)*

#### *7.6.3.5. Important role models*

Role modelling appeared to be an important theme for fruit and vegetable intake and healthy eating in the transcribed data. This was divided into three sub-themes: *'Female members of the family'*, *'Celebrities'* and *'Reasons for admiration'*.

### *Female family members*

Female family members as role models for healthy eating emerged as a common sub-theme. Family members over all were mentioned frequently but specifically females (mum, sister and aunt) appeared more often than males.

*Male 4: My parents eat a lot of healthy food. They mix them up and they eat a lot of vegetables. They rarely eat something that is unhealthy.*

*Male 2: Yea my parents too. They eat a lot of healthy food, especially my mum.*

*(Group 2, year 8)*

*Interviewer: Can you think about a person that you admire that eats healthy?*

*Female 1: My mum.*

*Female 2: My sister and my cousin.*

*Female 3: My mum and my auntie*

*(Group 3, year 9)*

All groups mentioned female family members as role models for healthy eating. All the groups talked about mothers as role models but mothers were mentioned twice as much in the male groups, in comparison to the female groups.

*'My mum! You should see the bread she eats, you can't even class it as bread, it's black. And we never have white bread at home.'*

*(Male 1, Group 6, year 10)*

*'My mum. She always eats good food. And she drags me a long with it!'*

*(Female 6, Group 7, Year 11)*

*'I would say my mum's best friend. She's always like I'm not going to eat that. She doesn't give up. She's like I'm going to lose weight I have to eat healthy. Before she was overweight and now she lost so much weight and looks perfect.'*

*(Female 4, Group 5, Year 10)*

### *Celebrities*

Famous people (actresses, singers and sports stars) also appeared as a sub-theme for role modelling, even though these were not as commonly mentioned as family members. Sports stars were mentioned as role models in the male discussion groups and female singers and actresses were more frequently mentioned in the female discussion groups.

*'I would say J.Lo. She doesn't eat unhealthy food and eat a good diet but sometimes she indulges herself and enjoys it.'*

*(Female 5, Group 1, year 8)*

*'A guy called Novak Djokovic he went on a gluten free diet for some time and he is really strict with what he eats. It really paid off with him.'*

*(Male 5, Group 8, year 11)*

*'If I'm thinking of a celebrity it would be Demi Lovoto. She went to rehab or something because she was overweight and now she is trying to work out more, eat more to be healthier.'*

*(Female 3, Group 3, year 9)*

Being skinny was not always perceived as something positive. Some females highlighted that it was important to enjoy food but also to eat a healthy diet.

*Female 5: There are a lot of skinny actresses.*

*Female 3: Yea but I wouldn't say I admire them they are always dieting.*

*Female 5: Yea I don't want to eat like that you got to enjoy food but eat healthy.*

*Female 3: no that is right*

*(Group 5, year 10)*

#### *Reasons for admiration*

The third sub-theme in this category was related to the physical, psychological and social descriptions of the participants' role models for healthy eating.

*Interviewer: Why do you like the people you just mentioned? How would you describe them?*

*Female 4: They stick to it and eat healthy.*

*Female 6: Willpower*

*Female 1: They are good looking and healthy.*

*Female 2: Yeah healthy and have a strong mind to say no to unhealthy food.*

*(Group 1, year 8)*

These descriptors were mainly related to lifestyle factors and these people were often positively described as healthy, avoiding temptations, health conscious etc. These reasons were also very similar to the theme that emerged in relation to role modelling and physical activity.

*'With my mum she always is conscious of what she eats and tries to be really healthy. I think that is important.'*

*(Male 4, Group 8, year 11)*

*'Because every time we want to eat something unhealthy she says no we shouldn't eat that it is not healthy. Even though she orders junk food she tries to order something more healthy.'*

*(Female 1, Group 3, year 9)*

The participants often described their perceived role models as 'mentally strong' for being able to stick to their plans and avoid temptations. They often described them as 'strong minded' and 'having willpower'.

*'With my sister because she can say no to junk food which is quite hard'*

*(Male 9, Group 4, year 9)*

*'If you want to do that much for your career I admire that.'*

*(Male 6, Group 8, year 11)*

*'Yea they have a strong mind and can avoid temptations.'*

*(Male 5, Group 8, year 11)*

Physical attributes in relation to healthy eating, such as weight management was also a reason for admiration. This theme appeared more frequently in the transcribed data from the female group interviews. In fact, weight concerns were not mentioned at all as a reason for admiration among the male groups.

*'My mum never wants to eat sweets because she says that then you will gain weight. My aunt eats really*

*healthy. It's good that they are careful with their weight and don't want to get fat. My auntie lost a lot of weight before.'*

*(Female 3, Group 3, Year 9)*

*'A lot of celebrities that eat healthy look good. Well they have to so they look good for their roles.'*

*(Female 2, Group 7, Year 11)*

## **7.7. Discussion**

Study 3 expanded on some of the findings from Study 1 and explored adolescents' knowledge, perceived influencers and outcome expectations of physical activity and healthy eating. Drawing from psychological theories, the aim was to gain a better understanding of physical activity and healthy eating in children by exploring the factors that influence secondary school children's intention and behaviour of physical activity and fruit and healthy eating from a qualitative perspective. Semi-structured focus group interviews were carried out with 40 secondary school children between the ages of 11 and 15 years in a school in Dubai, United Arab Emirates. The qualitative data from the focus group discussions were analysed using a thematic approach (Braun and Clarke, 2006). This data showed that there were many factors that influenced children's physical activity and health eating habits, including personal, cognitive and social influences. This study mainly drew from the Social Cognitive Theory (Bandura, 1986) and considered Knowledge, Outcome expectations, Facilitators and Social influences. Social influences (socialisation, modelling and support) acted as a particularly strong influence on both physical activity and fruit and vegetable intake. Enjoyment of activity and foods was also a strong and reoccurring influencer on both health behaviours. Furthermore, a reflexive analysis was conducted to consider the effects of the researcher's own feelings and behaviour on the collection and analysis of the data (see appendix 8).

### **7.7.1. Knowledge**

*Knowledge of physical activity* was the first main theme that emerged in the data. This was related to the participants' understanding of physical activity and included two sub-themes: *Structured and unstructured activity* and *Frequency and duration*. These themes were both related to Knowledge of physical activity. Physical activity was often associated with structured sports activities, mainly reported by the male participants. This finding is supported by research by Mulvihill et al. (2000). However, there was also some understanding of physical



activity as activities in less structured and informal settings, especially in the female interviews.

The theme *Knowledge of healthy eating* showed that the participants' perceptions of healthy eating included fruits and vegetables and less junk food. *Everything in moderation* appeared as a sub-theme and was commonly mentioned, especially among the males. The participants fully grasped the concept of moderation and often referred to a diet containing mainly healthy foods and balanced it out with physical activity. It was okay to sometimes eat unhealthy food as long as it was not too often or too much. Fielden et al (2011) supported this finding.

This study also looked at adolescents understanding of the recommendations of daily physical activity and fruit and vegetable intake. There was an overall good understanding of recommendations of physical activity and often in line with the current recommendations of 60 minutes per day for adolescents and children (World Health Organization, 2011). In contrast to previous findings (Robertson and Marvin, 2011; Rawlins et al., 2012; Letona et al., 2013) which suggested that children and adolescents have an understanding of daily physical activity as less than the recommendation. The participants in this study often thought they should be active for one hour or more each day. However, in regards to fruit and vegetables, there was a general lack of understanding of the recommended guidelines in both males and females. This is in line with previous studies (Herbert et al., 2010; Krolner et al., 2011).

Even though knowledge alone is insufficient to behaviour change (Howard, 1988) it is important that children know what is good for them and why. Furthermore, it is important for researchers and health promoters to have the knowledge on how children understand physical activity, healthy eating and the recommended guidelines. In order to enhance diet and activity levels it is important that

children know what is good for them and what they need to do to stay healthy. Some children may for example think they simply eat healthy because they do not eat chocolate. There is a need to study this further and knowing how children think about food choices will further our understanding of the gap between nutrition knowledge and dietary behaviours. It is important however, to target other factors in addition to knowledge in physical activity and healthy eating interventions. People do need skills and knowledge to perform an action but it is crucial to also consider other factors such as motivation and self-efficacy (Bandura, 1986).

Furthermore, it is particularly important when using self-reporting measures for children to have an equal understanding of the terminology. Some children may only consider structured exercise such as sports as physical activity. If they don't participate in any sports and being asked a question about their past physical activity they may report it as zero, even though they help with chores, play on a trampoline and do other types of unstructured physical activity throughout the day. Or a child may think that he eats no vegetables for dinner without realising it is served cooked and pureed in a stew. Or that potatoes are part of his recommended five portions of fruit and vegetables and therefore counts a bag of potato crisps as a portion of vegetables. Researchers therefore need to explain what counts as physical activity and a healthy diet to effectively screen, measure and communicate these behaviours to children. This had already been considered for Study 1 and 2 in the current research programme. For these studies, participants were given examples of types of physical activities and portions of fruits and vegetables before completing any self-reported measures.

### **7.7.2. Outcome expectations**

*Outcome expectations* refer to the perceived costs and benefits of health behaviours and are a person's expectations of the consequence (outcome) of the

behaviour (Bandura, 2004). A number of the emerging themes were related to this.

The theme *Impact on health, wellbeing and physical appearance emerged* in the data, which suggested that, physical (fitness, health and appearance) and mental (enjoyment) health outcomes were commonly identified as benefits of physical activity. The sub-themes related to the benefits of physical activity were: *Physical Fitness, Positive health, Enjoyment and Improved looks*. Physical fitness was perceived as the strongest benefit of physical activity and the participants, both males and females across all age groups, expressed physical fitness as benefit of physical activity. Physical activity would also lead to improved physical health and reduce the risk of ill health. The participants also thought that physical activity will lead to weight loss and improved looks. These findings were supported by several studies (Belanger et al., 2011; Gavin et al., 2013; Inchley et al., 2008; Loman et al., 2008; Mulvihill et al., 2000 and Tegerson and King, 2002).

Knowledge and evaluation of the behavioural outcomes are key determinants of behaviour according to the Social Cognitive Theory (Bandura, 1986) and the Theory of Planned Behaviour (Ajzen, 1991). The results clearly indicated that the participating adolescents had a fairly good understanding of the benefits of physical activity. So is it beneficial to provide adolescents with information about the benefits of physical activity, as they already seem to be aware of the benefits? It can be suggested that in addition to providing (or reminding) adolescents about the benefits of physical activity, it would also be important to consider other factors in order to increase motivation for physical activity. Shephard et al. (2001) suggested that providing information is necessarily, but not enough.

Bandura (1997) acknowledged that while positive outcome expectations can serve to motivate behaviours, unrealistic outcome expectations can be

detrimental to behaviour maintenance when the expected benefits are not realised or do not occur in the expected time frame. So for example if a person does not see immediate effects of physical activity on physical appearance, the motivation to continue can decrease. It was therefore also positive to see that the participants often mentioned feelings of enjoyment as a positive outcome of physical activity as this outcome could be achieved more immediate. Immediate rewards are important for adolescents (Galvan, 2013), and research has shown that adolescents have an increased preference for immediate (short-term) gratification compared to adults. The increased perception of rewards is due to increasing development of sub-cortical areas of the brain causes adolescents to seek short-term reward instead of long-term reward (Galvan, 2013). This could explain why *Positive health* as an outcome was less common as a theme in comparison to physical fitness and enjoyment.

The costs of physical activity were often perceived as negative health outcomes such as exhaustion, pains and injuries and emerged as the sub-themes: *Pains and injuries* and *Beyond the limit*. These findings were fairly surprising and not in line with previous researchers (Cockburn and Clarke, 2002; Musaiger et al., 2012; O’Dea et al., 2003 and Tegerson and King, 2002) who found that time restraints, boredom, and negative feelings about self were reported as costs of physical activity. Constantinou, Manson and Silverman (2009) studied females’ perceptions of what constitutes a safe environment and what constitutes a safe sport and found that they often were scared to get hurt or injured when taking part in ‘boyish’ sports. Martin (2002) also found that students of low of average ability were concerned about safety and avoiding injuries during PE lessons. It would be interesting to study the negative outcome expectations further from a qualitative perspective, as these outcomes could be likely to act as barriers to physical activity.

The theme *Physical and psychological rewards* was linked to the perceived benefits of fruit and vegetable intake. The sub-theme *An apple a day keeps the doctor away* was related to positive impacts on health (reduce risk of illness, increased wellbeing and staying healthy). *Improved looks* reappeared as a sub-theme as the participants reported weight control and improved physical appearance as benefits to fruit and vegetable intake. The findings are supported by research by Herbert et al. (2010).

The findings showed that it is important to consider positive health outcomes, such as improved health, fitness and physical appearance, in order to motivate children to engage in physical activity and fruit and vegetable intake. Social outcomes and self-evaluative outcomes of physical activity and fruit and vegetable intake also appeared to act as important facilitators. Study 3 did not specifically look at the participants' intentions to engage in physical activity and fruit and vegetable intake. It would have been interesting to see whether the different outcomes (such as improved looks, enjoyment and positive health) had different effects on behavioural intentions. One way to study this could be to be more specific when asking participants about their perceived behavioural outcomes. So instead of just asking whether they thought that "doing 60 minutes of physical activity each day would be good for me", it could be useful to word the questions more specific such as: "*I think that doing 60 minutes of physical activity each day would improve my physical appearance*". This would then give us an idea whether different behavioural outcomes have different effects on behavioural intentions.

### 7.7.3. Facilitators

The theme *Having fun together* emerged as a strong facilitator of physical activity and highlighted the importance of enjoyment and socialization. Enjoyment is an intrinsic reward, which also appeared to be a positive outcome of physical activity. The participants often valued joyful physical activities

together with friends as also suggested by previous studies (Allender et al., 2006; Prochanska and Taylor, 2001; Biddle et al., 2005; Brooks and Magnusson, 2007; Cox et al., 2006). Adolescents spend a significant part of their time at school together with their friends and peer relationships play a significant role in their lives (Sawka et al., 2013). According to Sawka et al. (2013), several mechanisms can explain the processes of social socialisation in this age group, including behavioural modelling, peer pressure, social norms. For the present study, socialisation acted as a strong behavioural reinforcer and therefore appeared to be an important facilitator of physical activity, linked to enjoyment. Physical activity provides opportunities for enjoyment and social interactions in adolescents. These are therefore very important factors to consider for future interventions and studies. It should therefore be recommended that physical activity interventions should focus on enjoyment and socialisation in order to be as successful as possible.

*'Availability and appearance'* was a small main theme that emerged in the data on fruit and vegetable intake. Positive views of the availability, appearance and presentation of fruits and vegetables was reported as a motivator of intake. It was important to the participants to have a good and appealing selection of fruits and vegetables available to them, especially in school. This supported the findings of several studies (Krolner et al., 2011; McKinley et al., 2005; Stevenson et al., 2007; Neumark-Sztainer et al., 1999). Appealing ways of serving fruits and vegetables should be available to children both at home and in school.

The theme *Sometimes yummy and sometimes yucky* was linked to the enjoyment of fruits and vegetables occurred frequently across the data. Liking the taste acted as a motivator and disliking the taste acted as both a cost and barrier to intake. This is in line with a number of previous studies that also found that taste played an important role in fruit and vegetable intake (Stevenson et al.2007; Neumark-Sztainer, Story, Perry and Casey (1999); Zeinstra et al., 2007; Wind et

al., 2007; Krolner et al., 2011). Providing adolescents with wide variety of appealing, tasty and nutritious fruits and vegetables, served in different ways, would be an important strategy to improve fruits and vegetables within this age group.

Self-evaluative outcomes, in terms of enjoyment, appeared to be an important facilitator of both physical activity and fruit and vegetable intake and should be considered in intervention research. Based on this finding, future efforts should emphasise on enjoyment of both physical activity and healthy food choices. Enjoyment is a type of intrinsic motivation (Deci and Ryan ,1985). According to Deci and Ryan (1985), when people are intrinsically motivated, they perform an action with full willingness, which is accompanied by a feeling of volition. This type of motivation has been a strong predictor of health enhancing behaviours among adolescents (Lally and Gardner, 2013). Future research should study the direct influence of enjoyment and socialisation as facilitators of physical activity and healthy eating, on behavioural intentions. It would be interested to measure intrinsic motivation (enjoyment) as a predicting factor of behavioural intentions from a quantitative perspective, by perhaps adding it to the Theory of Planned Behaviour.

#### **7.7.4. Role modelling**

This study considered role modelling and the sub-themes *My family* and *Male athletes* emerged under the theme *Important role models*. Family and male sports stars appeared as important role models for physical activity as previously suggested by researchers (Fielden et al., 2011 and Payne et al., 2003). The participants often perceived role models as healthy, fit and strong minded. Family, both immediate and extended family was frequently mentioned in the interviews.

The data showed gender differences in role modelling and males often considered male sports stars as role models whereas females considered family members as role models. Males often admired male sports stars such as basketball and football players. This finding was backed up by research by Payne et al (2003) and Fielden et al. (2011). Female sports stars were not mentioned at all during the interviews, either by males and females. The lack of female sports stars as role models for females has been linked to femininity and Cockburn and Clarke (2002) and Dwyer et al. (2006) found that female sports stars were not considered as feminine. It would be interesting to study this further and also to take this into consideration for intervention research. .

In regards to fruit and vegetable intake, female family members appeared as important role models for both females and males in the data. Family overall was important but in particular females such as mothers, sisters, aunts etc. This supports Cullen et al.'s (2000) study, which showed that social role modelling by parents, especially through mothers appeared to be an important facilitator of healthy eating. Previous research has also supported the importance of family members as role models (Molainson et al., 2005 and Brug et al., 2008) and there is a relationship between family parents' lifestyles and that of their children in terms of their activity levels and what they eat (Rasmussen et al., 2006). The findings for the present study provide a good rationale for encouraging family members, not only parents, to model healthy behaviours and maintain a healthy lifestyle. Celebrities (athletes, actresses and singers) were also reported as social role models, but not as often as family members. Male participants more often referred to sports stars and females to actresses as role models for healthy eating. This can be an important ingredient for health promotion among adolescents.

For physical activity and healthy eating, the given reasons for admiring the mentioned people were often related to physical appearance (mainly reported



by females), physical and mental strengths. The participants often said that they admired their role models' willpower to perform and maintain the behaviours. They often described this as a very important and admirable factor and it is likely that this has a positive impact on their own behavioural intentions. It is important to note that the Social Learning Theory explains that people can learn new information without demonstrating new behaviours (Bandura, 1997). It would therefore be interesting to study the influence of role modelling on behavioural intentions in adolescents.

Family member's modelling of physical activity and healthy eating had a positive influence on the participants. The participants often admired family members for their self-control and self-efficacy in relation to physical activity and healthy eating. It was however not evident if the modelling of these cognitions could possibly enhance self-efficacy and control in the participants in the same way it is assumed by the Social Learning Theory (Bandura, 1986), that the modelling of health behaviours will influence health behaviours. Mental strengths (perceived behavioural control or self-efficacy) were a reason for admiration of role models of both physical activity and healthy eating. It was particularly interesting to find that the participants admired behavioural control and willingness to be physically active and eat healthy. As the results from Study 1 showed, control was a predictor of behavioural intentions for both physical activity and fruit and vegetables intake and has been linked as a facilitator to physical activity (Robbins, Pender, Ronis and Pis, 2004) and fruit and vegetable intake (Thompson et al., 2007) in previous studies. Kumar (2014) found that low levels of self control (self-efficacy) among high school students, influenced their healthy eating habits and they had also experienced more temptation to eat unhealthy and found they found it difficult not to do so. Based on these findings, interventions to increase self-efficacy should be implemented and hence hopefully improve physical activity and healthy eating intentions and behaviour among adolescents. It could be particularly fruitful to use role models who

demonstrate high levels of self-control toward the health behaviour as an intervention technique.

#### ***7.7.5. Limitations and practical implications of Study 3***

Although Study 3 provided valuable data concerning determinants for physical activity and healthy eating in secondary school students, there were several limitations to Study 3.

One limitation was concerning the chosen sample method for the focus groups. Convenience sampling is a time and cost effective method, which enables the researcher to achieve the required sample size in a relatively fast and inexpensive way. This was particularly convenient for the present study as not much time was allocated for the students to participate in the group discussions. Participants were not chosen or random, they volunteered to participate, which could mean that the sample is unlikely to be representative of the population being studied (Price, 2013). Future studies should adopt a chosen or random sample method in order to achieve a representative sample. Another limitation was that past behaviour and behavioural intentions were not considered during the focus groups discussions. It is likely that this would have influenced the participants' thoughts, opinions and responses. Future studies should consider this and perhaps look for differences between children that are participating or not participating in the studied health behaviours. It would also be fruitful to specifically target Emirati participants. This would allow for a better understanding of behavioural influences in adolescents in the United Arab Emirates. It would not only be interesting to study the role of role modelling in children that are physically inactive, but also to study their knowledge, perceived facilitators and outcome expectations of physical activity and healthy eating behaviours. This kind of information would be useful for future health promotion programmes aimed at enhancing healthy eating and physical activity in school children in the United Arab Emirates.

Even though focus group allows for greater openness and interaction in participants' responses, it is also important to consider individual dominance (Vaughn, Schumm and Sinagub, 1996). Individual dominance can skew the themes derived from the focus group discussions. The moderator also ensured to encourage all participants to contribute to the discussions, which may have encouraged silent individuals to speak within the group (Smithson, 2000). The focus groups were homogeneous in terms of gender and age, which would have helped to reduce incidents of dominance (Smithson, 2000). Even though the moderator was able to facilitate equal participation as much as possible to ensure that the findings were representative of the study sample, she had no previous experience in conducting interviews, which may at times have altered the phrasing of questions compared to an experienced interviewer.

It is also possible that some of the participants felt inhibited in their expressions and feelings by the other participants in the group and therefore did not feel completely comfortable to share their true thoughts (Smithson, 2000). This was unlikely to have occurred in the present study as the focus groups did not reflect on any sensitive content and the moderator was also successful in creating a friendly and permissive atmosphere in all group discussions and all participants' seemed happy to contribute to the discussions. The focus groups seemed to engage the participants in the topic of healthy eating and physical activity. It would therefore perhaps to be useful for future studies to combine focus group discussions with intervention activities. As previously discussed in Study 2, it may be efficient for intervention activities to be completed in smaller structured groups to assure that the participant truly understand the activity and complete it in the correct way.

A major limitation with the present study was that barriers to physical activity and healthy eating was not directly considered during the focus groups interviews even though the topic was touched on through some of the other questions. The question regarding barriers were mistakenly excluded from the list of focus group questions where designed. It would have been fruitful to have this information and behavioural barriers should definitively be considered for future studies, especially in the Gulf region where a limited number of studies have addressed this. It would have been interesting to see if the participants living in this region of the world perceived barriers to physical activity and healthy eating in a similar way than children in Western countries. These differences could perhaps be geographical between colder and warmer climates. Henry et al. (2004) discussed that the weather in countries such as United Arab Emirates with exceptionally high summer temperatures, with temperatures reaching over 45 °C often makes people stay indoors and avoid even light physical activity. It is important to study this in future research as such knowledge is useful for intervention and health promotion planning, as it might be used to identify seasonal appropriate activities that can be targeted for the promotion of physical activity all year long.

#### **7.7.6. Conclusion**

Study 3 has offered a valuable approach of adolescents' views and thoughts about physical activity and healthy eating, which can be of great importance when planning interventions promoting physical activity and healthy eating. Social factors (support, modelling and socialisation), enjoyment, wellbeing and physical appearance appeared as important influences of physical activity and this should be considered in future interventions for these specific age groups. The importance of social influences is in line with the findings from Study 1 which indicated that social norms were successful predictors of physical activity and fruit and vegetable intake. The findings on role models confirmed Bandura's (1977) theory of modelling as an important factor in influencing health

behaviours. Despite the potential limitations of the focus group design, this study revealed valuable data concerning the influencing factors of physical activity and healthy eating in secondary school students in the United Arab Emirates. Future focus group research should also target the Emirati population and include the testing of interventions aimed at enhancing physical activity and healthy eating habits.

## **Chapter 8 - Final discussion and Future directions**

This final chapter provides an overview of chapters two to seven of the current research programme, bringing together findings from Study 1, Study 2 and Study 3. Strengths and weaknesses of the studies and overall research programme are addressed and implications based on the findings to the field of health psychology and recommendations for future research are provided.

### **8.1. Overview of the current research programme**

Childhood obesity has become a major concern all over the world and obesity in both adults and children is rising at an alarming rate. Among adolescents in the United Arab Emirates, 28 percent of males and 40 percent of females were overweight or obese (Ng et al., 2012). Although there is a genetic component to obesity, poor lifestyle choices appear to be the major cause (Chouquet and Meyre, 2011). The development of physical activity and healthy eating habits significantly reduce the risk of obesity and related ill health (Chaput et al., 2011). Even though obesity has become a serious concern in the Middle East; there is a clear gap of missing obesity related research and prevention programmes from this part of the world. The current research programme is one of the first of its kind to be conducted among adolescents in the United Arab Emirates, which makes it unique. Up to date, there is a limited amount of research to determine the motivate children to engage in obesity preventative behaviours such as health eating and physical activity.

The overall aim of this research programme was therefore to investigate the factors that may influence adolescents' intentions and actions of physical activity and fruit and vegetable intake from a psychological perspective. The research was conducted in private schools in Dubai, United Arab Emirates. To be able to

gain as much insight into the problem as possible, a mixed research methodology combining both qualitative and quantitative approaches, was employed. This type of research method can be very effective in the study of children's health behaviours and the combination of these designs holds the ability to provide better and more in-depth answers to research questions (Gorard and Makopolou, 2012).

The current research programme was comprised of three parts studying the psychological determinants of physical activity and fruit and vegetable intake in children from three angles, using cross-sectional, intervention and focus group research designs. Study 1 (chapter 5), studied the influencing factors of physical activity and fruit and vegetable intake using the constructs from the Theory of Planned Behaviour (Ajzen, 1991) and Prototype/Willingness model (Gibbons and Gerrard, 1998). The Theory of Planned Behaviour has been widely used in health psychology to successfully predict a wide range of health behaviours including physical activity (Armitage, 2005; Hagger et al., 2007) and fruit and vegetable intake (Gratton et al, 2007; Povey et al., 2000). Many health behaviours are both public and social and adolescents therefore have clear images of what they think of a person that engages in a particular behaviour (Gibbons and Gerrard, 1995). As adolescents seem to be highly image-conscious, these images (prototypes) have a significant impact on their own behaviours (Gratton et al, 2007). Study 1 studied the influence of the constructs from the Theory of Planned Behaviour and Prototype/Willingness model, to see whether prototype perceptions could add to the Theory of Planned Behaviour in predicting intentions and actual behaviour.

This then led on to Study 2 (chapter 6), where two interventions, based on prototype perceptions and action planning, were tested to see whether it enhanced actual behaviour, behavioural intentions and health cognitions (attitudes, perceived behavioural control, subjective norms and prototype

perceptions). Implementation intentions (Gollwitzer, 1993) is a technique that involves planning and rehearsal of goal pursuit and have been shown to be successful in promoting health related behaviour change (Gollwitzer, 1999). The second intervention was a novel ingredient to intervention research using the prototype perception construct from Study 1 and the Prototype/Willingness model, based on research by Chater et al. (2007). Study 3 extended from Study 1 and studied the influencing factors of physical activity and fruit and vegetable intake from qualitative perspective. This study was outlined in chapter 7 and drew from the Theory of Planned Behaviour, Prototype/Willingness model and Social Cognitive Theory (Bandura, 1986), to gain a better understanding of physical activity and healthy eating in children by exploring the factors that may influence their intentions and actions through semi-structured focus group interviews. The findings of each of the studies are summarised below.

## **8.2. Summary of findings, practical implications and future research**

The current study programme considered physical activity and fruit and vegetable intake among adolescents in the United Arab Emirates. Only 20.4 percent of the participants in Study 1 met the recommended guidelines of physical activity and reported that they were physically active for 60 minutes daily over the past week. This is lower than figures by the World Health Organization who found that 27 percent of adolescents in the United Arab Emirates were physically active for 60 minutes. This figure was even lower for fruit and vegetable intake where only 16.4 percent met the guidelines of 5 portions of fruit and vegetables over the past week. Previous research by Fikri and Al Matrosuhi (2005) found that 21 percent of adolescents (13-15 years) in the United Arab Emirates ate five or more portions of fruits and vegetables daily. This indicates the importance of promoting these behaviours in the United Arab Emirates.



The current research programme presented a number of interesting findings. These will be discussed below together with a number of implications for future research.

### **8.2.1. Study 1**

The first objective of this study was to examine how well components from the Theory of Planned Behaviour (attitudes, subjective norms and perceived behavioural control) and Prototype/Willingness Model (Prototype evaluation and similarity) predicted physical activity and fruit and vegetable intentions and behaviour after controlling for parental experiences, age and gender. The second objective of this study was to examine whether variables from the Prototype/Willingness Model increased the prediction of intentions and behaviour, after variables from the Theory of Planned Behaviour after gender, age and parental influences had been taken into account. The third objective was to determine whether any of the influencing factors were moderated by age and gender. Study 1 employed a semi-longitudinal using self-reported questionnaires to assess whether constructs from the Theory of Planned Behaviour (attitudes, perceived behavioural control and subjective norms) and Prototype/Willingness Model (prototype evaluation and similarity) predicted physical activity and fruit and vegetable intake after controlling gender, age and parental behaviour in N=536 secondary school children in Dubai.

Path analysis indicated that attitudes, subjective norms and perceived behavioural control predicted behavioural intentions for both physical activity and fruit and vegetable intake. The data also showed that behavioural intentions were strong predictors of actual behaviour. Perceived behavioural control did not predict behaviour directly, but indirectly through intentions. The Theory of Planned Behaviour successfully predicted behavioural intentions. The model accounted for 35.5 percent of the variance of physical activity behavioural intentions and 45.6 percent of the variance of fruit and vegetable behavioural

intentions. This supports the findings of meta-analytic reviews to support the theory's prediction of behavioural intentions (Armitage and Conner, 2001). Armitage and Conner (2001) evaluated the efficacy of the Theory of Planned Behaviour for predicting intention and behaviour by including 185 studies in their review. They found that attitude, subjective norm, and perceived behavioural control accounted for 39% of the variance in behavioural intention and 27% of the variance in behaviour. The findings for the current findings showed that the Theory of Planned Behaviour accounted for 17.9 percent of the variance of physical activity and 19.6 percent of the variance of fruit and vegetable intake. Surprisingly, subjective norms were a strong predictor of behavioural intentions and also predicted physical activity behaviour directly. The role of subjective norms was particularly interesting. Subjective norms have often appeared to be the weakest predictor of behavioural intentions and actual behaviour than did attitudes and perceived behavioural control when studied in young people (Hagger et al., 2002; Ravis and Sheeran, 2003). These findings support previous research by Alselaimi (2010). Alselaimi (2010) found that subjective norms predicted both behavioural intentions and physical activity in Saudi-Arabian secondary school and university students and explained that this may be due to differences between collectivistic and individualistic culture. This may also be the case for the findings of the current findings. Hagger et al. (2007) proposed a hypothesis that subjective norm relationships with behavioural intentions were more important in collectivistic cultures than in individualistic cultures. It would be important to study this further in Middle-Eastern samples.

Hierarchical regression analysis showed that the Prototype/Willingness Model enhanced the prediction of behavioural intentions by 2.6 percent for physical activity and by 2.9 percent for fruit and vegetable intake. Out of the two prototype perception constructs, prototype similarity (based on descriptive norms) appeared to be the strongest predictor of behavioural intentions. This is in line with previous research by Ravis et al. (2006). It was interesting to find that

prototype similarity also enhanced the prediction of actual fruit and vegetable intake. The full models, including the Theory of Planned behaviour constructs, Prototype perceptions, gender, age and parental behaviour, accounted for 35.3 percent of the variance of behavioural intentions for physical activity and 45.6 percent of the variance of behavioural intentions for fruit and vegetable intake. 18.7 percent of the variance of physical activity was explained by the full model, with parental behaviour, subjective norms and behavioural intentions being significant predictors of physical activity. 22.4 percent of the variance of fruit and vegetable intake was explained by the full model and parental behaviour, subjective norms, prototype similarity and behavioural intentions being the significant predicting factors of fruit and vegetable intake.

Study 1 also presented some gender and age differences. In line with Bromley et al. (2005) and Pate et al. (2007), males reported significantly higher behavioural intentions to participate in physical activity, in comparison to females. Intentions and behaviour decreased with age, supporting research by Whitehead and Biddle (2000). This decrease could perhaps be explained by significant decreases of physical activity attitudes and perceived behavioural control with increased age. A weak but significant decrease in prototype similarity was also found with age. No age differences were found in children's behavioural intentions or actual behaviour of fruit and vegetable intake and there was a weak but significant decrease of prototype similarity with increased age. There was a strong significant difference between males and females in behavioural intention and with females having higher intentions to eat 5 portions of fruits and vegetables each day comparing to males. Females also reported higher scores of subjective norms, a finding that is in line with research by Munoz-Silva (2007).

Based on these findings, it was suggested that components from the Prototype/Willingness Model would be a valuable extension of the Theory of Planned Behaviour, especially when targeting young people. Prototype similarity

appeared to be particularly important in predicting behavioural intentions and children with higher perceived similarity to the prototype demonstrated higher behavioural intentions. It was also interesting to find that prototype similarity enhanced the prediction of fruit and vegetable intake. The findings of Study 1 are in line with previous research by Ravis et al. (2006). Ravis et al. (2006) encouraged the use of positive health images for future interventions in order to attempt to enhance perceived similarity to these images. They suggested that it could be useful to target prototype similarity by including comparison of a specific individual that represents the healthy prototype. It would be interesting to study this further. Prototype similarity can perhaps be targeted in interventions by exposing children to positive images of people engaging in positive behaviours. This would, according to Ravis et al. (2006) encourage them to associate themselves with the image and hopefully influence behaviour.

Study 1 support the theory of adding Prototype perception components (particularly prototype similarity) to the Theory of Planned behaviour when predicting health behaviour intentions in adolescents. The overall model accounted for large amount of the variance in predicting behavioural intentions, in line with research by Ravis et al. (2006). Although these effect sizes are impressive (especially the findings from the Theory of Planned Behaviour), the models leave a substantial proportion of the variance in intentions to be explained. To address this gap, an interventional approach was taken on in Study 2, using implementation intentions (Gollwitzer, 1993) as an attempt to support intentions to turn into actions and also prototype perceptions to enhance adolescents' positive health images. Future research should continue study the role of prototype perceptions in adolescents' health enhancing behaviours, as majority of research using the Prototype/Willingness Model have focused on health risky behaviours (Gerrard et al., 2005; Lazura et al., 2011; Ravis et al., 2006).

### **8.2.2. Study 2**

Study 2 was outlined in chapter 6 and employed a longitudinal research examining the effectiveness of two interventions: an action planning intervention and an image intervention on physical activity and fruit and vegetable intake. 120 secondary school students took part in the study and the participants received an action planning intervention, an image intervention or a control intervention.

Findings from MANOVA analyses appeared to be similar for physical activity and fruit and vegetable intake and revealed no significant intervention effect on intentions or behaviour. Some significant intervention effects were seen on health cognitions across time points and conditions. The action planning intervention appeared to have a significant but weak effect on subjective norms across time points, which was rather interesting. It is unclear why the action planning intervention enhanced subjective norms but it can be assumed that the participants talked about their plans with significant others such as friends and family members after it was completed and was given positive feedback. However this is just an assumption and should be further studied. Discussion action plans with significant others may have positive effects on health cognitions, intentions and behaviour.

The image intervention showed a significant effect on prototype evaluation across time points and conditions. The image intervention appeared to successfully enhance participants' image of a person who participates in physical activity and fruit and vegetable intake. However, the intervention did not alter prototype similarity. Findings from Study 1 showed that Prototype similarity influenced behavioural intentions to a greater extent than prototype evaluation, which may explain why the image intervention did not have an influence on behaviour. Future interventions should therefore target prototype similarity based on descriptive norms to enhance health behaviours. Based on the findings

from Study 1 and Study 2, it is therefore suggested to target prototype similarity by including comparison of a specific individual that represents the healthy prototype. This type of intervention was also recommended by Rivas et al. (2007).

Further research is needed in order to test the effectiveness of interventions targeting social images and implementation intentions. As previously discussed in chapter 6, it would perhaps be effective to combine an action planning intervention with a motivational intervention. Previous research has shown that the formation of implementation intentions successfully increased behaviour in participants with high intentions (De Vet, 2009). Taking participants' level of motivation in to account could be useful by only using implementation intentions with people with strong intentions. However, this may only be possible in controlled settings such as individual or group counselling sessions. A combined intervention, starting with a motivational intervention (aimed at increasing intentions), followed by an implementation intentions intervention (aimed at turning the intentions into actions) may be the most feasible approach. This type of intervention has successfully been implemented in the past (Gratton et al., 2007; Kellar and Abraham et al, 2003; Prestwich et al., 2005) and would perhaps be more successful than directly targeting implementation intentions.

### **8.2.3. Study 3**

Outlined in chapter 5, Study 3 drew from Study 1 and the first objective of this study was to in-depth explore individual, social and psychological influences of physical activity and healthy eating by conducting focus group interviews, using a theory driven thematic analysis approach (Braun and Clarke, 2006). The second objective was to evaluate socio-cognitive theoretical concepts drawing on the Social-cognitive theory (Bandura, 1986), Theory of Planned Behaviour (Ajzen, 1991) and Prototype/Willingness model, to better understand adolescents' perceptions of physical activity and healthy eating. The social-cognitive theory

has been widely used in health psychology research and health promotion. It considers elements that according to Bandura (2004) greatly determine behaviour change, including: outcome expectations, goal setting, perceived self-efficacy, knowledge, perceived facilitation and perceived impediments. The combination of these elements was considered in Study 3 and guided focus group discussions, combined with the constructs from the Theory of Planned Behaviour and Prototype perceptions.

Participants perceptions of knowledge, outcome expectations, facilitators, social modelling of physical activity and fruit were studied from a qualitative research design and gathered through eight semi-structured focus group interviews with secondary school children. Eight main themes emerged in the analysed data. These themes were linked to some of the elements that greatly determine behaviour change in the Social Cognitive Theory (Bandura, 2004): *outcome expectations, modelling, knowledge and perceived facilitators*. Four themes emerged from the data on physical activity. *'Knowledge of physical activity'* referred to children's understanding and knowledge about physical activity in general. Physical activity was often referred to as structured sports, especially among males. The participants had a good overall understanding about the recommended guidelines of daily physical activity and estimated that they should engage in physical activity on a daily basis. The theme *'Impacts on health, wellbeing and physical appearance'* referred to children's expectations of the outcomes of physical activity. The positive outcomes included improved fitness and physical appearance, physical and psychological health benefits and feelings of enjoyment. Negative perceived outcomes referred to the risk of pains, injuries and overdoing physical activities. Enjoyment and socialisation appeared to be an important facilitator of physical activity through the theme *'Having fun together'*. The children also highlighted family members as *'Important role models'* of physical activity. It was particularly interesting to find that males were more

likely to consider male athletes as role models in comparison to females. Female athletes were not mentioned at all during the interviews.

Four themes emerged from the data of healthy eating. The *'Knowledge of healthy eating'* theme showed that children considered healthy eating as a balanced diet containing increased fruits and vegetables and decreased junk food. There appeared to be a lack of understanding of the recommended guidelines of fruits and vegetable intake and children often overestimated or underestimated the recommended intake. *'Physical and psychological rewards'* of physical activity was mainly related to positive impacts on health, as well as approved physical appearance. Taste of fruits and vegetables appeared to play an important role and acted both as a facilitator and barrier to children's intake and was discussed under the theme *'Sometimes yummy and sometimes yucky'*. Availability, both at home and in school was also highlighted in the group discussions. Female family members appeared as the most important role model of fruit and vegetable intake for both males and females under the theme *'Important role models'*.

The findings of Study 3 have a number of practical and research implications that needs to be considered. Knowledge, outcome expectations, facilitators, perceived self-efficacy and role modelling are particularly important. The combination of these elements can greatly determine behaviour change, according to the Social Cognitive Theory (Bandura, 2004).

In regards to knowledge, the findings of Study 1 enhanced our understanding of children's understanding of physical activity, healthy eating and the recommended guidelines. Even though knowledge alone is insufficient to behaviour change (Howard, 1988), it is important that children know what is good for them and why they need to do it in order to enhance health behaviours. Furthermore, it is significant for researchers and health promoters to have the



knowledge on how children understand physical activity, healthy eating and the recommended guidelines. For future research, in order for children to have an equal understanding of the terminology it is recommended to give children information of what counts as physical activity and portions of fruit and vegetables before completing any self-reported measures.

In regards to outcome expectations and facilitating factors, the result of this study showed that physical, social and self-evaluative outcomes appeared to be important in children's physical activity and fruit and vegetable intake. This is in line with the Social-cognitive theory (Bandura, 2004) and should be taken into account for future intervention research. The positive effects of physical activity and fruit and vegetable intake on physical health (such as improved fitness, health and physical appearance) should be emphasised. Self-evaluative outcomes such as enjoyment appeared to be a powerful motivator and should be considered for future initiatives. Finally, social outcomes appeared to be important. Physical activity often provided opportunities for social interaction and approval, which was valued by the participants. Making physical activity fun is key and children should be encouraged to participate in enjoyable activities, ideally incorporating socialisation.

Physical activity and healthy eating starts with parents, according to the present findings and this was also in line with the findings from Study 1. Findings indicated that a role model does not have to be a celebrity and the most important role models appear to be close family members. The findings on gender differences in role modelling for physical activity were rather interesting and should be considered for future intervention and research. According to this, male athletes act as good role models for males, however not for females. Targeting physically active family members, as role models for both males and females may also be useful in order to enhance children's physical activity and healthy eating. Interventions targeting female family members as effective role

models for fruit and vegetable intake could be potentially successful. Efforts to involve parents and other family members should therefore be components of future interventions.

### **8.3. Strengths and limitations of the current research programme**

A number of possible limitations with the current research programme need to be addressed. Some of these limitations referred to the whole programme, others to specific studies only.

A limitation of the research programme was to do with the time frame of the studies, especially Study 1 and Study 2. Data for each of these studies were collected around the same time. It would have been a lot better to complete Study 1, analyse and interpret its data, to then base the interventions for Study 2 on the findings from Study 1. As the results from Study 1 indicated that prototype similarity was a particularly powerful influencer of behavioural intentions, the image intervention could perhaps have been based on prototype similarity, instead of prototype evaluation. The intervention could perhaps have involved exposing children to positive images of people engaging in positive behaviours and induce comparison with these people.

The participants' body mass index was not taken into account for the current research programme. This has previously been considered as a possible predictor of health cognitions, intentions and behaviour (Fila and Smith, 2006; Gerrits et al., 2010) and it would have been good to consider this. All three studies may have concluded with stronger significant findings if body mass index would have been considered for each participant. However, the participating schools did not want to take part in this. It has also been suggested that screening and evaluation of body mass index for at school can be more harmful than beneficial, especially to individuals who are overweight due to weight stigmatizing and the feeling of being classified according to weight also appears to have psychological

and behavioural impacts on students within the school setting (Kalich et al., 2008; Reinold et al., 2009). Measures of self-reported height and weight could instead have been included, especially for the older participants as these types of measures have been shown to be reliable (Gerrits et al., 2010).

The researcher did not gain access to conduct the research within local government schools which difficulty to get access to the Emirati population and this is an issue that needs future investigation. Having a larger sample of Emirati participants would have presented a more accurate picture of the study variables within this population. Approximately 10 percent of the overall sample was Emirati and it would be useful for future studies to conduct this type of research in government schools where all the students are Emirati nationals (KHDA, 2015). However, it is important to point out that the sample showed an accurate representation of the population of Dubai, where the population structure is built up with a population where 11 percent being local Emiratis and 89 percent being expatriates of varying nationalities (Ministry of foreign affairs, 2014). The ethnic and socio-economic background of the participants was also not considered for the current research programme, which is a major limitation. Future studies should take these factors into account as differences in health behaviour have been reported between ethnic (Brodersen et al., 2007) and socio-economic groups (Wardle et al., 2003).

It is also important to acknowledge study specific limitations. Study 1 referred to measurements of parental behaviour. There was only one item in the questionnaire that measured parental behaviour by asking the participants '*How often does your mum, dad or other caregiver engage in (behaviour)?*'. Parental behaviour should have been separated in to maternal and paternal behaviour in order to get a clearer picture of actual behaviour as this can vary between mothers, fathers and other caregivers (Chater et al., 2007). Measures of peer and sibling behaviour could also have been considered as the findings of Study 3

showed this to be important. Future studies should consider these measures. A major limitation also appeared to be that past behaviour was not considered properly and could not be controlled for in Study 1. Instead only recent behaviour was measured (behaviour over the past week). Past behaviour have shown to influences current behaviour (Armitage and Conner, 2001; Hagger, Chatzisarantis and Biddle, 2002a). Bargh (1994) explained that health behaviours performed on a regular basis becomes a habit and not much planning is therefore involved. Habits are based on so called *automatic processes*, which are a type of a self-regulatory process that turns new health behaviours in to habitual behaviours and are formed through regular repetition of a behaviour (Bargh, 1994). Future studies should measure past behaviour to control for habitual effects by asking the participants about their behaviour over the past 6 months.

Study 2 only assessed actual behaviour over a longer period (6 months). All other variables were only measured over a period of 7 days. Measuring data over a longer period of time would perhaps discover changes that would allow the researchers to draw more firm conclusions on effective relationships. In regards to the interventions for Study 2, it could not be assured if the intervention activities were performed correctly. This is referred to as implementation fidelity and refers to the degree to which an intervention or programme is delivered as intended (Carroll et al., 2007). It would therefore be more effective to conduct the interventions in smaller groups so the researcher can intervene and support the participants when needed and this should be considered for future research. Researchers using implementation intentions have suggested that it is more effective for implementation intentions to be formed in smaller structured groups to avoid the risk of plans being ambiguous or unrealistic (Gratton et al., 2007; Kellar and Abraham et al, 2003; Prestwich et al., 2005).

Study 1 and Study 2 used self-reported measures for behavioural data. The use of self-report data may be limited and therefore problematic. Data may be limited due to individual recall and accuracy. Understanding of the questions may vary between participants. Participants are also likely to interpret rating scales differently (Krossnick and Pressner, 2010). It would have therefore been more useful to rely on accelerometers to measure physical activity (Sallis, 2010) and food diaries to measure fruit and vegetable intake (Brower and Mousack, 2010). It can also be highlighted that the target used for physical activity was 60 minutes per day and the target for fruit and vegetable intake was 5 portions per day. It may be suggested that these targets are high and may be difficult for children to achieve. This was also highlighted as a limitation in Gratton et al. (2007) and they suggested for future studies to consider setting children a more realistic target or allow children to set their own target.

There were also some additional limitations specific to Study 3. Focus groups can sometimes be problematic. They often tend to become influenced by one or two individuals that talk more than the others. It may also hinder participants to speak freely and be reluctant to share certain beliefs in group settings. Study 3 considered facilitators of physical activity and healthy eating but failed to ask students about their perceived barriers. Future research should include this as it would be interesting to see whether these barriers would be different to those perceived in Western countries.

#### **8.4. Overall theoretical and practical implications**

This thesis has identified a number of key issues relevant in the identification of adolescents' physical activity and fruit and vegetable intake.

Findings from the current research programme provide some evidence for the capacity of the Theory of Planned Behaviour linked with the Prototype/Willingness Model (especially prototype similarity) to predict adolescents' intentions of physical activity and fruit and vegetable intake which

adds to the literature of using this augmented model to predict intentions towards health enhancing behaviours when studied in adolescents (Rivis et al 2006; Rivis and Sheeran, 2003). The present findings also showed that subjective norms were a strong predictor of behavioural intentions. As previously discussed, previous research has suggested that subjective norms were the weakest predictor amongst the Theory of Planned Behaviour constructs (Hagger et al., 2002). Future research should therefore focus on subjective norms in collectivistic samples such as in Middle Eastern countries. The findings of subjective norms and prototype similarity (based on descriptive norms) appeared to be important predictors of behavioural intentions which suggests that children are not only motivated by the approval of significant others, but they are also motivated by significant health behaviours and how close they identify themselves to be to those people. The role of descriptive norms in adolescents' health behaviours should therefore also be studied further. Important gender and age differences also existed and needs to be taken into account for future health promotion initiatives.

Important implications of Study 1, 2 and 3 is concerned with physical activity and healthy eating interventions and promotion of these positive health behaviours. Future research could further study whether volitional interventions (implementation intentions) should be combined with motivational interventions. The motivational intervention could be implemented to increase intentions, and the volitional intervention should then be aimed at turning intentions into actions. It is recommended to implement combined strategies aimed at enhancing both positive images and perceived similarity of a specific prototype as children may be more likely to engage in health enhancing behaviours if they associate themselves with people that engages in the behaviour. Building positive images of health enhancing behaviours may encourage children to want to associate themselves with that image. It was also recommended for future studies to consider a combination of intentions in

willingness in adolescents in order to measure both planned and spontaneous behaviours.

It is recommended to consider social factors (support, modelling and socialisation) as well as enjoyment in future interventions and school programmes as these appeared to be important influences of physical activity and fruit and vegetable intake. It is therefore recommended that secondary school students in the United Arab Emirates, through the course curriculum, are educated on the recommended guidelines and benefits of physical activity and healthy eating. Educators and health promoters should also be aware of the motivating factors of these behaviours and try to enhance them. It is important to understand the factors that motivate the students to participate physical activity and healthy eating habits, but also to understand and tackle the perceived behavioural barriers that prevent them from meeting the recommended guidelines of these behaviours. It would also be crucial to consider the social support the child has and identify the people that would support them to achieve their goals. Parents should be educated on this and their own health behaviours should also be targeted through interventions. Parents and other family members need to understand the implication of their behaviour for the development and maintenance of the physical activity and healthy eating pattern of their child.

### **8.5. Conclusion**

The current research programme has made a number of important contributions to the field of health psychology. The study is one of the first of its kind in the United Arab Emirates, which provides a noble contribution to this field of research. The countries in the Gulf region are witnessing an alarming rise in obesity, especially the high-income, oil-producing countries such as Saudi Arabia, United Arab Emirates, Bahrain, Qatar and Kuwait (Al-Haifi et al., 2013) and the United Arab Emirates, amongst some of these other countries have been

included in the top 10 ranking of the heaviest countries in the world (Walpole et al., 2012). There is a great need for obesity related research and interventions to tackle this issue and relevant research within the region is limited (Musaiger et al., 2011). Prevention is key for combatting obesity and there is a great need for population-based approaches to prevent obesity in the United Arab Emirates.

This mixed methods research programme, implementing both qualitative and quantitative methods, has shed light on the psychosocial factors that influence adolescents' physical activity and healthy eating habits in the United Arab Emirates. Further quantitative and qualitative approaches are needed to further establish the influential factors of children's healthy eating and physical activity habits in the Middle East, which will be useful for health promotion initiatives. Future research and public health interventions that aim to increase children's physical activity and healthy eating habits in the United Arab Emirates would benefit from the findings presented in this thesis.

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## **Appendices**

1. **Consent forms (part 1 and 2)**
2. **Questionnaire**
3. **Frequencies of participants' physical activity and fruit and vegetable intake**
4. **Interventions**
  - a. **Action planning**
  - b. **Image**
  - c. **Control**
5. **Consent forms (part 3)**
  - a. **School consent form**
  - b. **Parent consent form**
  - c. **Pupil consent form**
  - d. **Focus groups debrief**

6. Focus groups questions

7. 6) Table of themes

Reflexive Analysis

## **1. Consent forms (Study 1 and 2)**

### ***1a) School consent for Study 1 (sent out to recruit additional participants)***

Dear Sir/Madam,

My name is Lena Nilsson and I am conducting my doctorate research in the field of health promotion in adolescents, under the supervision of Prof. Andrew Guppy and Dr Angel Chater at the University of Bedfordshire in the UK.

In my research, I am looking to explore what influences adolescents' fruit and vegetable intake and physical activity, from a psychological perspective. The age group I am approaching is adolescents between the age of 11 and 14. I am also trying to see how fruit and vegetable intake and physical activity can be promoted through two simple interventions. I would be very grateful if your school would be willing to participate in my project. If your school agrees to participate, we would like to send a consent letter to parents seeking their approval of their child's participation.

I will visit the classrooms at two occasions. During the first visit the pupils will receive a pack of questionnaires where they will answer questions regarding their fruit and vegetable intake, physical activity levels and attitudes and beliefs about this. These questionnaires have previously been used frequently on school children and will take approx. 25 minutes to complete. The total visit will not take more than 45 minutes. I will visit you again a week later and the pupils will receive the same questionnaire pack to complete again.

I am hereby seeking the approval to conduct my research at your school. I will do everything possible to minimise disruption for your school. I will visit you at a convenient time to introduce the research and make arrangements for data collection and initiate the parental consent process. All materials needed will be provided and I will be responsible for administering the questionnaire and activities. I would aim for this to take place between January and March 2010 at two occasions, which is most convenient for your school. Both visits will not take more than 30-45 minutes each time.

Your contribution would be greatly appreciated and be very valuable for research in this area. Your participation in this study is entirely voluntary and you can choose to

terminate your participation at any time. All information relating to this study will be kept confidential and no individual school or pupil will be identified in any way to anyone outside the research team. At the end of the evaluation, I will be pleased to send you a summary of the research findings.

Could you please complete the enclosed reply form and return it in the pre-paid envelope by DATE or email me at the below address. I am hoping for your support and look forward to receiving your reply.

Please feel free to contact me at any time if you have any queries regarding this study.

Thank you for your time.

Best Regards,

Lena Nilsson

050-923 91 55

[lena\\_nilsson@hotmail.co.uk](mailto:lena_nilsson@hotmail.co.uk)

99095007@beds.ac.uk

Att: Lena Nilsson

Fax: 04 2654269

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Please send this form via fax, email or in the pre-paid envelope as soon as possible. Thank you for your time!

I have read the letter regarding the study on healthy eating, physical activity and wellbeing in adolescents and give permission to ours schools participation in the project:

**Yes**

**No**

Name of school: .....

Name: ..... Signature: .....

Position: ..... Date: .....



**1b) Consent for parents (sent out to school I)**

Study 1

Dear Parent,

I am writing to you because your child's school has been chosen to take part in a study looking at the psychological influences on fruit and vegetable and physical activity intake. We are, therefore, asking your consent for your child to participate. Your child will fill in a short questionnaire and I will visit your child's classroom at two time points during a class lesson.

The head teacher of your child's school is supporting this research the valuable contribution of your child would be greatly appreciated. His or her participation in this study is entirely voluntary and you can choose to terminate the participation at any time. All information relating to this study will be kept confidential and no individual school or student will be identified in any way to anyone outside the research team. There are no risks or benefits of participating in this study; but it will hopefully help your child develop some healthy habits!

Please could you send the completed form below to your child's tutor by ADD DATE .

Please contact me at any time if you have any queries regarding this study.

Thank you for your time! Best Regards,

Lena Nilsson

[99095007@beds.ac.uk](mailto:99095007@beds.ac.uk)

050-9239155

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Please return this form to the school by DATE.

\_\_\_\_\_

I have read the letter regarding the study on healthy eating, physical activity and wellbeing in adolescents and I hereby:

give

do not give

consent for my child (name): .....in class: ..... to participate in the project.

Signature of parent/carer:..... Date:.....

**1c) Consent for parents (sent to schools D, E, R)**

Study 2

Dear Parent,

I am writing to you because your child's school has been chosen to take part in a study looking at the psychological influences on fruit and vegetable and physical activity intake. They have also been chosen to be included in a class-room intervention to enhance physical activity and fruit and vegetable intake.

We are, therefore, asking your consent for your child to participate. Your child will fill in a short questionnaire and either participate in a short activity promoting fruit and vegetable intake and physical activity or receive information regarding this. I will visit your child's classroom at two time points during a class lesson.

The head teacher of your child's school is supporting this research the valuable contribution of your child would be greatly appreciated. His or her participation in this study is entirely voluntary and you can choose to terminate the participation at any time. All information relating to this study will be kept confidential and no individual school or student will be identified in any way to anyone outside the research team. There are no risks or benefits of participating in this study; but it will hopefully help your child develop some healthy habits!

Please could you send the completed form below to your child's tutor by ADD DATE .

Please contact me at any time if you have any queries regarding this study.

Thank you for your time! Best Regards,

Lena Nilsson

[99095007@beds.ac.uk](mailto:99095007@beds.ac.uk)

050-9239155

-----  
Please return this form to the school by DATE.

\_\_\_\_\_

I have read the letter regarding the study on healthy eating, physical activity and wellbeing in adolescents and I hereby:

give

do not give

consent for my child (name): .....in class: ..... to participate in the project.

Signature of parent/carer:..... Date:.....

**1d) Consent for schools (sent to schools D, E, R)**

Consent form for schools participating in both Study 1 and Study 2

Dear Sir/Madam,

My name is Lena Nilsson and I am conducting my doctorate research in the field of health promotion in adolescents, under the supervision of Prof. Andrew Guppy and Dr Angel Chater at the University of Bedfordshire in the UK.

In my research, I am looking to explore what influences adolescents' fruit and vegetable intake and physical activity, from a psychological perspective. The age group I am approaching is adolescents between the age of 11 and 14. I am also trying to see how fruit and vegetable intake and physical activity can be promoted through two simple interventions. I would be very grateful if your school would be willing to participate in my project. If your school agrees to participate, we would like to send a consent letter to parents seeking their approval of their child's participation.

I will visit the classrooms at two occasions. During the first visit the pupils will receive a pack of questionnaires where they will answer questions regarding their fruit and vegetable intake, physical activity levels and attitudes and beliefs about this. These questionnaires have previously been used frequently on school children and will take approx. 25 minutes to complete. I will then give them some simple activities about healthy eating and physical activity to do in the classroom. One group of pupils will participate in an activity that is non-health related. The aim is to see the impact these activities have on the pupils' fruit and vegetable intake and physical activity. These activities have been used before and are suitable for teenagers. The total visit will not take more than 45 minutes. I will visit you again a week later and the pupils will receive the same questionnaire pack to complete again. I will also leave small questionnaire with two questions for the pupils to fill out one week later. This can be done in the classrooms and can be given out by the class teacher.

I am hereby seeking the approval to conduct my research at your school. I will do everything possible to minimise disruption for your school. I will visit you at a convenient time to introduce the research and make arrangements for data collection and initiate the parental consent process. All materials needed will be provided and I will be responsible for administering the questionnaire and activities. I would aim for this to take place between January and March 2010 at two occasions which is most convenient for your school. Both visits will not take more than 30-45 minutes each time.

Your contribution would be greatly appreciated and be very valuable for research in this area. Your participation in this study is entirely voluntary and you can choose to terminate your participation at any time. All information relating to this study will be kept confidential and no individual school or pupil will be identified in any way to anyone outside the research team. At the end of the evaluation, I will be pleased to send you a summary of the research findings.

Could you please complete the enclosed reply form and return it in the pre-paid envelope by Thursday the 13<sup>th</sup> of January 2011 or email me at the below address. I am hoping for your support and look forward to receiving your reply.

Please feel free to contact me at any time if you have any queries regarding this study.

Thank you for your time.

Best Regards,

Lena Nilsson

050-923 91 55

[lena\\_nilsson@hotmail.co.uk](mailto:lena_nilsson@hotmail.co.uk)

99095007@beds.ac.uk

Att: Lena Nilsson

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-----

Please send this form via fax, email or in the pre-paid envelope as soon as possible. Thank you for your time!

I have read the letter regarding the study on healthy eating, physical activity and wellbeing in adolescents and give permission to ours schools participation in the project:

**Yes**

**No**

Name of school: .....

Name: ..... Signature: .....

Position: ..... Date: .....

## 2. Questionnaire


Hi!

We are interested in your attitudes and experiences about health and wellbeing. We would like to ask you some questions about fruit and vegetable intake and physical activity and how you feel about these.

You do not have to answer these questions but it would be really helpful if you did! It is important you answer all the questions.

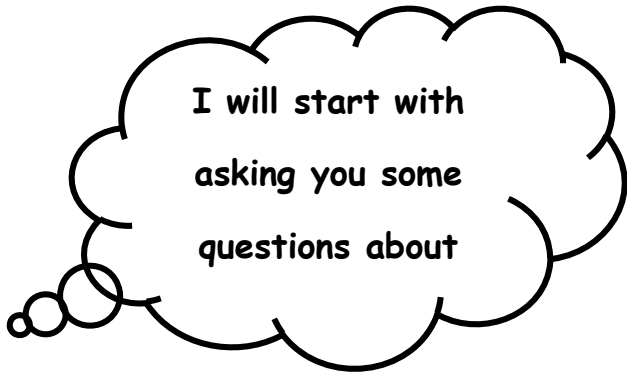
All answers will be kept completely confidential!

★Thank you for participating in this survey!★



Please fill out your initials and  
the month and date you were  
born:





**What is physical activity?**  
Some examples:  
• *Brisk walking*  
• *Active play*  
• *Most sports*  
• *Swimming*  
• *Games e.g. skipping*  
• *Dance*  
It doesn't all have to be done

**What is a portion of fruit and vegetables?**  
A portion is about a handful (or 80g).  
• *Frozen fruit and vegetables*  
• *Unsweetened fruit smoothies and pure fruit juice*  
• *Cooked fruit and vegetables*

**Section A**

**1) How many days have you engaged in physical activity (at least 60min/day) over the last week?**

None    1 day    2 days    3 days    4 days    5 days    6 days    7 days

**2) How many days have you eaten 5 portions of fruit and vegetables each day over the last week?**

None    1 day    2 days    3 days    4 days    5 days    6 days    7 days

**Section B**

**1) How often does your mum, dad or other caregiver engage in 30 minutes of physical activity on a weekly basis?**

None    1 day    2 days    3 days    4 days    5 days    6 days    7 days    I don't know

**2) How often does your mum, dad or other caregiver eat 5 portions of fruit and vegetables on a weekly basis?**

None    1 day    2 days    3 days    4 days    5 days    6 days    7 days    I don't know

**Section C**

1) How old are you? \_\_\_\_\_

2) I am:    Male       

              Female       

3) In what country were you born? \_\_\_\_\_

4) In what country was your mother born? \_\_\_\_\_

5) In what country was your father born? \_\_\_\_\_

6) What is your nationality? \_\_\_\_\_

7) What is your religion? \_\_\_\_\_

I will now ask you some questions about your self image - the way you see yourself.

Please could you circle the number you feel best represents your image, one for each adjective.

**Section D**

I am interested in how you describe yourself – not how other people would describe you.

**Could you please tell us how closely each of the 16 adjectives below describes you.**

I see myself as:	Not at all (1)		←————→			(7) Extremely	
<b>Healthy</b>	1	2	3	4	5	6	7
<b>Exciting</b>	1	2	3	4	5	6	7
<b>Popular</b>	1	2	3	4	5	6	7
<b>Immature</b>	1	2	3	4	5	6	7
<b>“Cool” (sophisticated)</b>	1	2	3	4	5	6	7
<b>Unattractive</b>	1	2	3	4	5	6	7
<b>Independent</b>	1	2	3	4	5	6	7
<b>Careless</b>	1	2	3	4	5	6	7
<b>Glamorous</b>	1	2	3	4	5	6	7
<b>Dull (boring)</b>	1	2	3	4	5	6	7
<b>Good Looking</b>	1	2	3	4	5	6	7
<b>Dirty</b>	1	2	3	4	5	6	7
<b>Successful</b>	1	2	3	4	5	6	7
<b>Unhealthy</b>	1	2	3	4	5	6	7
<b>Uncool</b>	1	2	3	4	5	6	7
<b>Leader</b>	1	2	3	4	5	6	7

I would now like to ask  
you how you feel about  
eating fruit and  
vegetables...

When answering questions,  
please circle the number  
that most nearly reflects  
your feelings, one for each  
statement.

---

**Section E**

**1) How many days over the next week do you plan to eat 5 portions of fruit and vegetables?**

None    1 day    2 days    3 days    4 days    5 days    6 days    7 days

**2) How many days over the next week do you want to eat 5 portions of fruit and vegetables?**

None    1 day    2 days    3 days    4 days    5 days    6 days    7 days

**3) How many days over the next week do you intend to eat 5 portions of fruit and vegetables?**

None    1 day    2 days    3 days    4 days    5 days    6 days    7 days

**4) How many days over the next is it very likely that you will eat 5 portions of fruit and vegetables?**

None    1 day    2 days    3 days    4 days    5 days    6 days    7 days

---

**Section F**

**1) Most people who are important to me think I should 5 portions eat fruit and vegetables each day next week.**

Strongly disagree    1    2    3    4    5    Strongly agree

**2) Most people who are important to me will eat 5 portions of fruit and vegetables each day next week.**

Strongly disagree    1    2    3    4    5    Strongly agree

**3) Most people will like me to eat 5 portions of fruit and vegetables each day next week.**

Strongly disagree    1    2    3    4    5    Strongly agree

---

**Section G**

**1) If I wanted to, I could easily eat 5 portions of fruit and vegetables each day next week.**

Strongly disagree    1    2    3    4    5    Strongly agree

**2) It would be easy for me to eat 5 portions of fruit and vegetables each day next week.**

Strongly disagree    1    2    3    4    5    Strongly agree

---

**3) It is possible for me to eat 5 portions of fruit and vegetables each day next week.**

Strongly disagree    1    2    3    4    5    Strongly agree

---

**Section H**

**1) For me to eat 5 portions of fruit and vegetables each day next week is:**

Bad	1	2	3	4	5	Good
Harmful	1	2	3	4	5	Beneficial
Unpleasant	1	2	3	4	5	Pleasant
Unenjoyable	1	2	3	4	5	Enjoyable
Foolish	1	2	3	4	5	Wise

---

**Section I**

**1) Fruits and vegetables taste good to me.**

Strongly disagree    1    2    3    4    5    Strongly agree

**2) I think that eating 5 portions of fruit and vegetables daily would help me to stay healthy.**

Strongly disagree    1    2    3    4    5    Strongly agree

**3) Staying healthy is important to me.**

Strongly disagree    1    2    3    4    5    Strongly agree

**4) Being healthier as a result of eating 5 portions of fruit and vegetables each day would be good.**

Strongly disagree    1    2    3    4    5    Strongly agree

---

**Section J**

**1) My family wants me to eat 5 portions of fruit and vegetables each day next week.**

Strongly disagree    1    2    3    4    5    Strongly agree

**2) When it comes to eating fruit and vegetables, I want to do what my family wants me to do.**

Strongly disagree    1    2    3    4    5    Strongly agree

**3) My friends want me to eat 5 portions of fruit and vegetables each day next week.**

Strongly disagree    1    2    3    4    5    Strongly agree

**4) When it comes to eating fruit and vegetables, I want to do what my friends want me to do.**

Strongly disagree    1    2    3    4    5    Strongly agree

---

**Section K**

**1) I always have fruits and vegetables available to me.**

Strongly disagree    1    2    3    4    5    Strongly agree

**2) The cost of fruits would prevent me from eating 5 portions of fruit and vegetables each day next week.**

Strongly disagree    1    2    3    4    5    Strongly agree

**3) The lack of availability of fruits would prevent me from eating 5 portions of fruit and vegetables each day next week.**

Strongly disagree    1    2    3    4    5    Strongly agree

**Section L**

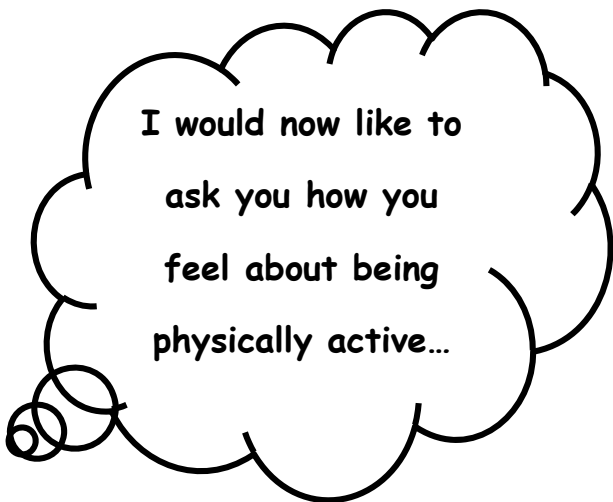
What I am interested in here are your ideas about people that eat a lot of fruit and vegetables... For example, we all have ideas about what typical movie stars are like or what the typical grandmother is like. When asked, we could describe one of these images – we might say we think the typical movie star is pretty or rich, or that the typical grandmother is sweet and frail. We are not saying that all movie stars or all grandmothers are exactly alike, but rather that many of them share certain characteristics.

**1) Describe the ‘typical’ young person (your age) who eats 5 portions of fruit and vegetables every day.**

	Not at all (1)		←————→			(7) Extremely	
Healthy	1	2	3	4	5	6	7
Exciting	1	2	3	4	5	6	7
Popular	1	2	3	4	5	6	7
Immature	1	2	3	4	5	6	7
“Cool” (sophisticated)	1	2	3	4	5	6	7
Unattractive	1	2	3	4	5	6	7
Independent	1	2	3	4	5	6	7
Careless	1	2	3	4	5	6	7
Glamorous	1	2	3	4	5	6	7
Dull (boring)	1	2	3	4	5	6	7
Good Looking	1	2	3	4	5	6	7
Dirty	1	2	3	4	5	6	7
Successful	1	2	3	4	5	6	7
Unhealthy	1	2	3	4	5	6	7
Uncool	1	2	3	4	5	6	7
Leader	1	2	3	4	5	6	7

**2) In general, how similar do you feel you are to this typical person?**

Not at all 1 2 3 4 5 6 7 Extremely



When answering questions, please circle the number that most nearly reflects your feelings, one for each statement.

---

**Section M**

**1) How many days over the next week do you plan to do 60 minutes of physical activity?**

None    1 day    2 days    3 days    4 days    5 days    6 days    7 days

**2) How many days over the next week do you want to do 60 minutes of physical activity?**

None    1 day    2 days    3 days    4 days    5 days    6 days    7 days

**3) How many days over the next week do you intend to do 60 minutes of physical activity?**

None    1 day    2 days    3 days    4 days    5 days    6 days    7 days

**4) How many days over the next is it very likely that you will do 60 minutes of physical activity?**

None    1 day    2 days    3 days    4 days    5 days    6 days    7 days

---

**Section N**

**1) Most people who are important to me think I should do 60 minutes of physical activity each day next week.**

Strongly disagree    1    2    3    4    5    Strongly agree

**2) Most people who are important to me will do 60 minutes of physical activity each day next week.**

Strongly disagree    1    2    3    4    5    Strongly agree

**3) Most people will like me to do 60 minutes of physical activity each day next week.**

Strongly disagree    1    2    3    4    5    Strongly agree



---

### **Section O**

**1) If I wanted to, I could easily do 60 minutes of physical activity each day next week.**

Strongly disagree    1    2    3    4    5    Strongly agree

**2) It would be easy for me to do 60 minutes of physical activity each day next week.**

Strongly disagree    1    2    3    4    5    Strongly agree

**3) It is possible for me to do 60 minutes of physical activity each day next week.**

Strongly disagree    1    2    3    4    5    Strongly agree

---

### **Section P**

**1) For me to do 60 minutes of physical activity each day next week is:**

Bad	1	2	3	4	5	Good
Harmful	1	2	3	4	5	Beneficial
Unpleasant	1	2	3	4	5	Pleasant
Unenjoyable	1	2	3	4	5	Enjoyable
Foolish	1	2	3	4	5	Wise

---

### **Section Q**

**1) It feels good to be physically active.**

Strongly disagree    1    2    3    4    5    Strongly agree

**2) I think that doing 60 minutes of physical activity each day would help me to stay healthy.**

Strongly disagree    1    2    3    4    5    Strongly agree

**3) Staying healthy is important to me.**

Strongly disagree    1    2    3    4    5    Strongly agree

**4) Being healthier as a result of doing 60 minutes of physical activity each day would be good.**

Strongly disagree    1    2    3    4    5    Strongly agree

---

**Section R**

**1) My family wants me to do 60 minutes of physical activity each day next week.**

Strongly disagree    1    2    3    4    5    Strongly agree

**2) When it comes to being physically active, I want to do what my family wants me to do.**

Strongly disagree    1    2    3    4    5    Strongly agree

**3) My friends want me to do 60 minutes of physical activity each day next week.**

Strongly disagree    1    2    3    4    5    Strongly agree

**4) When it comes to being physically active, I want to do what my friends want me to do.**

Strongly disagree    1    2    3    4    5    Strongly agree

---

**Section S**

**1) There are always ways of being physically active 60 minutes per day.**

Strongly disagree    1    2    3    4    5    Strongly agree

**2) It is difficult to find ways to be physically active 60 minutes per day.**

Strongly disagree    1    2    3    4    5    Strongly agree

**3) The lack of availability of ways of being physically active for 60 minutes would prevent me from doing it daily.**

Strongly disagree    1    2    3    4    5    Strongly agree

---

**Section I**

What I am interested in here are your ideas about people that are physically active...

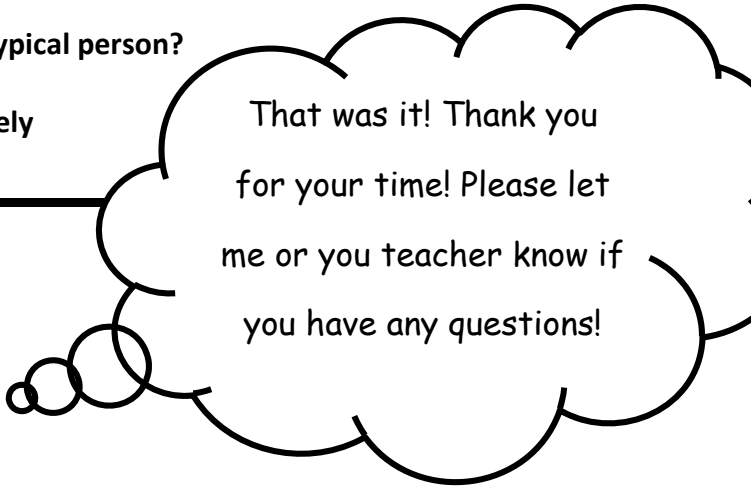
1) Describe the 'typical' young person (your age) who is being physically active for 60 minutes every day.

	Not at all (1)		←————→			(7) Extremely	
Healthy	1	2	3	4	5	6	7
Exciting	1	2	3	4	5	6	7
Popular	1	2	3	4	5	6	7
Immature	1	2	3	4	5	6	7
"Cool" (sophisticated)	1	2	3	4	5	6	7
Unattractive	1	2	3	4	5	6	7
Independent	1	2	3	4	5	6	7
Careless	1	2	3	4	5	6	7
Glamorous	1	2	3	4	5	6	7
Dull (boring)	1	2	3	4	5	6	7
Good Looking	1	2	3	4	5	6	7
Dirty	1	2	3	4	5	6	7
Successful	1	2	3	4	5	6	7
Unhealthy	1	2	3	4	5	6	7
Uncool	1	2	3	4	5	6	7
Leader	1	2	3	4	5	6	7

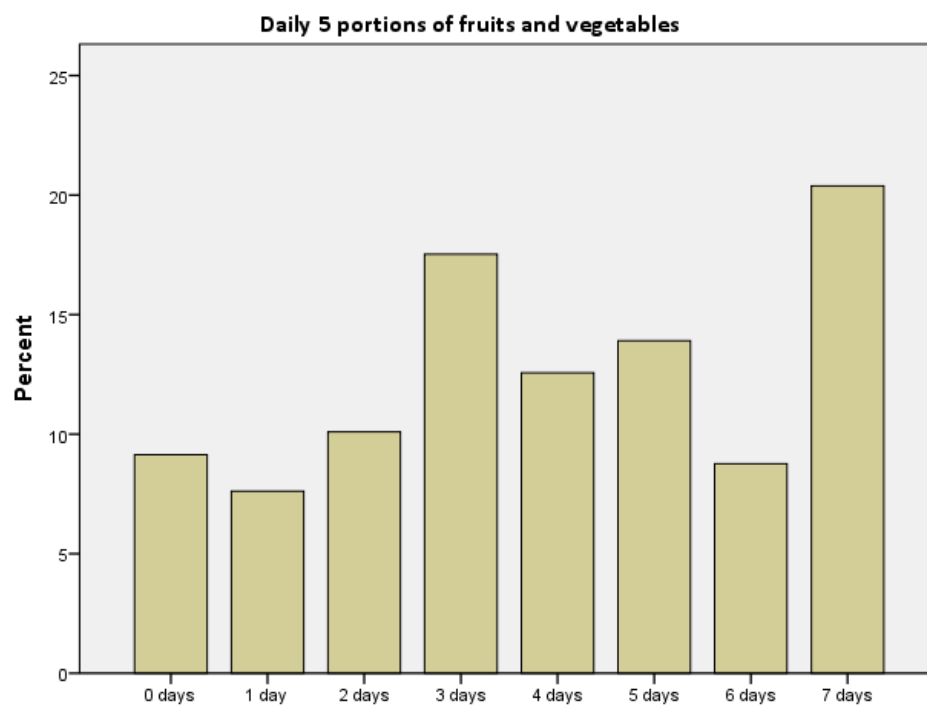
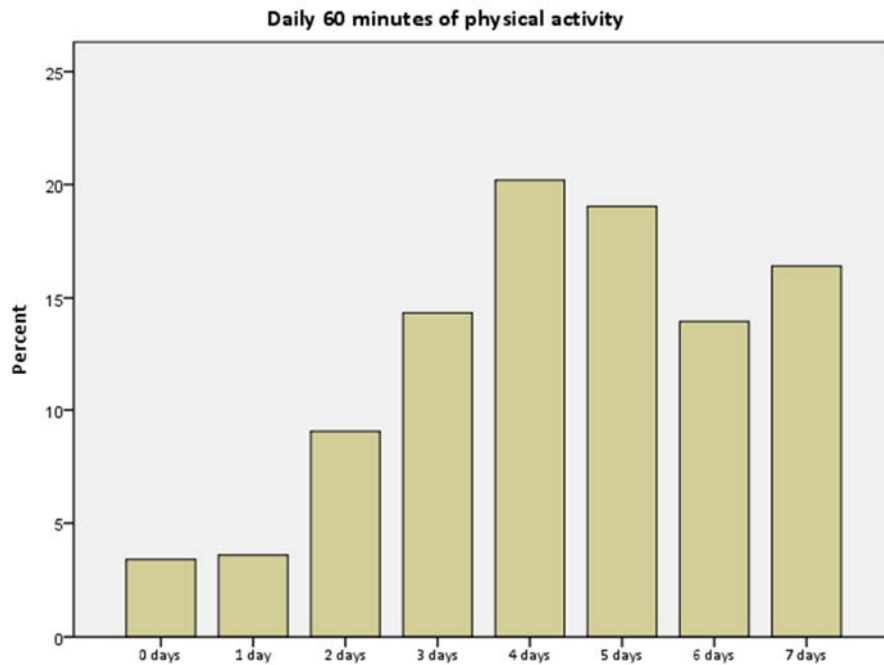
2) In general, how similar do you feel you are to this typical person?

Not at all 1 2 3 4 5 6 7 Extremely

---



### 3. Frequencies of participants' physical activity and fruit and vegetable intake – Study 1



#### 4. Interventions

##### 4a) Action planning intervention

**Make a specific goal on how you are planning to engage in 60 minutes of physical activity over the next week:**

##### **Remember!**

It doesn't all have to be done at once. It can be spread over the whole

---

**What** are you going to do to be physical active for 60 minutes? (For example play football, walk briskly, dance, exercise playing the Wii etc.)

**How** long are you going to be physically active for? (You can for example do your 60 minutes at once or break it up to 10-15 minutes periods)

**Where** are you going to be physically active for 60 minutes? (at home, in the park etc.)

**When** are you going to be physically active for 60 minutes? (days and times)

**With** whom are you going to be physically active with? (Alone, with your parents, friends etc.)

Look back over your plan and use these to help you to develop 'If-Then' plans. The 'If' stands for a situation which will 'Then' lead to a behaviour.

---

So if your goal was to play football for 45 minutes on Monday afternoon:

**IF** it is Monday afternoon after school, **THEN** I will go to play football

Or

**IF** it is Saturday morning, **THEN** I will go for a swim.

Try to write 5 IF-THEN plans to be physically active for 60 minutes everyday over the nextweek.

Fill in your plans below:

<b>IF</b>
<b>THEN</b>
<b>IF</b>
<b>THEN</b>
<b>IF</b>
<b>THEN</b>
<b>IF</b>
<b>THEN</b>
<b>IF</b>
<b>THEN</b>

Once you have written your If-Then plans, map them onto the weekly timetable. Make sure they are Specific stating **WHAT** type of physical activity you will be doing,

---

Time	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Morning							
Lunchtime							
Afternoon							
Evening							



Make a specific goal on how you are planning to eat 5 portions of fruit and veggies each day during the next week. Answer the following

**What is a portion of fruit and vegetables?**  
 A portion is about a handful (or 80g).  
 • Frozen fruit and vegetables  
 • Unsweetened fruit smoothies and pure fruit juice  
 • Cooked fruit and vegetables  
 • Dried fruit  
 • Tinned fruit and vegetables

Example:

<u>What</u>	<u>Where</u>	<u>When</u>
<i>Sliced banana in my cereal</i>	<i>At home</i>	<i>Breakfast time</i>

1<sup>st</sup> portion

<u>What</u> are you going to eat? (Fruit salad, carrot sticks, water melon etc.)	<u>Where</u> are you going to eat it? (at home, in school, out at a restaurant etc.)	<u>When</u> are you going eat it? (For breakfast, snack, lunch etc.)

2<sup>nd</sup> portion

<u>What</u> are you going to eat?	<u>Where</u> are you going to eat it?	<u>When</u> are you going eat it?

3<sup>rd</sup> portion

<u>What</u> are you going to eat?	<u>Where</u> are you going to eat it?	<u>When</u> are you going eat it?

<u>What</u> are you going to eat?	<u>Where</u> are you going to eat it?	<u>When</u> are you going eat it?

5<sup>th</sup> portion

<u>What</u> are you going to eat?	<u>Where</u> are you going to eat it?	<u>When</u> are you going eat it?

Look back over your plan and use these to help you to develop 'If-Then' plans The 'If' stands for a situation which will 'Then' lead to a behaviour.

---

So if your plan was to eat a banana for breakfast:

**IF** it is breakfast, **THEN** I will eat a banana with my cereal.

Or

**IF** it is lunchtime, **THEN** I will eat cucumbers with my food.

Try to write 5 IF-THEN plans to achieve eating 5 portions of fruit and vegetables based on your typical day.

Fill in your plans below:

<b>IF</b>  <b>THEN</b>
<b>IF</b>  <b>THEN</b>
<b>IF</b>  <b>THEN</b>
<b>IF</b>  <b>THEN</b>
<b>IF</b>  <b>THEN</b>

**4b) Image intervention**

I would now like to find out what you think of people who eats plenty of fruit and vegetables...

It is recommended to eat 5 portions (80g -about a handful) of fruit and vegetables every day. That's five portions of fruit and veg altogether, not five portions of each.  
**(NHS - UK)**

Think of 2 people who you admire who eat a lot of fruit and vegetables and write them down on your sheet (This can be anyone such as a friend, celebrity, parent etc.)

What do you like about them and how would you describe them?

I admire:

- 1.
- 2.

I would describe them as:

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

I would now like to find out what you think of people who are physically active...

Think of 2 people who you admire who engage in regular physical activity and write them down on your sheet (This can be anyone such as a friend, celebrity, parent etc.)

What do you like about them and how would you describe them?

The UK government recommends children and young people to engage in a total of 60 minutes of moderate intensity physical activity every day. (30 minutes for adults).

I admire:

1.

2.

I would describe them as:

1.

2.

3.

4.

5.

#### 4c) Control intervention

What do you know about Dubai? Take the Dubai quiz and find out! 😊

---

**1. How many Emirates are there in U.A.E?**

- 7
- 8
- 6

**2. What colour is U.A.E's flag?**

- Red, white and black
- Red, white, blue and
- Red, green, white and black

**3. The only one of its kind in the Middle East, this can be found in 'The Mall of the Emirates'**

- Camel rides
- Indoor ski slope and snow park
- Indoor aquarium with real divers

**4. If you were to take your 4x4 vehicle into the desert to drive up and down sand dunes you would be doing what**

- Dune beating
- Dune bashing

- o Dune driving

**5. Which road was the first one to link Dubai to Jebel Ali?**

- o The Beach Road
- o Al Ain road
- o Sheikh Zayed road

**6. The main source of Dubai's revenue in the 1980s was:**

- o Oil
- o Gold
- o Coal

**7. What is Dubai's Burj Al Arab?**

- o The world's largest mall, featuring over 700 stores
- o The world's tallest building, measuring nearly 2,300 feet
- o A seven-star hotel decorated in 22-karat gold

The correct answers:

Q1: 7 Emirates

Q2: Red, green, white and black

Q3: Indoor ski slope and snow park

Q4: Dune bashing

Q5: Sheikh Zayed road

Q6: Oil

Q7: A seven-star hotel decorated in 22-karat gold



## **5. Consent forms (Study 3)**

### ***5a) School consent***

Dear Sir/Madam,

My name is Lena Nilsson and I am conducting my doctorate research in the field of health promotion in adolescents, under the supervision of Prof. Andrew Guppy and Dr Angel Chater at the University of Bedfordshire in the UK.

In my research, I am looking to explore what influences adolescents' fruit and vegetable intake and physical activity, from a psychological perspective. The age group I am approaching is adolescents between the age of 11 and 14. I would be very grateful if your school would be willing to participate in my project. If your school agrees to participate, we would like to send a consent letter to parents seeking their approval of their child's participation.

For this part of the research programme I am looking for pupils to take part in focus group discussions. Each group should have 4 to 6 participants and they will be divided by their genders. The group discussions will not take more than one hour in total. This can be done in an area in the school, which is most convenient for you. The participants will be asked to discuss questions related to physical activity and fruit and vegetable intake.

I am hereby seeking the approval to conduct my research at your school. I will do everything possible to minimise disruption for your school. I will visit you at a convenient time to introduce the research and make arrangements for data collection and initiate the parental consent process. I would aim for this to take place in the fall term of 2011, whichever time most convenient for your school. Each focus group discussion will not take more than 30-45 minutes each time.

Your contribution would be greatly appreciated and be very valuable for research in this area. Your participation in this study is entirely voluntary and you can choose to terminate your participation at any time. All information relating to this study will be kept confidential and no individual school or pupil will be identified in any way to anyone outside the research team. At the end of the evaluation, I will be pleased to send you a summary of the research findings.

Could you please complete the enclosed reply form and return it as soon as possible via email, post or fax. I am hoping for your support and look forward to receiving your reply.

Please feel free to contact me at any time if you have any queries regarding this study.

Thank you for your time.

Best Regards,

Lena Nilsson

050-923 91 55

[lena\\_nilsson@hotmail.co.uk](mailto:lena_nilsson@hotmail.co.uk)

99095007@beds.ac.uk

Att: Lena Nilsson

Fax: 04 2654269

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Please send this form via fax, email or in the pre-paid envelope as soon as possible. Thank you for your time!

I have read the letter regarding the study on healthy eating, physical activity and wellbeing in adolescents and give permission to ours schools participation in the project:

**Yes**

**No**

Name of school: .....

Name: ..... Signature: .....

Position: ..... Date: .....

### **5b) Parents consent**

Dear Parent,

I am writing to you because your child's school has been chosen to take part in a study looking at the psychological influences on fruit and vegetable and physical activity intake.

Your child has been chosen to participate in a group discussion on this.

We are, therefore, asking your consent for your child to participate. He or she will take part in a 30-45 minutes group discussion where we will talk about their views of physical activity and healthy eating.

The head teacher of your child's school is supporting this research the valuable contribution of your child would be greatly appreciated. His or her participation in this study is entirely voluntary and you can choose to terminate the participation at any time. All information relating to this study will be kept confidential and no individual school or student will be identified in any way to anyone outside the research team. There are no risks or benefits of participating in this study; but it will hopefully help your child develop some healthy habits!

Please could you send the completed form below to your child's tutor by ADD DATE . Please contact me at any time if you have any queries regarding this study.

Thank you for your time!

Best Regards,

Lena Nilsson

[99095007@beds.ac.uk](mailto:99095007@beds.ac.uk)

050-9239155

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Please return this form to the school by DATE.

I have read the letter regarding the study on healthy eating, physical activity and wellbeing in adolescents and I hereby:

give

do not give

consent for my child (name): .....in class: ..... to participate in the project.

### **5c) Pupil written consent**

Hi!

Your parents have given their consent for you to participate in a study about physical activity and healthy eating. We will create a group discussion where we will talk about your thoughts and opinions about physical activity and healthy eating. This will allow you to talk freely and share your views with the group. Please remember that I'm not testing you in anything, I'm just interested in your views and there are no right or wrong answers. It is entirely up to you what you say or not say and you are free to leave the discussion at any time. I also want to ask you not to talk at the same time or interrupt anybody that is speaking.

I want to ask you permission to record our conversation. The reason I want to do this is so it will make it easier for me to remember what we spoke about and don't miss anything. Nobody else apart from me will have access to the recording. Is everyone ok with this? I also want to let you know that your real names won't be used so you are being completely anonymous. .

We are, therefore, asking your consent to participate. You will take part in a 30-45 minutes group discussion where we will talk about your views of physical activity and healthy eating. Your participation in this study is entirely voluntary and you can choose to terminate the participation at any time. All information relating to this study will be kept confidential and no individual school or student will be identified in any way to anyone outside the research team. There are no risks or benefits of participating in this study.

Thank you for your time and please contact me if you have any questions or concerns!

Lena Nilsson

[99095007@beds.ac.uk](mailto:99095007@beds.ac.uk)

050-9239155

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I have read the letter regarding the study on healthy eating, physical activity and wellbeing in adolescents and I hereby give my consent to participate in the study:

Yes

No

Name:

Date:

Class:

### **5d) Pupil verbal consent/debrief**

Participant Information Sheet (to be read aloud)

Hi! My name is Lena and I'm doing a study where I'm looking at young people's – like yourself views on healthy eating and physical activity.

We will create a group discussion where we will talk about your thoughts and opinions about physical activity and healthy eating. This will allow you to talk freely and share your views with the group. Please remember that I'm not testing you in anything, I'm just interested in your views and there are no right or wrong answers! It is entirely up to you what you say or not say and you are free to leave the discussion at any time. I also want to ask you not to talk at the same time or interrupt anybody that is speaking.

I want to ask you permission to record our conversation. The reason I want to do this is so it will make it easier for me to remember what we spoke about and don't miss anything. Nobody else apart from me will have access to the recording. Is everyone ok with this? I also want to let you know that your real names won't be used so you are being completely anonymous. .

This will take 30 to 45 minutes!

Does anyone have any questions?



## 6. Focus group session plan and questions

Duration: 30-45 minutes

- Welcome and Introduction: Verbal and written consent + provide information about study
- Warm up questions: 10 minutes

What is your name and what is your dream holiday destination?

What is your favourite TV show?

What do you think is the greatest super hero power?

- Questions
  - Can you think of different ways to be physically active for?
  - How often and for how long do you think you need to be physically active for on a weekly basis?
  - What would help you to be physically active more often?
  - What are the pro's about being physically active?
  - What are the con's about being physically active?
  - Can you think about ways to have fun and be physically active at the same time?
  - Can you think about a person that you admire that are physically active?
  - Why do you like that person?
  
  - What should you eat/not eat to stay healthy?
  - How much fruit and vegetable do you think you should eat on a weekly basis?
  - What would help you to eat more fruit and vegetables?
  - What are the pro's about eating fruit and vegetables?
  - What are the con's about eating fruit and vegetables?
  - Give examples on different ways to eat fruit and vegetables.
  - How can you make fruit and vegetables enjoyable?
  - Can you think about a person that you admire that eats healthy?
  - Why do you like that person?
- Time for questions and Thank Y

## 7) Table of themes

### Physical Activity

Main themes	Subthemes	Category
Important role models	Male sports stars	Modelling
	My family	
	Reasons for admiration	
Having fun together	Enjoyment	
	Socialisation	
Impacts on health, wellbeing and physical appearance	Physical fitness	Benefits
	Improved looks	Benefits
	Enjoyment	Benefits
	Positive health	Benefits
	Beyond the limit	Costs
	Pains and injuries	Costs
Knowledge of physical activity	Structured and unstructured physical activity	Knowledge
	Frequency and duration	

### Fruit and vegetable intake

Main themes	Subthemes	Category
Knowledge of healthy eating	Everything in moderation	Knowledge
	Weekly intake	
Physical and psychological rewards	<i>An apple a day keeps the doctor away</i>	Facilitators
	<i>Improved looks</i>	
Availability and appearance		
Sometimes yummy and sometimes yucky		
Important role models	Female family members	Modeling
	Celebrities	
	Reasons for admiration	

### **8) Reflexive Analysis – Study 3**

A reflexive analysis of Study 1 is written in first person format: *“I really enjoyed this part of the research programme and I thought it was enjoyable and interesting to interview the children. All the participants were able to engage well during the focus group interviews and responded well to all questions, given a wide range of different responses. I feel that the participants felt relaxed during the interview and many of them seemed to enjoy talking about this topic. The warm up questions were fun and engaging and I think it made the participants feel more at ease. I did not lead the questions in a particular direction, and tried to remain as open as possible. I enjoyed talking to all the participants in all of the groups. As a school counsellor, I am very used to talking to children in groups. I think me feel comfortable facilitating the discussions, perhaps more than I would feel if I was talking to groups of adults. However, I was well prepared to perform the role as a moderator and found it easy to do so. I also feel that the potential adult/child power imbalance was reduced. It may have helped that I was a younger looking female who was casually dressed who communicated with the participants in a friendly manner. It was unlikely that the participants perceived me as a figure of authority and this may have reduced the potential power imbalance and increased their levels of comfort during the group discussions.*

*As a child I disliked and rarely participated in physical activity. This has followed me into adulthood and even as an adult I am inactive. This was one of the reasons I wanted to conduct my research within this field. I have a keen interest in supporting children like myself as a child, who have very little motivation to be active. I therefore enjoyed discussing the topic, especially how they can make physical activity more enjoyable. I have always been interested in unhealthy eating behaviours, not only to prevent the risk of obesity, but also eating disorder. I believe that my enthusiasm for the topic influenced my performance as a moderator, hopefully in a positive way. I especially think that I tended to show understanding for the children when they talked about dislike of certain physical activities, since I felt I could relate to their feelings. Even though my feelings and reactions not were intended, I think they made the participants feel more comfortable talking to me about their dislikes and concerns.*

*Concerning the analysis of the focus group texts, my presentation and interpretation of the data required little interpretation due to the focus groups questions. These questions were specific and*

*emerged from constructs of specific social cognition models (see appendix 6). It is unavoidable that I influenced the results, as I conducted the interviews and analysed the data. Even though I analysed the transcripts from a specific social cognitive perspective, the themes that emerged may have been slightly different if someone else had conducted the interview and analysed the transcripts.”*