

PHYSICAL ACTIVITY PARTICIPATION

**Using the Theory of Planned Behaviour to Investigate the Antecedents  
of Physical Activity Participation among Saudi Adolescents**

Submitted by

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### Abstract

Despite the widely documented physical, psychological, and social benefits of participation in physical activity (Sallis, Prochaska, & Taylor, 2000; U.S Department of Health & Human Services, 2000), less than half of young Saudi adolescents are involved in non-school organised sport (General Presidency for Youth Welfare, 2007; Al-Hazzaa, 2004). Thus, examination of social and psychological determinants of participation in leisure time physical activity is important. This PhD examined these determinants within Saudi adolescents.

A mixed methods approach was adopted to identify and test the important social and psychological determinants of participation in leisure-time physical activity. Phase one of the research was qualitative in nature. The purpose of this phase was to illustrate how an elicitation method can be used to identify salient behavioural (termed consequences), normative (termed referents), and control (termed circumstances) beliefs about physical activity as perceived by adolescents. These findings, along with theoretical propositions and evidence from previous studies, contributed to the development of a model of the social and psychological determinants of participation in leisure-time physical activity. They also contributed to the development of ways to measure important concepts in the model.

Phase two was quantitative in nature and used multiple regression analysis to test the relationships among the key variables of interest. In part one of this phase, self-report questionnaires measured the respondents' intention to participate in leisure time physical activity (dependent variable); it also measured their attitude toward physical activity behaviour, as well as subjective norms, perceived behavioural control, descriptive norms, self-efficacy, self-identity, and past behaviour (independent variables). The results revealed that attitudes, subjective norms, perceptions of behavioural control predicted physical activity intentions in a Saudi Arabian context. Moreover, descriptive norms, self-efficacy, and past behaviour contributed to the

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prediction of intentions, while self-identity did not. The results also pointed to some gender differences: while Saudi females considered attitude, subjective norms, perceived behavioural control and self-efficacy during intention formation, Saudi males considered attitude, subjective norms, perceived behaviour control, self-efficacy, and past behaviour only during intention formation. In terms of the salient beliefs, being active, maintaining fitness and controlling weight predicted attitudes; friends, mother, and brother predicted subjective norms; and availability of place, availability of time, and bad weather predicted perceived behavioural control. The results also pointed to some gender differences. While Saudi females considered being active, maintaining fitness, controlling weight, friends, family, father, mother, and brother, availability of place, availability of time, and bad weather, Saudi males considered being active, friends, family, father, brother, availability of place, availability of time and bad weather. In part two of this phase, five weeks after completing the main questionnaire, participants completed a follow-up questionnaire that assessed self-reported physical activity during the previous five weeks. Results revealed that intention, perceived behavioural control, subjective norms, self-efficacy, and past behaviour, but not attitude, descriptive norms, or self-identity predicted physical activity. Results also pointed out important gender differences. That is, while Saudi males appeared to consider intention, perceived behavioural control, and past behaviour when predicting exercising behaviour, this was not the case for Saudi females who considered intention, subjective norms, self-efficacy, and past behaviour only.

Overall, the findings of this thesis offer partial support for the capacity of the theory of planned behaviour to predict participants' physical activity intention and behaviour. The standard TPB variables, self-efficacy and past behaviour predicted intention, while, subjective norms, self-efficacy and past behaviour predicted behaviour. In general, findings also point out important gender differences. That is, while Saudi males appear to consider the standard TPB variables, self-efficacy, and past behaviour when predicting intention, and perceived behavioural control and past behaviour when

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predicting physical activity behaviour, this is not the case for Saudi females. In contrast, Saudi females consider attitude, subjective norms, and self-efficacy when predicting intention, and self-efficacy and past behaviour when predicting physical activity behaviour. Implications of these findings are that in order to alter physical activity patterns, factors influencing adolescents' intention and behaviour to participate in physical activity must be addressed. Specially, effective interventions should target cognitive, social, environmental and psychological factors aimed at promoting physical activity among adolescents.

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## Chapter One

### Introduction

Participation in physical activity and sport has been positively associated with physiological health benefits and psychological well-being. For example, physical activity has been associated with reduced risk of all causes of mortality, including heart disease, diabetes, hypertension, and colon cancer, as well as with increased muscular strength and endurance (Dowling, 1996). Exercise has also been shown to maintain and/or improve bone mass and to reduce body fat (Denys, 1999).

In addition to the physiological benefits of physical activity, there are many psychological benefits, such as reduced anxiety, decreased levels of depression, and reduced negative stress, as well as having positive effects on life stress (Mouton, Walter, Calmbach, Dhanda, Espino, and Hazuda, 2000). Also, involvement in physical activity has been positively related to self-concept, body image, self-esteem, achievement attitudes, and cognitive functioning (see Katonah and Flaxman, 2001; Nicholas, Pearce, Pentony, and Pilz, 2001). A study by Branch (1998) revealed that physical activity led to positive changes in mood, relief of tension, and increased alertness, energy, and ability to cope. Moreover, vigorous exercise was positively associated with sense of control and physical fitness; it also decreases the risk of negative health behaviours including smoking and alcohol use (Weinberg and Gould, 1999; Willis and Frye-Campbell, 1992).

Not only is participation in physical activity beneficial to the general population, it is also beneficial to children and young people (U.S. DHHS 2000). For example, because research suggests that the benefits of physical activity habits in early life may continue into adulthood, early participation in physical activity is crucial to life-long health and disease

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prevention (Dowling, 1996). Finally, the Office of Elementary and Secondary Education (2000) reported that the health benefits of physical activity during childhood and adolescence can help build and maintain healthy bones, muscles, and joints, help control weight, prevent or delay the development of high blood pressure, and reduce feelings of anxiety and depression.

The discovery of the physical and psychological benefits of regular participation in physical activities resulted in a proliferation of recommendations suggesting what forms of physical activity are beneficial to health. The American College of Sports Medicine (ACSM), Center for Disease Control (CDC), and the Surgeon General recommend that all adults accumulate a minimum of 30 minutes of moderate-intensity physical activity on most days of the week. With respect to younger populations, a group of international experts made two different recommendations. The first guideline states that all adolescents aged between 11 and 21 should be active every day for at least 30 to 60 minutes as part of play, games, sport, work, transportation, recreation, physical education, or planned of exercise, in the context of family, school, or community activities (Willis and Frye-Campbell, 1992). The second guideline suggests that adolescents should engage in three or more sessions per week of activities that last 20 minutes or more at a time and require a moderate to vigorous level of continuous exertion, such as brisk walking, jogging, bicycling, swimming, sports, or dancing (Scharff, Homan, Kreuter and Brennan, 1999). Therefore, the message conveyed by health organisations is that any type of physical activity confers health benefits, although the health benefits of vigorous participation are more substantial.

Despite the benefits of physical activity, young people do not always follow these recommendations and, therefore, do not accrue the health benefits of regular exercise. Epidemiological evidence suggests that activity levels begin to decline during the teen

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years, when daily physical activity decreases at a rate of about 2.7% per year for males and 7.4% for females (Sallis, 1993). Similarly, according to Rowland (1999) the decline is more dramatic among teenage girls than boys. At age 13, only about 6% of all teens report no physical activity. By age 19, 25% of all girls and 20% of all boys report no physical activity at all. According to the World Health Organisation (WHO), 60% to 85% of people in the world—from both developed and developing countries—lead sedentary lifestyles; thus, making lack of activity one of the more serious, yet insufficiently addressed public health problems of our time. It is estimated that nearly two-thirds of young people are also insufficiently active, with serious implications for their future health. The rates of physical inactivity have increased in most Western countries, such as the United States, Canada, and the United Kingdom.

Physical inactivity is not only a characteristic of Western countries, but is also a problem in many Arabic countries, such as Saudi Arabia. According to Rabaan (1994), participation in physical activity by Saudi citizens is low despite the rapid growth of competitive sport. It was estimated that only 20% to 30% of the young male population were involved in non-school organised sport (General Presidency for Youth Welfare, 2007). Therefore, as Al-Nuaim (1997) pointed out, studies investigating the physical activity habits of Saudi Arabian people are urgently needed (Al-Hazzaa, 2002). In a review of eight studies, Al-Hazzaa (2004) reported that the total rate of inactive Saudis ranged from 43.3% to 99.5%. Only two studies included data for both males and females and their findings indicated that females were much less active than males. In addition, according to a recent survey using a sample of adolescent boys, the rate of inactive adolescents (exercising for one day or less per week) was approximately 50% (Al-Rukban, 2003).

In addition, Alsaif et al. (2002) found that the majority of the Saudi population were either obese (39%) or overweight (36%) and that obesity is a major risk factor for many

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chronic diseases, including hypertension, type 2 diabetes mellitus, coronary heart disease, and stroke. Similarly, Rasheed (1998) indicated that obesity is a health risk factor for Saudi women. Specifically, Rasheed found the majority of Saudi women to be severely obese (64%) and not to exercise regularly. However, it is important to stress that there is a dearth of research examining psychological determinants of physical activity among the general and young population in Saudi Arabia. One study conducted by Al-Reffae and Al-Hazaa (2001) examined reasons for inactivity and found that 70% of the population reported time constraints and lack of facilities as the most popular reasons for physical inactivity. However, this study was atheoretical in the sense that it did not adopt a theoretical framework in studying physical activity or inactivity. One reason for this may be that there are no standardised procedures and measures to identify psychological antecedents of physical activity, such as beliefs, attitudes, and intentions in the Arabic language. Therefore, instruments that validly assess beliefs, attitudes, and intentions of people in the Arabic language are urgently required in order to inform an intervention to promote physical activity among the Saudi population.

One way to overcome measurement issues and identify antecedents of physical activity participation in Saudi Arabia is to consult research conducted in Western countries and apply the research in a Saudi Arabian context. Theoretical models developed in Western countries can provide useful guides for developing research in Saudi Arabia considering that, many times, research from Western countries has been successfully applied in different countries such as Greece, Russia, Estonia, and Poland (Hagger, Chatzisarantis, Barkoukis, Wang, and Baranowski, 2005).

The determinants of physical activity in Western culture are generally divided into four groups: a biological and demographic group of factors; a psychological group of factors; a social and cultural group of factors; and a physical environment group of factors

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(Sallis, Prochaska, and Taylor, 2000). Factors designated to each of these groups have been studied for a variety of populations, including adolescents. Studies of gender and age as determinants of physical activity in youth, are considered under the biological and demographic group, and these studies have suggested that boys tend to be more active than girls and physical activity declines with age in adolescence (Sallis, Hovell, Hofstetter, and Barrington, 1992).

Social and cultural determinants of physical activity include socioeconomic status, ethnicity, family support, social support from others, and the influence of peers and parents (Sallis et al., 1992). Physical environment factors influencing children and adolescents' activity levels include cold weather, time spent indoors, and schooldays (children are more active on weekends) (Sallis et al., 1992).

Many psychological, cognitive, and emotional factors have been studied as potential predictors of physical activity in young people, such as self-efficacy, outcome expectations, barriers, general self-esteem, exercise self-schema, body image, self-motivation, intention to be active, and knowledge of exercise (Sallis, Prochaska, and Taylor, 2000); other factors that have been studied include perceived physical activity capacity, skill, or competence (Biddle, Sallis, and Cavill, 1998).

The research enterprise in Western countries comprises two interrelated processes. First, formative research that aims to identify determinants of physical activity (Ajzen, 2003), and second, applied or experimental research that aims to verify causal links between determinants of physical activity participation (Ajzen and Fishbein, 1980). Those two types of research are interlinked in that one cannot proceed to applied research unless determinants of physical activity have been identified. In accordance with this view, the research presented in this thesis is formative and aims to identify psychological determinants of physical activity in Saudi Arabia. The present thesis does not adopt an



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applied, interventionist, or experimental approach to promote physical activity participation. Nevertheless, because the present thesis identifies antecedents of physical activity participation, it can inform intervention programs about how physical activity participation in Saudi Arabia can be promoted.

Several models and theories have been proposed to describe, explain, and predict human behaviour in Western cultures. These models include social cognitive theory (SCT) (Bandura, 1986), the health belief model (Janz and Becker, 1984), protection motivation theory (Rogers, 1983), theory of reasoned action (TRA) (Ajzen and Fishbein, 1980; Fishbein and Ajzen, 1975), theory of planned behaviour (TPB) (Ajzen, 1985), self-determination theory (SDT) (Deci and Ryan, 1985, 2000), and the transtheoretical model (Prochaska, DiClemente, 1982). Within these theories, investigators have examined the influence of factors such as attitude, perceived behavioural control, subjective norm, intention, readiness to change, self-efficacy, intrinsic and extrinsic motivation, and decisional balance on physical activity behaviour.

Two theoretical frameworks that have featured prominently in the exercise setting are the theory of reasoned action (Fishbein and Ajzen, 1975) and the extended theory of planned behaviour (Ajzen, 1985). The theory of planned behaviour was developed to explain volitional behaviour and is based on the premise that individuals behave in a rational manner by deliberating on the information that is available to them and by considering the possible implications of their behaviour (Ajzen, 1985). The theory of planned behaviour proposes that an individual's intention to perform a given behaviour is the immediate determinant of that behaviour (Ajzen, 1988). Further, intentions are the product of three cognitive variables: attitude toward the behaviour (the individual's positive or negative perception of performing the given behaviour), subjective norms (the individual's perception of pressure from important others to perform or not perform the

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given behaviour), and perceived behavioural control (perceptions of ease or difficulty of performing the given behaviour) (Ajzen, 1991).

The theory of planned behaviour is one of the most successful frameworks for studying determinants of physical activity because it accounts for a substantial amount of variance in intention and behaviour. The constructs of the theory of planned behaviour are well defined, and the theory can be flexible when applied in non-Western countries. This is because some of its constructs are global and, therefore, can be used to measure perceptions about physical activity in different countries, such as Saudi Arabia.

Studying the psychological determinants of exercise participation in countries like Saudi Arabia can be an exciting line of research due to the cultural and political changes that this country has undergone in the last ten years. Sport in Saudi Arabia is relatively new in comparison to Western countries. The first sport governing body, the General Presidency of Sport Welfare (GPSW), was established in the 1950s. The GPSW has been responsible for the fast development of sport within Saudi Arabia. It provides all sorts of facilities, such as sports centres, youth camps, sports halls, public playgrounds, and club buildings with the required equipment. In 1975 there were 53 sports clubs. This figure rose to 156 in 2009, with a membership of more than 160,000. In 2009 there were 26 sports federation committees. Saudi Arabia's commitment to sport has ensured not only the provision of a wide range of sporting facilities for the population as a whole, but also improvements in performance in a number of sports - to the point where the Saudi athletes can compete in many world games, such as the summer Olympics, volleyball, basketball, and other sports. The national football team is best known for qualifying four consecutive times for the FIFA World Cup and six times for the Asian Cup, which the team has won three times. Given the rapid change and popularity of physical activity and sport in Saudi Arabia, it would be exciting to examine whether the same psychological antecedents proposed by the theory of

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planned behaviour that was developed in Western countries (UK, US) also determines the physical activity intentions of young Saudi people.

Studying psychological determinants of physical activity participation in Saudi Arabia can be an interesting topic for research because in Saudi Arabia women's sport is nonexistent due to the unique setting and the role of women in Saudi Arabia with regard to the traditional and conservative society. To date physical education programmes in girls' schools are not available and girls are excluded from physical education. Women are not allowed to run, ride bicycles, or do any kind of physical activity on public roads (except walking). Just a few private gyms and fitness facilities are available for women and these are very expensive. Given the unique circumstances facing young Saudi women, it would be interesting to know whether young Saudi women believe that participation in regular physical activities is hard to do.

Saudi Arabia is a Middle Eastern Arab country that is located in the Southeast of Asia. It occupies most of the Arabian Peninsula, with an estimated size of approximately 2,250,000 square kilometres (about 9 times larger than the UK, which is estimated at 243,000 sq km). The climate in Saudi Arabia may be another factor that determines participation in physical activities. Saudi Arabia has a desert climate characterized by extreme heat during the day and unpredictable rainfall; therefore, Saudi Arabia has the largest sand desert in the world, the Rub Al-Khali. The average summer temperature is 48° C, but readings of up to 54° C are common. The heat becomes intense shortly after sunrise and lasts until sunset; in the winter, the temperature drops below 0° C, but the almost total absence of humidity and the high wind-chill factor make a bitterly cold atmosphere. Generally speaking, the climate is not favourable for participation in regular physical activity; therefore, it is interesting to investigate whether climate (i.e. the weather) is a

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significant factor that can prevent young Saudis from participating in regular physical activity.

To summarise, due to the rapid cultural and political change that Saudi Arabia has undergone in the last ten years, the study of psychological determinants of physical activity in Saudi Arabia is a pertinent and exciting topic of research. By using the tenets of the theory of planned behaviour, the present thesis aspires to identify the most proximal determinants of physical activity in Saudi Arabia and to uncover important gender differences in beliefs about exercise and physical activity. The next section introduces important theories of intentional behaviour such as protection motivation theory, health belief model, social cognitive theory, the theory of reasoned action and the theory of planned behaviour are then reviewed. Moreover, some extensions and modifications of the theory of planned behaviour will be discussed, including past behaviour. Also, normative extensions of the theory of planned behaviour will be discussed and will include descriptive norms and self-identity. Control related extensions of the theory of planned behaviour including self-efficacy will also be presented.

### **Purpose of thesis**

The purpose of this thesis was to investigate the antecedents of Saudi adolescents' intentions and behaviour regarding participation in leisure-time physical activity.

### **Research questions**

1. Do intention, perceived behavioural control, and past behaviour influence participation in leisure-time physical activity behaviour? (Q1)
2. Do attitude toward behaviour, subjective norm, perceived behavioural control, and additional variables influence intention to participate in leisure-

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time physical activity? (Q2)

3. Do behavioural, normative, and control beliefs influence attitude, subjective norm, and perceived behavioural control? (Q3)

**Review of Literature**

A potentially successful approach to developing physical activity interventions involves targeting social-cognitive variables that exert strong influences on physical activity behaviour (Edmundson et al., 1996; Nader et al., 1999; Parcel, Simons-Morton, O'Hara, Baranowski and Wilson, 1989). Theories of intentional behaviour constitute a popular framework that can assist in understanding antecedents of physical activity behaviour and the processes by which psychological variables influence physical activity behaviour (Rhodes, Plotnikoff, and Spence, 2004). Therefore, some important social cognitive theories will be reviewed in this section. These are the social cognitive theory (SCT) (Bandura, 1998), the health belief model (HBM, Rosenstock, 1974), the protection motivation theory (PMT, Rogers and Mewborn, 1976), the theory of reasoned action (TRA, Fishbein and Ajzen, 1975), and the theory of planned behaviour (TPB) (Ajzen, 1991). Previous research within these theories has not successfully identified the causes of exercise behaviour change, but each, including their respective limitations, is summarized below. Moreover, some extensions and modifications of the theory of planned behaviour will be discussed, including past behaviour. Also, normative extensions of the theory of planned behaviour will be discussed, including descriptive norms and self-identity. Moreover, control related extensions of the theory of planned behaviour including self-efficacy will be discussed.

**Social cognitive theory (SCT) (Bandura, 1986).** Social cognitive theory explains psychosocial functioning in terms of a triadic reciprocal causation (Bandura, 1986). Within this model, internal personal factors in the form of cognitive, affective, and biological events; behavioural patterns; and environmental influences all operate as interacting determinants that influence one another bi-directionally (Bandura, 2001). Starting with the

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person, the way an individual thinks, his or her beliefs, attitudes, and intentions, as well as personal attributes such as genetics, history, gender, and age influence behavioural choices. The development of behavioural skills and behavioural successes and failures then influences beliefs, attitudes, and intentions. Environmental influences (both social and physical) influence the person apart from his or her behaviour when thoughts and feelings are modified through modelling or social persuasion (Bandura, 1986). Individuals influence the environment in how they interact with their environment, in how they interpret their environment, and in how they behave within their environment. In the final reciprocal link between the environment and behaviour, in the transactions of everyday life, behaviour alters environmental conditions, and it is, in turn, altered by the very conditions it creates (Bandura, 1986). The ways that we interpret our social and physical environment will influence how we behave within that environment; our behaviour will reciprocally influence the ways that we interpret our social and physical environment. What part of the potential environment becomes the actual environment thus depends on how people behave (Bandura, 1986).

Because of the reciprocal causation within the model, therapeutic efforts to change behaviour can be directed at all three domains. Psychosocial functioning is improved by altering faulty thought patterns, by increasing behavioural competencies and skills in dealing with situational demands, and by altering adverse social conditions (Evans, 1989). Behaviour is modified and developed by constant interactions and adaptations within the person, the behaviour, and the environment. The relative influence exerted by the three sets of interacting factors will vary for different activities, different individuals, and different circumstances. For example, when environmental conditions exercise powerful constraints on behaviour, they emerge as the overriding determinants; when situational constraints are

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weak, personal factors serve as the predominant influence in the regulatory system (Bandura, 1986).

From the perspective of the social cognitive theory, the person is defined by five underlying basic capabilities and it is from these basic capabilities that humans are able to adopt and maintain behaviour: symbolizing capability, forethought capability, vicarious capability, self-regulatory capability, and self-reflective capability (Bandura, 1986). A key component of self-reflection is self-efficacy.

Self-efficacy is a central component of Bandura's (1986) social cognitive theory and, according to Bandura, is essential in changing health behaviour. Self-efficacy is a personal belief that individuals have, in their capability to perform particular tasks. Personal efficacy beliefs are expected to determine action both directly and indirectly through their effect on motivation. The belief that one's actions can produce the desired effect is expected to directly influence behavioural engagement because, according to Bandura, an individual will have little incentive to act if he/she does not believe he/she possesses the power to produce the desired outcomes. Self-efficacy is also expected to influence behaviour indirectly by regulating motivation.

Both the predictive power and ease of operation has meant that exercise psychologists often use self-efficacy independently from Bandura's (1986) social cognitive theory. The other variables in Bandura's theory include outcome expectations and proximal goals. In Bandura's terms, self-efficacy is continually "severed" from his social cognitive theory and "grafted" onto other theories (Bandura, 2000, p. 307). In Bandura's view, this represents "cafeteria style research" in which constructs are picked from various theories and strung together in the name of theoretical integration (Bandura, 2000, p. 299). It is interesting that Bandura's (1986) social cognitive theory, in its entirety, has not been used more in exercise psychology research. Theoretically, Bandura's social cognitive theory



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shares many similarities with another social cognitive theory called the theory of planned behaviour (Ajzen, 1985) and early research indicated that Bandura's theory had superior predictive validity (Dzewaltowski, Noble, and Shaw, 1990). One explanation is that the sheer volume of research testing the theory of planned behaviour in the exercise domain has meant that it has become the more dominant of the two. Where research has tested Bandura's social cognitive theory in its entirety, only self-efficacy, and not outcome expectations or proximal goals, has been found to be predictive of physical activity (Dishman, Motl, Saunders, and Felton, 2004).

In a study by Booth Owen, Bauman, Clavisi, and Leslie (2000) involving SCT, researchers interviewed 449 Australians to determine the influence of social cognitive variables, perceptions of social and environmental influences, reported availability of facilities, and perceived reinforcement for physical activity on exercise behaviour. Only health benefits of physical activity significantly correlated with physical activity participation. High exercise self-efficacy, perceived opportunities to walk locally, and social support from family and friends were associated with participation in physical activity. The results also suggested that men were more physically active than women.

The ability to predict physical activity from SCT constructs varies across males and females because the correlations between the constructs and the physical activity variables are different for the two groups. For example, in a study designed to determine those predictors of physical activity that explained the differences in behaviour among male and female adolescents, Baranowski, Perry, and Parcel (2002) found that self-efficacy to overcome barriers was significantly higher among males than females and was a significant covariate in males for vigorous physical activity and for moderate-to-vigorous physical activity.

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A study by Dishman et al. (2004) indicated that for males, self-efficacy and baseline activity were the only variables that contribute significantly to predicting a 4-month period of physical activity. For females, baseline activity, intentions, stress, and social influence predicted physical activity. In regression models explaining variance in a 16-month period of physical activity, baseline activity and intention explained males' behaviour, while baseline activity, intention, and stress explained females' behaviour. Trost et al. (1997) demonstrated that different variables contribute to models explaining variance in behaviour between genders; the study also found varying results for the ability to explain variance in activity levels among boys and girls. The models explaining behaviour among females were able to account for 17-26% of the variance in behaviour, while the models explaining behaviour among males were able to account for 5-17% of the variation. The model developed by Sallis et al. (1999) for predicting high school male behaviour was able to account for 43% of the variance in physical activity levels; neither demographics nor environmental variables contributed to the model; child variables (including measures of self-efficacy) predicted 35.4% of the variance and social variables predicted 6.5% of the variance in physical activity levels. The model for predicting female behaviour was able to account for 58.6% of the variance in physical activity levels. These findings suggest that the determinants of physical activity differ between males and females.

One of the problems with SCT is that it is a very complex and dynamic theory, and it incorporates reciprocal relationships in several stages of the theory, making it difficult to test the theory because it implies that a change in one construct will lead to a subsequent change in every other construct.

**Health belief model (HBM) (Rosenstock, 1990).** The health belief model (HBM) was originally developed in the 1950s by a group of social psychologists and tested in a study as a systematic method to explain the failure of people to obtain a chest x-ray for the

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early detection of tuberculosis. Since then, in addition to predicting preventive behaviours, the model has been revised, expanded, and broken down into different components in studies emphasizing the relationship between health beliefs and health-related behaviours (Sheeran and Abraham, 1995).

The HBM provides a theoretical basis from which health-related behaviour might be predicted and changed. Rosenstock (1974) proposed that HBM has roots in the expectancy-value approach. This approach predicts behaviour based on two elements: 1) the subjective value to the individual concerning a particular outcome, and 2) the individual's estimate of the probability of a behaviour being associated with that outcome. From this perspective, the HBM suggests that an individual's motivation to avoid an unpleasant health outcome is based on his or her subjective thought (value) toward the outcome and his or her belief of likelihood that a specific action would prevent that outcome (expectancy).

The health belief model has four major components and the model postulates that these four beliefs influence health behaviour. With respect to exercise behaviour the four components are: (1) perceived susceptibility, the individual's assessment regarding his or her risk for a particular health threat due to inactivity; (2) perceived severity of the health threat; (3) the individual's perception that he/she may benefit from the recommended activity; and (4) the individual's perception of potential barriers to the activity, or the extent to which the benefits of physical activity exceed the costs associated with the recommended activity (Maddux, 1993). Further, it is proposed that a cue to act is the stimulus regarding the likelihood of the individual taking the action. Cues to action may be internal (e.g. chest-pain, some other indicator of illness) or they may be external (e.g. television advertisement). This model was originally developed to explain poor compliance with public health programmes, such as immunisation (Maddux, 1993).

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Perceived susceptibility refers to one's own belief about how likely one is to contract a disease or illness. If an individual perceives him/herself to be at risk the likelihood of him/her taking preventive measures is increased. Perceived severity refers to how contracting an illness or disease will impact the quality of life for an individual. These would include how having the disease would impact familial relations, whether there will be pain and discomfort involved, or if there is a risk of death involved. Perceived benefits refer to the intrinsic and extrinsic rewards individuals will receive by not engaging in the behaviour that poses a risk. Intrinsic rewards include how they feel about themselves for doing what is best for their health and extrinsic rewards include not having their lives impacted by the disease or illness. Perceived barriers refer to things that impede or stop the health promoting behaviour. These could include lack of knowledge, lack of time or money, inconvenience, or unpleasant states. Lastly, the cues to action are environmental factors that may serve as catalysts to jumpstart the individual into action. These cues may be in the form of attendance at a community health education program, public service announcements, or advice from a physician (see Figure 1).

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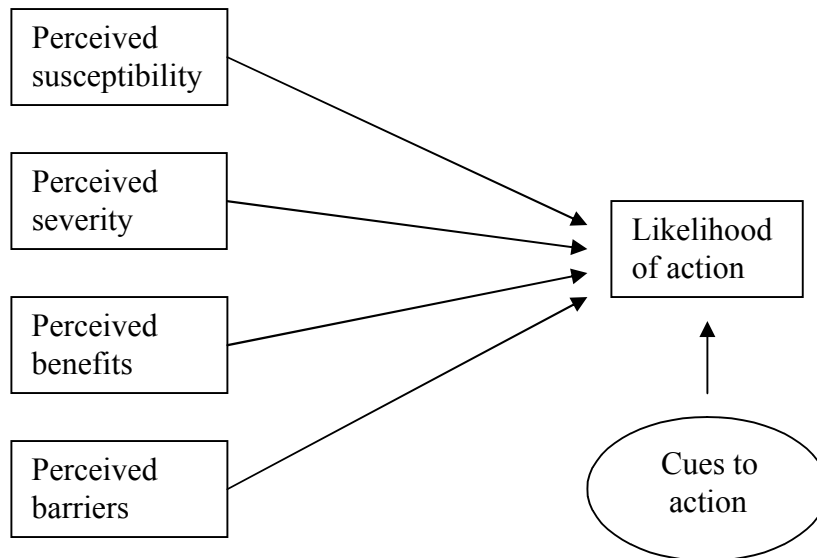


FIGURE 1 The Health Belief Model (Rosenstock, 1974)

The concept of self-efficacy was defined as one's belief in one's ability to carry out a certain action (Bandura, 1986). If an individual possesses the necessary skills and knowledge they will empower him/her to make the necessary changes. Self-efficacy is not part of the HBM, but has been added in the more recent modification of HBM to increase the explanatory power of the model. Low self-efficacy can be considered as a perceived barrier to performing or changing a health behaviour (Hanson and Benedict, 2002; Wallace, 2002). It was found to be essential to include self-efficacy in the HBM due to the possible difficulties that exist with changing health behaviours. In order to create positive lifelong changes in one's health behaviour or lifestyle, a great deal of self-confidence is necessary before any positive change can occur (Rosenstock et al., 1988).

The HBM posits the greatest likelihood that an individual will perform a health behaviour to avoid a health problem is under the following conditions. First, the individual needs to believe he/she is personally susceptible to the health problem. Second, he/she

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needs to perceive the threat of severity of the health problem. Third, the individual must believe that the benefits of performing the behaviour outweigh the barriers. Finally, internal and/or external cues must trigger the health behaviour. Accordingly, a high degree of perceived susceptibility, severity, and benefit will strengthen the possibility that the individual will perform the health behaviour, while a stronger degree of perceived barriers lessens the possibility that health behaviour would occur. In addition, threat perception, the combination of perceived susceptibility and severity will provoke the desire to perform the health behaviour (Rosenstock, 1974).

Research examining the predictive ability of the HBM in exercise settings is limited (Ferrini, Edlestein and Barrett-Conner, 1994). Various studies have shown weak but positive relationships between health-related knowledge or beliefs and health behaviour (for example, Näslund, Fredrikson, Hellenius and de-Faire, 1996), whilst others have demonstrated that health beliefs were not related to positive health behaviour (such as that by Quine, Rutter, and Arnold, 1998). Dishman (1991) showed that those who had perceptions that exercise was of minimal health value or that their health was poor exercised infrequently.

Hayslip and colleagues (1996) extended research into the health belief model through the development of scales that assessed perceptions of factors that influenced physical activity in younger and older adults as derived from the HBM. Results showed that the scales could distinguish between two populations: (1) younger adults (mean age 20.5 years) and (2) older adults (mean age 71.8 years). Younger adults were more frightened about ageing, perceived greater barriers to exercise, felt less vulnerable to health difficulties, had access to more social support influencing their exercise and health habits, and were more strongly motivated by cues to action (Hayslip et al., 1996). Using self-reports of physical activity the model was able to also distinguish between the diversity of

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physical activity among the two groups. The younger group reported greater diversity of activity than did their older counterparts. It must be noted that the older group were considered “equally healthy and independent community residing individuals” (Hayslip et al., 1996, p. 317).

Despite the consistency of significant results using the HBM, it has been criticized for its lack of emphasis on social influences on behavioural choices and its assumption that people had accurate knowledge about health risks and effective means to reduce the risks (Somkin, 1993). In addition, variables such as intentions to perform a behaviour, social pressure, and self-efficacy, which have been found to be highly predictive of behaviour, have been excluded from the HBM (Conner and Norman, 1996).

**Protection motivation theory (PMT).** Protection Motivation Theory (PMT; Rogers, 1975) is similar to the HBM, but incorporates the concept of self-efficacy. The model has the potential to account for some of the exercise behaviour determinants, especially those in a health protective context (Fruin, Pratt and Owen, 1991) and has been utilised for health decision-making and action (Maddux, 1993). PMT postulates that the intention to perform a protective behaviour (i.e., exercise) is dependent on four main factors. These factors can be grouped into two cognitive processes (1) threat appraisal, thus the assessment of the risks of performing an unhealthy behaviour and (2) coping appraisal, an assessment of the factors that influence the likelihood of performing a preventive behaviour (Maddux, 1993). In the threat appraisal process, the health threat is evaluated in terms of the factors that increase (intrinsic and extrinsic rewards) or decrease (perceived severity and vulnerability of the health threat) the probability of making a maladaptive response. For example, an individual might appraise the threat of a sedentary lifestyle – if the individual perceives that he/she is likely to suffer the effect of that lifestyle (i.e., cardiac problems) and also perceives the results of this behaviour to be severe (i.e., heart attack)

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then, it is unlikely the individual will continue to perform the unhealthy behaviour. Coping appraisal is influenced by response efficacy (the individual's confidence in the recommended preventive behaviour, i.e., exercise) and self-efficacy (the individual's perceived confidence in his/her ability to perform the desired behaviour). Hence, when an individual makes a coping appraisal higher, levels of response efficacy and self-efficacy increase the probability he/she will have an adaptive response. For example an individual that has confidence that exercise will prevent deterioration in health and is also confident he/she can perform the exercise, then the individual will probably perform the behaviour (exercise). Those with higher levels of perceived response costs (e.g. discomfort) have a decreased probability of performing the coping response (Maddux, 1993). Together, these variables combine to form protection motivation theory (see Figure 1.2).

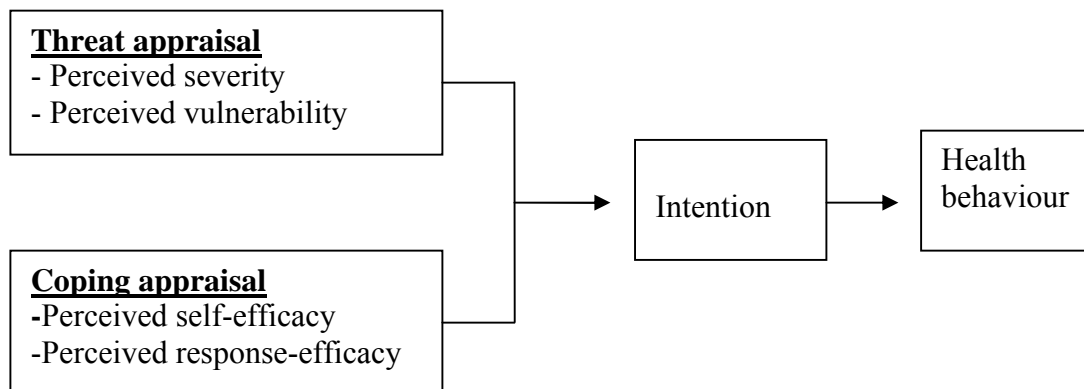


FIGURE 1. 2 Protection Motivation Theory (Rogers, 1975)

Intention, typically, is the most commonly assessed index of PMT and research has shown that self-efficacy and response efficacy are both good predictors of behavioural intention. Wurtele and Maddux (1987) appraised the revised PMT (including severity, vulnerability response efficacy, and self-efficacy). Vulnerability and self-efficacy enhanced intentions to exercise. Behaviour (self-reported changes) was predicted by intention. Maddux (1993) suggested that PMT is a useful model for understanding self-protective



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behaviour. Milne, Orbell, and Sheeran (2002) supported this suggestion, and showed that active adolescent students were more likely to adopt adaptive coping strategies when compared to their inactive counterparts. Response efficacy, response costs, and self efficacy were manipulated – these were shown to be influential on participant’s beliefs regarding the efficacy of exercise, costs associated with participating in an exercise programme, and beliefs in his/her ability to complete a programme of exercise. Response efficacy and self-efficacy both influenced which coping strategies the participants endorsed. Response had a main effect on the maladaptive strategies (fatalism and hopelessness). Participants in a high self-efficacy condition indicated a stronger behavioural intention to exercise. Those participants who exercised at a high level (more than 5hrs per week) endorsed intention to exercise and rational problem solving from the adaptive strategies. Milne et al. (2002) argued that interventions that promote response and self-efficacy could be useful in promoting adherence to exercise programmes. In a study of health related behaviour, smoking, Maddux and Rogers (1983) demonstrated that the probability of a threat’s occurrence and the effectiveness of a coping response had a main effect on intentions to take up a preventive behaviour. It was shown that self-efficacy was the most powerful predictor of behavioural intention and had a main effect on intention and interacted with two main variables of PMT – probability of a threat’s occurrence and coping response efficacy.

The PMT has been less widely criticized than the HBM; however, many of the criticisms of the HBM also relate to the PMT. For example, the PMT assumes that individuals are rational information processors (although it does include an element of irrationality in its fear component). It does not account for habitual behaviours, such as brushing teeth, nor does it include a role for social (what others do) and environmental factors (e.g. opportunities to exercise or eat properly at work). Rhodes et al. (2004) have

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also criticized the PMT for not tackling how attitudes might change (a problem with the HBM as well).

**Theory of reasoned action (TRA) (Ajzen and Fishbein, 1980; Fishbein and Ajzen, 1975).** As one of the most influential social-cognitive models developed in response to the weak attitude-behaviour relationship, the theory of reasoned action (TRA; Ajzen and Fishbein, 1980; Fishbein and Ajzen, 1975) supports the idea that people generally take into account implications of their actions before they decide to engage or not to engage in a given behaviour. In other words, behaviours are under volitional control. The TRA is based on the premise that a person's intention to perform a given behaviour is the most proximal antecedent of that behaviour. People's intentions are informed by their attitudes toward performing the behaviour and subjective norms about behavioural performance.

*Attitude* refers to the individual's positive or negative evaluation of performing a given behaviour (Ajzen and Madden, 1986; Fishbein and Ajzen, 1975). Attitudes are measured on a 7-point semantic differential scale and by using bipolar adjectives such as bad/good, harmful/beneficial, interesting/boring (Ajzen and Fishbein, 1980). Underlying the construct of attitudes are a person's *behavioural beliefs* about the likely outcomes of behavioural performance weighted by the person's positive or negative evaluation of these outcomes (i.e., advantages and disadvantages). At the operational level, the strength of behavioural beliefs is measured on 7- or 5-point Likert scales ranging from "extremely unlikely" to "extremely likely". Outcome evaluations are measured on 7- or 5-point semantic differential scales ranging from "extremely bad" to "extremely good". This relationship between behavioural beliefs and evaluation is grounded on an expectancy x value model (Feather, 1982).

*Subjective norm* is defined as the individual's perception that important others think he/she should perform a given behaviour (Ajzen and Fishbein, 1980). Subjective

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norms are usually measured on 7- or 5-point likelihood scales ranging from (1) unlikely to (7) likely (i.e. others who are important to me think that I should engage in physical activities) (Ajzen, 1985). Subjective norm is informed by a person's *normative beliefs* concerning the likelihood that specific people or groups who are important to him/her would approve or disapprove of the behaviour and the individual's motivation to comply with these expectations. At the operational level, the strength of normative beliefs is measured on 5- or 7-point scales ranging from "I should not" to "I should" (i.e. my parents think that I should engage in vigorous physical activities). These normative beliefs combine in a multiplicative fashion with a motivation to comply, which indicates the extent to which people want to do what most important others want them to do in determining subjective norms. Thus, the more favourably a person evaluates a behaviour and the higher a person's perceptions of support from important others for behavioural performance, the stronger his/her intentions to perform the behaviour and subsequent behavioural action (Ajzen and Fishbein, 1980; Fishbein and Ajzen, 1975). Importantly, the TRA holds that intention is a mediator explaining the processes by which attitudes and subjective norms influence behaviour (see Figure 1.3).

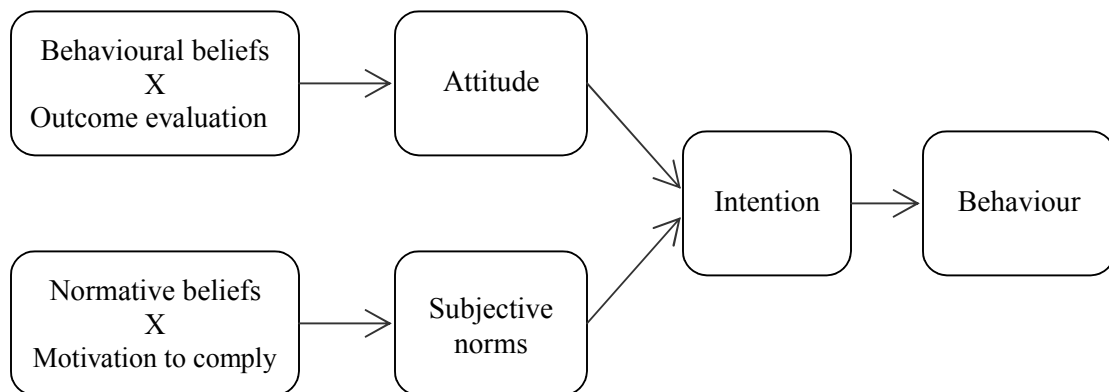


FIGURE 1.3 Theory of Reasoned Action (Ajzen and Fishbein, 1980)

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Meta analytic studies have confirmed the theory and its application to a variety of volitional health behaviours, including physical exercise (Hausenblas, Carron and Mack, 1997; Sheeran, and Taylor, 1999; Sheppard, Hartwick and Warshaw, 1988). The TRA has been corroborated in numerous studies across a number of different behaviours (Sheppard et al., 1988) such as infant-feeding (Manstead, Proffitt, and Smart, 1983), intentions to camp (Ajzen and Driver, 1991), eating behaviour (Pender and Pender, 1986), condom use (Morrison, Baker, and Gillmore, 1998; Sutton, 1998) and physical activity (Hagger et al., 2002; Morrison et al., 1998; Riddle, 1980). In social psychology, applications of the TRA have shown intention to be an important determinant of social behaviour (Sheppard et al., 1988).

Sheppard et al. (1988) conducted a meta-analysis to investigate the effectiveness of the TRA in predicting intentions and behaviours. The authors reviewed 87 separate studies involving 174 behaviours. Behaviours ranged from voting in presidential elections to resigning from a job to having an abortion to using birth control pills. Overall, the authors estimated correlations of  $R=0.66$  ( $p=0.01$ ) for the intention-attitude and subjective norm relationship and  $R=0.53$  ( $p=0.01$ ) for the intention-behaviour relationship. In other words, 43% of the variance in intention was explained by attitudes and subjective norms and 28% of the variance in behaviour was explained by intention, indicating that the TRA constructs significantly influence intention and behaviour. Even though the meta-analysis conducted by Sheppard et al. (1988) provided support for the use of the TRA in the prediction of intentions and behaviours, only 20% of the studies predicting behaviour and 11% of the studies predicting intentions used the models correctly. Several studies in the meta-analysis reported examining more than one behaviour, providing alternative choices, and not using intention as a measure. Sheppard et al. (1988) concluded, however, that the model

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performed extremely well, even if utilized in situations that did not fall within the boundaries set by the model.

In the domain of physical activity, tests of the TRA have provided strong evidence for the overall predictive value of intentions and have shown that attitudes have a pervasive effect on intentions with a lesser role for subjective norms (Hagger et al., 2002; Hausenblas et al., 1997; Riddle, 1980). In addition, formative research has shown that the TRA can be usefully applied in different populations, including children (Godin and Shephard, 1986; Greenockle, Lee, and Lomax, 1990; Theodorakis, Doganis, Bagiatis, and Gouthas, 1991), adults (Riddle, 1980) and clinical populations (Daltroy and Godin, 1989). As in social psychology, formative research on physical activity has shown that the large effects that attitudes and the small effects that subjective norms exert on intentions are not influenced by whether belief-based or direct measures of attitudes and subjective norms have been used (Theodorakis, 1991; Vallerand, Deshaies, Cuerrier, Pelletier, and Mongeau, 1992).

Moreover, panel studies have indicated that the strong effects of attitudes on intentions remain stable over time (Hagger, Chatzisarantis, and Biddle, 2001; Chatzisarantis and Hagger, 2005). However, some evidence suggests that age influences the effect of subjective norms on intentions. For example, Wankel et al. (1994) have shown that while the effect of subjective norms on intentions increases with age the converse is true for attitudes. Finally, Mummery, Spence, and Hudec (2000) have demonstrated that subjective norms predicted intentions among participants younger than 13 years old.

Although research has supported the validity of the TRA (Hagger et al., 2002; Sheppard et al., 1988), three conditions limit the utility of the TRA in predicting and explaining behaviour (Ajzen, 1985). These are the conditions of correspondence (or compatibility), stability, and volitional control. The condition of correspondence states that the predictive power of intention improves when measures of intentions and measures of

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behaviour are phrased in a way that correspond in four elements: action (e.g. exercise), target at which action is directed (e.g. vigorous exercise), time at which the behaviour is performed (e.g. over the next five weeks), and context in which the action is performed (e.g. during leisure-time). If measures are phrased in a way that do not correspond with the behaviour in one or more of these elements then, according to the principle of correspondence, predictive validity of intentions will decrease (Ajzen and Fishbein, 1977).

The second condition states that intentions can predict behaviour given that intentions have not changed before the behaviour is observed (Ajzen and Fishbein, 1980). Intentions are likely to change, the longer the time interval between assessments of intentions and behaviour, due to the learning of new beliefs that produce changes in attitudes and therefore in intentions (Sheeran and Orbell, 1998). The longer the delay, the greater the opportunities for intentional change, and hence the predictive accuracy of intentions is reduced (Ajzen, 1985).

The third condition is related to the predictive validity of intentions, and states that intentions predict behaviours that are under the complete volitional control of the individual (Ajzen and Fishbein, 1980). Generally speaking, behaviours are under complete volitional control when they can be performed at will, and are not facilitated or impeded by personal (i.e. low ability) and/or environmental factors (i.e. time, other habits) (Ajzen, 1985; Ajzen and Fishbein, 1980; Ajzen and Madden, 1986). When other factors influence performance of behaviour and the individual cannot control the impact that those other factors exert on behaviour then, according to Ajzen and Fishbein (1980), intentions may be less good predictors of behaviour.

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**Theory of planned behaviour (TPB).** The theory of planned behaviour (TPB; Ajzen, 1985, 1991) is an extension of the theory of reasoned action (TRA) introduced by Fishbein and Ajzen (1975). The TRA formulates that attitudes and subjective norms determine individuals' intentions to perform a given behaviour, and intentions to perform a behaviour correlate with actual behaviours. The TRA has provided strong support for predicting volitional behaviours, but it predicts poorly the behaviours that are not purely under individuals' volitional control (Ajzen, 1985, 1991). An example would be in the case of a person who has a high motivation to exercise (behaviour), but does not actually do so due to environmental conditions such as availability of place and sport equipment. A possible reason for this may be that there are multiple factors influencing one's intention, which complicates prediction of behaviour from intention.

The later addition of perceived behavioural control to the TRA has helped to account for additional variance in predicting behavioural intentions and behaviours and has extended the theory to successfully explain actions or behaviours that are not completely under individuals' volitional control (Ajzen, 1991). PBC is a construct describing how easy or difficult the performance of the behaviour is (Ajzen, 1991). Perceived behavioural control is related to Bandura's (1982) self-efficacy concept, which refers to perceptions of personal ability, but also comprises an external component, which refers to perceptions of control over environmental constraints (perceived control) (Conner and Armitage, 1998; Terry and O'Leary, 1995).

Perceived behavioural control is usually measured by people's perceptions of how much control they have over the performance of behaviour (e.g. "For me to exercise vigorously in the next five weeks would be easy/difficult"). However, this element of perceived behavioural control reflects past experience as well as external factors, such as anticipated resources and opportunities that may influence the performance of the

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behaviour (Ajzen, 1991). Perceived behavioural control is also a function of two types of beliefs: control beliefs, which refer to the likelihood that a factor that prevents or facilitates behaviour will occur, and perceived power, which refers to the perceived power of the barriers to actually prevent or facilitate the performance of a behaviour. As seen in the theoretical model in Figure 1.4, the theory of planned behaviour postulates that behaviour is predicted indirectly from perceived behavioural control through the mediating effect of behavioural intention, as well as directly from behavioural intention and perceived behavioural control (Ajzen, 1991).

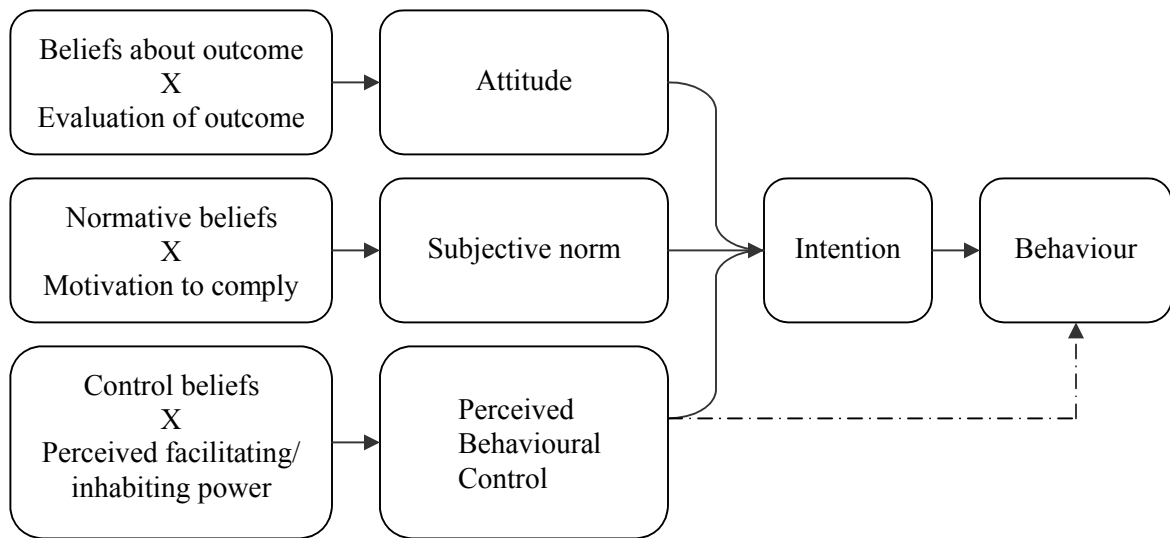


FIGURE 1.4 Theory of Planned Behaviour (Ajzen 1985)

In summary, attitude toward the behaviour, subjective norm, and perceived behavioural control result in the development of a behavioural intention influence a person's intention to act. According to Ajzen (1991), the more favourable the attitude, subjective norm, and perceived behavioural control toward a behaviour, i.e. when people



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evaluate a behaviour positively, believe that important others think they should perform it, and perceive control over it, the stronger should be their intention to engage in that behaviour. Intention is considered the direct antecedent of behaviour because given an adequate degree of actual control over a certain behaviour, individuals are expected to carry out their intentions. However, given the fact that many behaviours are not under one's complete volitional control, in addition to intention, perceived behavioural control can be considered.

The usefulness of the theory of planned behaviour in predicting behavioural intention, and behaviour generally, and health-related intention, and behaviour more specifically, has been supported by several theoretical and meta-analytic reviews. For example, in their meta-analytic review of 185 independently published studies on the theory of planned behaviour with regard to a variety of behaviours, including physical activity and exercise, Armitage and Conner (2001) found that across all behaviours the theory of planned behaviour accounted for 27% of the variance in behaviour. Overall, the perceived behavioural control construct added an average of 2% to the prediction of behaviour, over and above intention. These authors also found that attitude, subjective norm, and perceived behavioural control combined accounted for 39% of the variance in intention, with the perceived behavioural control -intention correlation independently accounting for 6% of the variance, controlling for attitude and subjective norm. The subjective norm-intention correlation was found to be significantly weaker than the other relationships with intention. Ajzen (1991) reviewed 16 studies to examine the prediction of intention in the theory of planned behaviour model. He found that a considerable amount of the variance in intention could be accounted for by the three predictors in the theory of planned behaviour model (attitude, subjective norm, and perceived behavioural control),

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with 18% to 88% of the variance being accounted for by these predictors for the different behaviours examined.

Sheeran (2002) found that intentions accounted for 28% of the variance in behaviour across 422 longitudinal studies. Similarly, attitudes, subjective norms, and perceived behavioural control, generally, account for 40–60% of the variance in intentions (e.g. Armitage and Conner, 2001; Godin and Kok, 1996; Sheeran and Taylor, 1999). A number of studies have also pointed out that the theory of planned behaviour is superior to the theory of reasoned action in predicting and explaining social behaviour (Armitage and Conner, 2001; Armitage and Conner 1999b; Hagger et al., 2002). For example, several studies have shown perceived behavioural control to exert pervasive effects on different types of intentions (Armitage and Conner 1999a), such as intentions to support performance of behaviour (Atsalakis and Sleaf, 1996) and studying intentions (Sideridis, Kaissidis, and Padelidiu, 1998), as well as health related intentions (Godin and Kok, 1996) like intentions to use condoms (Sheeran and Orbell, 1998; Sheeran, Orbell, and Trafimow, 1999), and intentions to use a helmet (Quine, Rutter, and Arnold, 2001). In addition, it has been shown that the effect of perceived behavioural control on intentions is strong and that it is not influenced by questionnaire format and social desirability (Armitage and Conner, 1999b).

Conner and Sparks (1996) also reviewed the utility of the theory of planned behaviour in explaining engagement in a variety of health-related behaviours. However, their review focused primarily on the utility of the perceived behavioural control construct in the prediction of intention and behaviour. Overall, these authors' review suggested that the perceived behavioural control construct added significantly to the prediction of behavioural intention and actual behaviours, including smoking and alcohol consumption. For other behaviours, such as sexual behaviours, exercise, and breast/testicle self-

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examinations, perceived behavioural control was found to add significantly to the prediction of intentions but not behaviour.

The theory of planned behaviour has been used extensively as a theoretical framework for explaining behaviour in the physical activity and exercise domain for numerous populations including youth (Abraham & Graham-Rowe, 2009; Hagger et al., 2002), competitive athletes (Mummery and Wankel, 1999), and those who are apparently healthy (Bryan and Rocheleau, 2002). There have been various reviews conducted over the years examining the theory of planned behaviour in physical activity settings. In one of the earliest narrative reviews, Godin (1993) summarized the published studies applying the theory of reasoned action and theory of planned behaviour to the prediction of exercising intention and behaviour. [Among the eight published studies that included the theory of planned behaviour,] all of the studies showed additional variance explained in behavioural intention by the construct of the perceived behavioural control over and above that accounted for by the theory of reasoned action. He found partial support for the usefulness of the theory of planned behaviour in predicting actual exercise behaviour with two studies (of the six that assessed behaviour) reporting significant contributions by the perceived behavioural control to predicting behaviour above that explained by intention. In a meta-analytic review of 31 studies, Hausenblas, Carron, and Mack (1997) found that the theory of planned behaviour predicted physical activity intentions and behaviour very well. Hausenblas et al. (1997) found large effect sizes for relationships between intention and attitude ( $ES = 1.22$ ), intention and perceived behavioural control ( $ES = 0.97$ ), behaviour and intention ( $ES = 1.09$ ), behaviour and attitude ( $ES = 0.87$ ), and behaviour and perceived behavioural control ( $ES = 1.01$ ). The relationship between intention and subjective norms revealed a medium effect size ( $ES = 0.56$ ), while the relationship between behaviour and subjective norm was zero-order. An effect size is a standardized value that is calculated by

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dividing the difference in means by the standard deviation (Thomas and Nelson, 2001).

Effect sizes in this case were categorized based on the recommendation of Cohen (1992) where values of .20, .50, and .80 were grouped as small, medium, and large, respectively.

In addition, a number of studies have shown that perceived behavioural control predicts intentions and behaviour equally well (Hagger et al., 2002) and that the effect of perceived behavioural control on intentions is not influenced by whether direct measures or belief-based measures of control were utilised (Godin, Valois, Jobin, and Ross, 1991). Further, formative studies have demonstrated that perceived behavioural control influences the effects that attitudes exert on intentions, such that attitudes predicted intentions only among individuals who were characterised by strong perceptions of control (Kimiecik, 1992). Moreover, there is evidence to suggest that the effect of perceived behavioural control on intentions is particularly pronounced for women and for older populations (Biddle, Goudas and Page, 1994; Wankel et al., 1994).

As indicated above, the relationships predicted by the theory of planned behaviour have generally been supported in the exercise setting in the general population and for the young population in particular. A number of studies have found the theory of planned behaviour to be predictive of both intentions to exercise and exercise behaviour itself in young people. Using the theory of planned behaviour, Bryan and Rocheleau (2002) were able to account for 67% of the variance in intention to engage in resistance training and 40% of the variance in actual resistance training behaviour in male and female students. In another study, Okun, Karoly, and Lutz (2002) found smaller but still significant results in studying leisure-time exercise behaviour in 530 students. Okun et al. found that the theory of planned behaviour was able to account for 35% of the variance in intention and 20% of the variance in leisure-time exercise behaviour. Sniehotta (2009) found that perceived behavioural control was only predictive of intention; furthermore, neither attitude nor

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subjective norms were predictive of intention. While subjective norms have consistently been regarded as the weakest of the theory of planned behaviour constructs (e.g. Blue, 1995; Hagger et al., 2002), the finding of attitudes not being a significant predictor was unexpected (Hausenblas et al., 1997). Studies such as these with the support provided by various reviews and meta-analyses suggests that the theory of planned behaviour is a valid and reliable theoretical framework for examining exercise behaviour generally, and in young people, specifically.

**TPB extensions and modifications.** One clear conclusion to emerge from formative research is that the theory of planned behaviour does not account for all determinants of intentions and behaviour (Armitage and Conner, 2001; Hagger et al., 2002), and for these reasons many researchers have proposed extensions and modifications of these theories (such as Conner and Armitage, 1998). This is supported by Ajzen (1991) who posits that the theory of planned behaviour is open to additional predictors if it is shown that they capture a significant portion of variance in intentions or behaviour after the theory's current variables have been taken into consideration. As a consequence, a number of constructs have been introduced into the framework of the theory of planned behaviour.

**Past Behaviour and Habit.** A major addition to the model is past behaviour. The theory of planned behaviour assumes that human behaviour is reasoned and follows the evaluation of attitudinal, normative, and control beliefs, and that evaluation of the beliefs produces corresponding intentions that guide behaviour. The notion that human behaviour is reasoned has been challenged by several researchers (e.g. Aarts, Verplanken, and van Knippenberg, 1998; Fazio, 1990). The theories of reasoned action and planned behaviour focused on deliberative processes and pay no attention to the effect of automatic mental processes on behaviour (Fazio 1990). In general, deliberative processes are characterized by considerable cognitive work and effort. It involves scrutiny of available information and

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analysis of attributes of behaviour (e.g. costs and benefits). Conversely, automatic processes might be characterized as follows: unintentionality, uncontrollability, lack of awareness, and efficiency (Bargh, 1996). Habitual behaviour appears to be under the control of automatic or unconscious cognitive processes (Aarts et al., 1998).

This stream of research assumes that human behaviour can be automatic and habitual and that individuals may use a simplified decision rule (Aarts et al., 1998). For example, Verplanken, Aarts, and van Knippenberg (1997) suggest that individuals who performed a travel behaviour frequently in the past were less likely to search for new information regarding the mode of travel and were more likely to focus on the habitual choice than on alternative choices. If human behaviour is habitual, or not completely reasoned, past behaviour thus has a direct effect on behaviour. If human behaviour is reasoned, prior experience or past behaviour should exert an influence on behaviours through intentions, and possibly, through attitudes and perceived behaviour control. Ajzen (1991) argues that the effects of past behaviour are mediated by perceived behavioural control because repetition of behaviour may lead to a better perception of how much control an individual has over the behaviour. Conner and Armitage (1998) analysed 11 studies related to the role of past behaviour in the theory of planned behaviour and did not find a strong correlation between past behaviour and perceived behavioural control. However, the notion that past behaviour is directly related to intentions and behaviours has been supported by a number of studies (Hagger, Chatzisarantis, and Biddle, 2001; Chatzisarantis and Hagger, 2005). Conner and Armitage found that past behaviour explained an average of 7.2% of the variance in intentions and 13% of the variance in behaviours. Bamberg, Ajzen, and Schmidt (2002) provided evidence that past behaviour had a direct path to intentions and to behaviours in the context of choice of transportation methods. Hagger et al.'s (2002) meta-analysis on exercise behaviours indicated that past

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behaviour had a moderate or strong relationship with intentions ( $r = .37$ ) and behaviours ( $r = .55$ ). More importantly, the inclusion of past behaviour lowered the correlation between intentions and behaviours. A number of other studies have shown that past behaviour is significantly related to later behaviour, over and above the effects of attitudes and perceived behavioural control (Bagozzi, 1992; Sutton, 1994).

However, it is important to acknowledge that inclusion of past behaviour in the theory of planned behaviour is important because it tests sufficiency of the theory of planned behaviour and helps identify the actual predictive power of attitudes, subjective norms and perceptions of control. For example, because past behaviour reflects effects from innumerable antecedents that influenced behaviour in the past, it can act as a statistical control that helps identify effects that are uncontaminated by variables that caused the behaviour in the past. Because formative research shows that past behaviour predicts intentions and behaviour (Hagger et al., 2002), it can be suggested that the theory of planned behaviour insufficiently captures determinants of physical activity participation (Rhodes and Courneya, 2003, 2004).

**Descriptive norms.** One reason why studies have not always observed effects of subjective norms on intentions may be that subjective norms insufficiently capture social influences, and for this reason subjective norms appear not to predict intention (Groube, Morgan, and McGree, 1986). Several studies have indicated that descriptive norms, constructs that aim to indicate the extent to which significant others are actually engaging in social behaviour (e.g. Cialdini, 2003; Cialdini, 1990), and subjective norms are conceptually distinct constructs (Donald, and Cooper, 2001), and that descriptive norms have a unique effect on intentions independent of the traditional subjective norms (Berg, Jonsson, and Conner, 2000; Grube, Morgan, and McGree, 1986; Nucifora, Gallois, and Kashima, 1993; White, 1994). Further, Grube et al. (1986) observed a moderating effect of

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descriptive norms on the subjective norms-intention relationship. In accordance with the contingent-consistency hypothesis Acock and DeFleur (1972) show that the relationship between attitudes and intentions to smoke increases as descriptive norms increase (Grube et al., 1986). However, Conner et al. (1998) have shown that descriptive norms and subjective norms do not possess discriminate validity and that a single social factor that includes descriptive and subjective norms predict intentions to use Ecstasy (see also Fishbein, 1993). Other exceptions include Conner and McMillan's (1999) study of cannabis use and Povey, Conner, Sparks, James and Shepherd's (2000) study of dieting in which descriptive norms did not exert main or moderating effects on intentions. Therefore, social-psychological studies have not consistently found main or moderating effects from descriptive norms on intentions. In the domain of physical activity, descriptive norms have been shown to exert a unique effect on physical activity intentions (Baker, 2003). However, the moderating effects that descriptive norms exert on the attitude-intention relationship are less well understood and often studies report strong correlations between descriptive norms and subjective norms (Conner and Sparks, 1996; Hagger and Chatzisarantis, 2005).

**Self-efficacy.** Ajzen (2001) indicates that the concept of perceived behavioural control is similar to self-efficacy in social cognitive theory (Bandura, 1977, 1989, 1997). However, several authors (e.g. Armitage and Conner, 2001; Terry, 1993) maintain that self-efficacy and perceived behavioural control are not interchangeable and are two different concepts: the extent to which an individual has access to the means to exert control over the target behaviour, termed perceived controllability (Ajzen, 2002), and an individual's situation-specific self-confidence for engaging in the behaviour, labelled self-efficacy (Manstead and van Eekelen, 1998; Terry and O'Leary, 1995). Terry and O'Leary (1999) analysed the constructs of self-efficacy and perceived behavioural control in different contexts. Their analysis revealed that regarding individuals' exercise behaviours, self-



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efficacy predicted intentions and perceived behavioural control predicted exercise behaviours. Recent re-conceptualizations maintain that self-efficacy is more closely related to the internal factor of control and that perceived behavioural control is more related to the external factor of control (e.g. Conner and Armitage, 1998). De Vries, Dijkstra, and Kuhlman (1988) supported the use of self-efficacy to predict intentions and behaviours. Armitage and Conner (2001) provided evidence to support a distinction between self-efficacy and perceived control over behaviours. Armitage and Conner's meta-analysis showed that the constructs of self-efficacy and perceived behavioural control had a comparable level of correlation with both intentions and behaviours and that multiple correlation coefficients were approximately .40. Additionally, the meta-analysis showed that perceived behavioural control and self-efficacy explained an additional 5% of the variance in intentions and 2% in behaviour. Self-efficacy contributed 7% of the variance explained in intentions and approximately 2% of additional variance explained in behaviour. More recent research that adopted this distinction has found that, for example, self efficacy was a significant predictor of individuals' intentions to exercise, and perceived behavioural control did not predict intentions (Jackson, Smith, and Conner, 2003). Hagger, Chatzisarantis, and Biddle (2002) provided support for such a distinction when they revealed that perceived behavioural control and self-efficacy have separate influences on intentions to participate in physical activity. However, other studies have found effects from perceived controllability and self-efficacy on both intentions and behaviour (e.g. Manstead and van Eekelen, 1998; Povey et al., 2000).

**Self-identity.** The role of the self in interpersonal behaviour has stimulated research into how self-identity may influence intentions within the theory of planned behaviour (Sparks, Hedderley, and Shepherd, 1992). In general, the construct of self-identity describes the extent to which a person construes a role-behaviour, such as mother, father, or exerciser

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as an important part of who he/she is (Terry, Hogg, and White, 1999). Identity theory (Stryker, 1968), the theoretical basis of the self-identity construct, conceives the self as a differentiated concept that comprises a collection of different role identities that reflect the roles that a person occupies in the social structure. Identity theory also predicts that when a behaviour has been performed frequently in the past, and thus comes under habitual control, decisions to engage in behaviour should depend more on the importance of the behaviour for the person's self-identity than on judgements and feelings about the behaviour (Charng, Piliavin, and Callero, 1988). Therefore, identity theory predicts a link between self-identity and intentions and this link entails that self-identities motivate behaviours because behaviours serve to validate a person's status as a role member (Callero, 1985).

In social psychology and physical activity literature, several studies have included self-identity as an independent predictor of intentions in the theory of planned behaviour, and have demonstrated its explanatory value and conceptual distinction from attitudes (Armitage and Conner, 2001; Biddle, Bank and Slavings, 1987; Bissonnette and Contento, 2001; Charng et al., 1988;; Conner et al., 1999; Fekadu and Kraft, 2001; Sparks et al., 1992; Sparks and Guthrie, 1998). Physical activity studies have also demonstrated the importance of self-identity in predicting physical activity intentions (Theodorakis, 1994; Theodorakis, Bagiatis, and Goudas, 1995) and physical activity behaviour (Theodorakis, 1994) after effects from components of the theory of planned behaviour have been taken into consideration. However, in social psychology and physical activity literature, the processes by which self-identity influences intention and behaviour are less well understood. For example inconsistent with Charng et al.'s (1988) prediction that self-identity is an important part of the processes underlying habitual behaviour, Terry et al. (1999) have found that self-identify facilitates both deliberative and habitual (recycling)

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behaviour (see also Kelly and Breinlinger, 1995). Most important, studies have reported small to large effects of self-identity on intentions (Armitage and Conner, 2001; Conner et al., 1999; Terry et al., 1999), and self-identity to be strongly correlated with attitudes (Conner et al., 1999; Terry et al., 1999; Theodorakis et al., 1995), subjective norms and descriptive norms (Armitage and Conner, 2001; Sparks and Guthrie, 1998).

### *Overview of the Thesis*

Thus far, important theories of intentional behaviour including social cognitive theory, health belief model, protection motivation theory, theory of reasoned action, and theory of planned behaviour were reviewed. The theory of planned behaviour is used and applied in this thesis because it is a popular psychological model that has received wide attention in social psychology and it has been used widely for understanding physical activity (Godin and Kok, 1996; Hagger et al., 2002). Moreover, some extensions and modifications of the theory of planned behaviour have been discussed, including past behaviour, descriptive norms, self-efficacy and self-identity.

**In the next chapter.** The sample of this study will include both Saudi men and women. The age of this sample will range from thirteen to seventeen years. The purpose of this study is to elicit modal salient behavioural, normative, and control beliefs. Gender differences on beliefs will also be examined. Following the theory of planned behaviour, six open-ended questions asked students for their perceptions about (a) performing physical activity at least 30 minutes each day; (b) advantages of participating in physical activity; (c) disadvantages of doing so; (d) people who approve of participation; (e) people who disapprove; (f) things that make it easy; (g) and things that make it hard. Content analysis revealed categories of salient consequences, reference groups, and circumstances. Given

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that there are no previous studies that examined beliefs about physical activity in a Saudi Arabian context, no formal hypotheses are made.

**In chapter four.** Psychometric properties for questionnaires on beliefs and the theory of planned behaviour with additional variables will be presented in this chapter, including a pilot study, instrument development, reliability, correlations, principal components analysis, two-way ANOVA, and current level of physical activity. It should be noted here that the sample and data used in chapters 4-6 are largely the same.

**In chapter five.** In this study the validity of the theory of planned behaviour model in predicting intentions will be examined. In addition, this study will determine what beliefs, attitudes, subjective norms, and perceptions of control Saudi adolescents have about participation in physical activity. In accordance with tenets of the theory of planned behaviour (Ajzen, 1991) and previous physical activity research, it is expected that attitudes, subjective norms and perceptions of control will predict intentions (hypotheses 1, 2, and 3). What is more, this study will investigate the sufficiency of the theory of planned behaviour model by including self-efficacy, descriptive norms, self-identity, and past behaviour. It is hypothesised that self-efficacy, self-identity, descriptive norms, and past behaviour will predict intentions (hypotheses 4, 5, 6 and 7), as previous research has shown (Hagger et al., 2002). Finally, it was hypothesised that behavioural, normative, and control beliefs toward vigorous exercise will be significantly associated with attitude, subjective norms, and perceived behavioural control about exercising vigorously (hypotheses 8, 9 and 10).

**In chapter six.** This study aims to assess the theory of planned behaviour model in predicting Saudis' physical activity behaviour. Hypotheses regarding the variables that would predict exercise and physical activity behaviours will be as follows: (1) intentions to participate in physical activity will significantly predict physical activity behaviour

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(hypothesis 1), (2) perceived behaviour control to participate in physical activity will significantly predict physical activity behaviour (hypothesis 2), and (3) past behaviour to participate in physical activity will significantly predict physical activity behaviour (hypothesis 2).

**In chapter seven.** Results from all studies are discussed in relation to tenets of the theory of planned behaviour and contemporary research. In addition, we defer discussion of theoretical and applied implications, strengths and limitations, and future research for the entire PhD to this chapter.

### Chapter Three: Elicitation of Model Salient Beliefs

#### Introduction

The theory of planned behaviour postulates that attitude, subjective norm, and perceived behavioural control can be assessed directly by asking respondents to rate each construct on a set of scales (Ajzen, 2002b). These predictors also can be measured indirectly using corresponding beliefs. Attitudes arise out of a combination of beliefs that behaviour will lead to certain consequences (behavioural beliefs) and evaluations of these consequences (Ajzen, 1991). Subjective norms and perceived behavioural control are also proposed to have similar origins. Subjective norms are determined by a combination of normative expectations of specific referent groups (normative beliefs) and a motivation to comply with those groups (Ajzen, 1991). Perceived behavioural control is determined by beliefs about the presence of factors that may facilitate or impede the performance of a behaviour (control beliefs) and the perceived power of those facilitative and/or constraining factors (Ajzen, 1991). By utilising predictor variables through the beliefs participants hold, researchers can understand why people hold certain attitudes, subjective norms, and perceptions of behavioural control (Ajzen, 2002a).

Ajzen and Fishbein (1980) introduced a method to elicit information about salient beliefs in a given population. They called these salient beliefs *modal salient beliefs*. Typically these modal salient beliefs are obtained from a representative sample of the population. To determine a sample's salient beliefs, Ajzen and Fishbein recommended that researchers: (a) conduct an elicitation study with open-ended questions assessing a sample's behavioural, normative, and control beliefs; (b) perform a content analysis to rank-order the beliefs; and (c) determine the five to eight most salient beliefs.

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However, some researchers have argued that a model with eight beliefs is unrealistic. Human capacity for information processing is limited, and because of this limitation, people are not able to process eight beliefs during attitude formation (Payne et al., 1993). Instead, van der Pligt and Eiser (1984) have argued that models with up to five beliefs should provide a more realistic picture of information processing. Indeed, in a series of studies, van der Pligt and Eiser (1984) were able to show that models with five and eight modal salient beliefs provided the same amount of information about attitude formation. Similarly, in a study of physical activity, Chatzisarantis, Hagger, Biddle, and Smith (2005) pointed out that people cannot recall more than four beliefs about physical activity.

Although elicitation studies are beneficial, most theory of planned behaviour and physical activity studies are conducted without them (Symons Downs and Hausenblas, 2001). While elicitation studies are not necessary for predicting physical activity intention and behaviour, a lack of elicitation studies in the physical activity literature may compromise the theory of planned behaviour's utility for understanding and explaining physical activity. Thus, research examining elicitation studies is warranted for at least two reasons. First, it is important to identify the salient physical activity beliefs of a variety of populations because not all people share the same thoughts and feelings about physical activity. More specifically, people's physical activity beliefs are acquired from a variety of sources such as their family environment, personal experiences, and interactions with other people. As a result, some beliefs may persist over time, others may be forgotten, and new beliefs may be formed by both positive and negative experiences (Ajzen and Fishbein, 1980). Thus, to understand the psychosocial and cognitive determinants of people's physical activity, it is important to identify which of their physical activity beliefs most strongly determine their attitude, subjective norm, and perceived behavioural control. For example, while researchers have reported the most common physical activity beliefs of

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healthy populations (Carron et al., 2003), it is unclear whether they represent the salient physical activity beliefs of specific populations at risk for sedentary behaviour.

Second, it is important to examine the participants, measures, and procedures of elicitation studies because inadequate methods can compromise the theory of planned behaviour's ability to lead to an understanding of physical activity intention and behaviour. More specifically, if the elicitation sample and the sample that is used to predict intention and behaviour (i.e., the main theory of planned behaviour participants) do not correspond with respect to their demographic characteristics (e.g. type of population, age range, sex, ethnicity, socioeconomic status), then the beliefs emerging from the elicitation study participants may not represent those of the main theory of planned behaviour participants. For example, if an elicitation study is conducted with a sample of adolescents in Saudi Arabia, then the main theory of planned behaviour study participants should also be adolescents in Saudi Arabia. Alternatively, if the main theory of planned behaviour study were conducted with older Western people, the salient physical activity beliefs of these people are likely to be different. In the latter case, researchers are measuring the beliefs of one population, and the attitude, subjective norm, and perceived behavioural control of another population, and there is a lack of correspondence between the elicitation and main theory of planned behaviour study participants. Thus, the utility of the theory of planned behaviour for explaining the psychosocial and cognitive determinants of physical activity behaviour are compromised (Ajzen, 1991).

### **Purpose of the study**

To apply the theory of planned behaviour to understand the psychosocial determinants of physical activity behaviour among Saudi middle and high school students, I first conducted a qualitative study. Ajzen (2002) suggested that because attitude, subjective



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norm, and perceived behavioural control are assumed to be based on corresponding sets of beliefs; an elicitation study is required to identify the salient beliefs underlying the decision to participate in physical activity held by this particular priority group of Saudi middle and high school students. Specifically, the study will identify behavioural beliefs/salient consequences, normative beliefs/social referents, and control beliefs /salient circumstances. Through the elicitation study, researchers can construct a list of the most commonly held beliefs in the research population, and those beliefs provide the basis for constructing a standard questionnaire for the main study (Ajzen, 2002).

### **Method**

#### **Participants and Procedure**

The target population in this study was young Saudi students from Saudi Arabia who ranged in age from fourteen to eighteen years old. With the coordination of the Saudi education ministry, I was given permission to distribute the open-ended questionnaires to boys and girls at middle and high schools\*. The questionnaires were distributed to 105 participants in four different schools in Riyadh (N = 105, male = 51, female = 54, age M = 15.2 years, SD = 1.7). The data were collected from the students during class lectures. All participants were assured that their participation was voluntary, their responses confidential, and only the principal investigator would have access to the raw data.

#### **Measures**

Using questions used originally by Ajzen and Fishbein (1980), this elicitation study used an open-ended response questionnaire to elicit the modal salient behavioural beliefs/salient consequences, normative beliefs/social referents and control beliefs /salient

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\* The Saudi students are aged between 13 to 15 years in the middle school and 16 to 18 in high school. The targeted ages in this study were between 14-18 years

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circumstances. Initially, the questionnaire was developed by translating the items into Arabic version and then translating them back. In elicitation study of this research, respondents were given a description of the behaviour in terms of target, action, context, and time (TACT) and were asked a series of open-ended questions to elicit beliefs.

In addition to demographic questions, participants responded to open-ended questions that asked about advantages and disadvantages of participation in vigorous leisure-time physical activity (behavioural beliefs/salient consequences), for example, “in your opinion what are the advantages/disadvantages of participating in vigorous physical activity for at least 30 minutes, three times per week, during leisure time?”; groups or individuals that would approve and disapprove of participating in vigorous physical activity (normative beliefs/social referents) for example, “who do you think will approve/disapprove of your participating in vigorous physical activity for at least 30 minutes, three times per week, during leisure time?”; and factors that make vigorous physical activity easy and difficult (control beliefs /salient circumstances), for example, “what factors or circumstances would enable/make it difficult for you to participate in vigorous physical activity for at least 30 minutes, three times per week during leisure time?”.

### **Translation of the Open-ended response Questionnaire**

The back-translation method is very important for a researcher to use for a scale translated from one language to another, because the method may guarantee equivalence of content between the original and the translated versions of instruments (Jones, Lee, Pillips, Zhang, and Jaceldo, 2001). In addition, the back-translation method is necessary since literal (direct) translations of measures may convey a completely different meaning (Sechrest and Fay, 1972; Streiner and Norman, 1989). Therefore, Arab researchers need to

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be familiar with strategies that can assist researchers in obtaining reliable and valid instruments that are culturally acceptable and in the language of the participants. In this study, the questionnaire was first constructed in English. Since the native language of the respondents is Arabic, the questionnaire was translated into Arabic. The method of back-translation was used to adapt the survey to Arabic and English, and items were presented in the same order as those in the English version. A panel of two Arab professors reviewed the English and Arab versions. Difficulties with the translation were discussed and resolved by the panel, with consensus then achieved. Please see Appendix A for a copy of an open-ended response questionnaire.

### **Data Analysis**

Content analysis suggested by Ajzen (2002b) was used to analyse the data from the elicitation study. The purpose of the content analysis was to identify categories of positive and negative outcomes or consequences of performing the behaviour of individuals or social groups who serve as social referents, and of easy and difficult circumstances in which to perform the behaviour. As recommended by Ajzen and Fishbein (1980), where content categories were identified, data were systematically coded to enable numerical analysis. Common and similar answers were grouped together as a broad belief. Once all codes were assigned, a frequency count was conducted based on the number of times a particular item appeared in the data. These beliefs were then arranged in a descending order of frequency counts. The final decision to be made concerned which of the beliefs to include in the modal salient set. Ajzen and Fishbein (1980) propose, as a rule of thumb, to use those beliefs that exceed a certain frequency. In the present study, a 30% criterion is adopted in assessing modal salient beliefs. That is, a belief is considered to be modal when it is mentioned by at least 30% of the sample.

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### Results

#### Behavioural beliefs/Salient Consequences

Table 3.1 presents the salient consequences of participating in physical activity perceived by Saudi adolescents (N = 105). As shown, for the whole population, only four behavioural beliefs exceed Ajzen and Fishbein's (1980) 30% criterion. Comparing these tables reveals that these students saw more positive outcomes than negative ones. The most frequently mentioned advantage, "weight control", was mentioned by over half (60%) of the students. Many of the perceived consequences involved physical health outcomes. In fact, the three most frequently mentioned advantages of physical activity (i.e., "weight control", "being active and body energy", "fitness") can be viewed as physical health consequences. The most frequently mentioned disadvantage, "cause fatigue", was mentioned by 31% of the students.

Salient consequences concerning outcomes related to "weight control", "being active and body energy", "fitness", and "cause fatigue" were the modal salient consequences for the whole sample. Females endorsed the same behavioural beliefs as males. It is also evident from Table 3.1 that while the content of modal salient consequences was similar for both genders, the order of outcomes changed. That is, while consequences related to fitness were the most popular beliefs in the list of modal salient consequences for the male sample, this consequence was the third most popular belief in the list of modal salient consequences for the female sample. By contrast, "weight control" was the most salient consequence for the female sample, but was the third most popular salient consequence for the male sample.

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Table 3.1 Behavioural Beliefs/Salient Consequences of Participating in Physical Activity

Number	Salient Advantages	Total N=105			
		Number	%	Males %	Females %
1	Weight control	64	60	32	65
2	Being active and body energy	49	47	33	51
3	Fitness	37	35	35	41
<b>Salient disadvantages</b>					
1	Cause fatigue (tired)	33	31	30	38

### Normative Beliefs/Salient Social Referents

Table 3.2 shows what the individuals and groups mentioned when these students were asked who approved and disapproved of their engaging in physical activity. Clearly, most of the salient referents for this behaviour (whole sample) were family, friends, mothers, fathers, and brother. The most frequently mentioned approving group, “friends”, was mentioned by 47% of all Saudi students (including males and females). Interestingly, no disapproving groups exceeded the 30% criterion.

Salient social referents regarding influences from mother and brother are modal for the female sample because more than 30% of the female sample endorsed this belief; however, these social referents were not modal for the male sample. Interestingly, social

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referents were mentioned more frequently for the female sample across the model normative beliefs than male population.

TABLE 3.2 Normative Beliefs/Salient Social Referents of Participating in Physical Activity

Number	Salient Social Referents	Total N=105			
		Number	%	Males %	Females %
1	Friends	49	47	43	48
2	Father	38	36	31	41
3	Mother	35	33	21	46
4	Family	34	32	31	33
5	Brothers	32	30	25	35

### Control beliefs/Salient Circumstances

Table 3.3 presents the circumstances (e.g. lack of place, lack of time, bad weather, and lack of sport equipment) that were mentioned as circumstances that made participating in physical activity for at least 30 minutes, three times per week, during leisure time more difficult. The most frequently reported barrier to physical activity, “lack of place”, was mentioned by about half (49%) of the students. Interestingly, no circumstances were mentioned that facilitated participating in physical activity for at least 30 minutes, three times per week, during leisure time.

As it is shown, while four salient circumstances can be considered as modal control beliefs for the female sample, only three are modal for the male sample. Barriers reflecting

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lack of place, lack of time, and bad weather were endorsed by at least 30% of the male and female samples. Specifically, while the barrier concerning “lack of sport equipment” was endorsed by at least 30% of Saudi females, this barrier was not popular among the male sample.

TABLE 3.3 Control Beliefs/Salient Circumstances Hindering Participating in Physical Activity

Number	Salient Circumstances that Hinder	Total N=105			
		Number	%	Males %	Females %
1	Lack of place	51	49	44	47
2	Lack of time	43	41	35	51
3	Bad weather	39	37	33	41
4	Lack of sport equipment	32	33	03	39

## Discussion

The purpose of this study was to determine salient consequences, social referents, and salient circumstances that form the belief structure underlying intention. It is essential that these salient beliefs be elicited for each new behaviour and for each new population of interest. In line with the recommendations of Ajzen and his colleagues (Ajzen, 2002b; Ajzen and Fishbein, 1980), an elicitation study was conducted in order to obtain the appropriate attributes for participation in physical activity behaviour from a sample of the target population. In particular, participants identified the advantages/disadvantages of participation in physical activity behaviour, people who they believed would

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approve/disapprove of them engaging in such behaviour, and factors that would make engaging in physical activity behaviour easy/difficult.

### **The Number of Beliefs about Physical Activity**

One clear conclusion that emerges from this study is that Saudi Arabian adolescents (whole sample, males and females) endorsed a total of 13 beliefs: four behavioural beliefs, five normative beliefs, and four control beliefs have been endorsed by at least 30% of the population (Ajzen and Fishbein, 1980). These results show similarity with van der Pligt and Eiser's (1984) proposition that people cannot generally recall and process more than four beliefs during attitude formation. In addition, results of the present study compare favourably with several studies conducted in the UK showing that people do not endorse a large number of behavioural beliefs, normative beliefs, and control beliefs. For example, in a study of British attitudes towards physical activity, Hagger et al. (2002) pointed out that young people did not recall more than four behavioural beliefs, normative beliefs and control beliefs regarding physical activity (see also Chatzisarantis, Hagger, Biddle, Smith, and Sage, 2006). It seems, therefore, that van der Pligt and Eiser's (1984) proposition concerning the number of beliefs underlying attitudes generalise to the Saudi Arabian population. Like with British people, Saudis recall, and consequently they may process, a limited number of beliefs when forming attitudes, subjective norms, and perceived behavioural control.

### **The Content of Behavioural Beliefs or Salient Consequences**

Another important finding of this study is concerned with the content of behavioural beliefs endorsed by Saudi Arabian adolescents. Behavioural beliefs concerning outcomes related to "weight control", "being active and body energy", "fitness", and "cause fatigue"



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were the modal salient beliefs for the whole population. Saudi Arabian females endorsed the same type of behavioural beliefs as males did.

An important difference between male and female beliefs about physical activity was concerned with the order of behavioural beliefs. That is, while beliefs related to “weight control” were the most popular beliefs in the list of modal salient beliefs for the female sample, this belief was the third most popular belief in the list of modal salient beliefs for the male sample. These results indicate that, at least with respect to a Saudi Arabian population, the structure of behavioural beliefs may be different for males and females (Ajzen and Fishbein, 1980).

### **The Content of Normative Beliefs or Salient Social Referents**

In addition to eliciting modal salient behavioural beliefs, this study elicited modal salient normative beliefs of Saudi Arabian adolescents. Results regarding normative beliefs indicated that for the whole sample, and for the female sample, the most popular modal salient normative beliefs concerned influences from friends, father, mother, family, and brother. However, normative beliefs regarding influences from mother and brother were not modal for the male sample.

The fact that normative beliefs concerning friends were endorsed by Saudi males and females suggests that, in Saudi Arabia, “friends” are an important source of social influence. For Saudi Arabian males, mother and brother do not constitute an important source of social influence, potentially because historically Saudi Arabian men have been regarded as more independent than Saudi Arabian women (Al-Mmunajjed, 1997; Al-Shammari et al., 1994). Saudi Arabian women appear to endorse a greater number of sources of social influence, perhaps because, compared to men, they have greater tendency to consider the social context when making decisions (Al-Shammari et al., 1994).

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### **The Content of Control Beliefs**

The most popular barriers concerned “lack of place”, “lack of time”, “bad weather”, and “lack of sport equipment”. These control beliefs support the notion that Saudi Arabian adolescents consider time constraints, accessibility to exercise facilities, and bad weather (e.g., a man wearing a sport suit and jogging in public places is criticised by the public) as relatively frequent and important barriers to exercise. Interestingly, none of the control beliefs reflected facilitating factors such as having more time, nice weather, and the availability of place.

Comparisons between Saudi Arabian males and Saudi Arabian females also revealed that lack of place and lack of time have been endorsed by both genders. Clearly, the fact that these Saudi Arabian adolescents considered accessibility to facilities and lack of time as barriers to exercise indicates that the Saudi Arabian context does not provide plenty of opportunities to exercise. Indeed, the Saudi Arabian government has only recently been investing in resources for exercise facilities, and policies and campaigns promoting regular participation in physical activities are still scarce in Saudi Arabia (Alsaif et al., 2002). Therefore, the Saudi Arabian authorities may need to correct the physical environment, perceptions of the public and make exercise facilities more accessible to Saudi Arabian adolescents.

Investigation of control beliefs also revealed important differences between Saudi Arabian males and females in the content of control beliefs. Specifically, while the barrier concerning “lack of sport equipment” was endorsed by at least 30% of Saudi Arabian females, this barrier was not popular among males. However, a reason for this difference may be related to the fact that less sport equipment is available to Saudi Arabian females

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than to Saudi Arabian males (Alsaif et al., 2002). Nevertheless, “lack of place” and “lack of time” have been the most popular modal salient control beliefs for both males and females.

### **Conclusions**

In conclusion, this study successfully elicited modal salient beliefs about physical activity and revealed important commonalities and differences in the content of beliefs for Saudi Arabian males and females. Commonalities in the content of beliefs across genders revolve around behavioural beliefs concerning weight control, being active and fitness, normative beliefs reflecting influences from friends, family and father.

Differences in the content of beliefs between males and females revolved around normative beliefs reflecting influences from mother and brothers, and barriers to exercise reflecting lack of time, lack of place, bad weather and lack of sport equipment. The implication of these findings is that interventions directed to Saudi males and females should target different types of beliefs about physical activity participation. Also, these findings can be used as a basis to validate direct measures in the theory of planned behaviour. Beliefs elicited from this study that will be used in the next chapter include behavioural beliefs (advantages and disadvantages; i.e., “weight control”, “being active and body energy”, “fitness” and “cause fatigue”), normative beliefs (important referents approving or disapproving; e.g., family, friends, mothers, fathers, and brother), and control beliefs (barriers and hindrances; e.g., lack of place, lack of time, bad weather, and lack of sport equipment).

**Chapter Four: Psychometric Properties for Questionnaires of Beliefs and the TPB with Additional Variables**

The purpose of this chapter was to test the psychometric properties of an instrument to measure the theory of planned behaviour and additional variables constructs.

**Pilot Test.** The major purposes of the pilot study were to check content validity of the questionnaire wording, clarity, readability, and cultural and age appropriateness. The measures were administered to a total of 42 volunteers (N = 42, male = 23, female = 19, age M = 15.8 years, SD = 1.6) from a Saudi middle and high school in Riyadh\*, Saudi Arabia. The volunteers did not participate in any future work in this PhD.

The instrument was reviewed by a panel of experts to determine the survey's appropriateness for the adolescent population. Four panels took part and consisted of two English specialists in the TPB to review the English version and two Arabic experts (well versed in psychology and the TPB to review the Arabic version). The wording of several questions was adjusted for age appropriateness and several questions were added at the suggestion of panel experts. The questionnaire appeared to be clear and readable, age appropriate for the proposed sample, and able to be completed in a timely manner.

**Main study (TPB)**

**Participants and procedure.** The target population in this study were young Saudi students who ranged in age from fourteen to eighteen years old. With the coordination of the Saudi education ministry, I was given a permission to distribute the theory of planned behaviour questionnaires to male and female students at four different secondary and high schools in Riyadh\*, Saudi Arabia. Questionnaires were distributed to 455 students (N =

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\* The Saudi students are aged between 13 to 15 years in the middle school and 16 to 18 in high school. The targeted ages in this study were between 14-18 years

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455, male = 234, female = 221, age M = 15.6 years, SD = 1.4). 42 did not complete the questionnaires and were therefore excluded from analysis, giving a final sample of 413 students (N = 413, male = 212, female = 201, age M = 15.8 years, SD = 1.3). The data were collected from the students during class lectures. All participants were assured that their participation was voluntary, their responses confidential, and that only the researchers would have access to the raw data.

**Study design.** A cross-sectional design was used for this investigation. Participants completed a questionnaire that indirectly assessed attitude, subjective norms and perceived behaviour control, and intentions; additional variables were obtained in this study and were phrased specifically to reflect exercising in vigorous physical activity for at least 30 minutes, 3 times per week, during leisure time.

**Instrument development.** The questionnaire was developed based on the theory of planned behaviour (Ajzen, 2002), and based on the results of the elicitation study, all initial measurement items were kept for the main questionnaire. The final version of the questionnaire included 55 questions to measure the components of the theory of planned behaviour, additional variables, and demographic information (See Appendix C). Part 1 collected direct and indirect measures of the theory of planned behaviour and additional variables. Part 2 included seven questions to measure the demographic information such as sex, weight, height, age, and class.

**Translation of the Questionnaire.** The questionnaire was first constructed in English. The questionnaire was translated into Arabic and the method of back-translation was used to compare the Arabic and English versions (Brislin, 1986). Items were presented in the same order as those in the English version. A panel of two Arab professors reviewed

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the English and Arab versions. Appropriate changes were made to the instrument where necessary regarding survey format and wording, such as items that were difficult to answer or not fully understood.

### Measures

#### Direct Measures

An *attitude* represents a positive or negative evaluation of performing the behaviour. A direct measure of attitudes was obtained using seven bipolar adjectives (Azjen, 2002) on a semantic differential scale (adjective pairs included ‘good-bad’, ‘valuable-worthless’, ‘beneficial-harmful’, ‘enjoyable-unenjoyable’, ‘necessary-unnecessary’, ‘interesting-boring’, and ‘pleasant-unpleasant’). An example item was as follows: “For me to exercise vigorously for at least 30 minutes three times per week over the next five weeks during leisure time will be . . .”. This item was measured on a 7-point scale ranging from (1) ‘bad’ to (7) ‘good’.

*Subjective norms* reflect the perceived social pressure to perform or not perform the behaviour. Three items (Azjen, 2002) were used to obtain a direct measure of subjective norms. The items were the following: “Most people who are important to me think that I . . . exercise vigorously for at least 30 minutes three times per week over the next five weeks”. This item was measured on seven-point scale ranging from (1) ‘should not’ to (7) ‘should’. “The people in my life whose opinions I value would . . . of my exercising vigorously for at least 30 minutes 3 times per week over the next five weeks during leisure time”. This item was measured on seven-point scale ranging from (1) ‘disapprove’ to (7) ‘approve’. “It is . . . expected from me that I exercise for at least 30 minutes 3 times per week over the next five weeks during leisure time”. This item was measured on a seven-point scale ranging from (1) ‘Extremely unlikely’ to (7) ‘Extremely likely’.

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*Perceived behavioural control* refers to the degree to which an individual feels that performance is under his or her control. Three items (Ajzen, 2002) were developed to assess perceived behavioural control based on those typically used in tests of the theory of planned behaviour (see Ajzen and Madden, 1986; Beale and Manstead, 1991). The items to assess perceived behavioural control were, “How much control do you have over whether you exercise vigorously for at least 30 minutes three times per week over the next five weeks?” This item was measured on a 7-point scale ranging from (1) ‘no control’ to (7) ‘complete control’. “I have control whether or not I exercise vigorously for at least 30 minutes 3 times per week over the next five weeks during leisure time”. This item was measured on a 7-point scale ranging from (1) ‘not at all’ to (7) ‘very much’. “Whether or not I exercise vigorously for at least 30 minutes 3 times per week over the next five weeks during leisure time is completely up to me ...”. This item was measured on a 7-point scale ranging from (1) ‘Strongly disagree’ to (7) ‘Strongly agree’.

### **Indirect Measures**

*Behavioural beliefs.* These are beliefs about the likely outcomes of the behaviour and the evaluations of these outcomes. Attitudinal indirect measures were calculated by multiplying each behavioural belief with its corresponding evaluation and then treating each product as an individual belief. Four items “weight control”, “being active and body energy”, “fitness”, and “cause fatigue”, were drawn from the elicitation study for measuring behavioural beliefs toward physical activity participation, and their outcome evaluations. To assess behavioural beliefs, respondents indicated the likelihood that four different outcomes would be likely consequences of exercising vigorously for at least 30 minutes three times per week over the next five weeks during leisure time. All items were assessed on seven-point scales ranging from (1) ‘strongly disagree’ to (7) ‘strongly agree’.

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An example of a behavioural belief item was, “I believe that exercising vigorously for at least 30 minutes three times per week over the next five weeks during leisure time will help me lose weight”. To assess outcome evaluations, respondents were asked to evaluate each of the beliefs on a scale ranging from (1) ‘extremely bad’ to (7) ‘extremely good’. An example item for the outcome evaluations was, “Controlling my weight as a result of exercising vigorously for at least 30 minutes three times per week over the next five weeks during leisure time will be...”.

*Normative beliefs.* These are salient beliefs about the normative expectations of others and motivation to comply with these expectations. Normative indirect measures were calculated by multiplying each normative belief by its corresponding motivation to comply and then treating each product as an individual belief. Five items were identified through the elicitation study. Normative beliefs were assessed by asking respondents the likelihood that salient others (five different referents, including father, mother, family, brother, and friends) would think that he/she should exercise vigorously for at least 30 minutes three times per week over the next five weeks during leisure time. All items were assessed on seven-point scales ranging from (1) ‘should not’ to (7) ‘should’. An example of a normative belief item was, “my friends think that I ... exercise vigorously for at least 30 minutes three times per week over the next five weeks during leisure time”. Meanwhile, participants’ motivation to comply was assessed by asking them, in general, how willing were they to do what each of the referents wanted them to do on seven-point scales: (1) ‘not at all’ to (7) ‘very much’. An example item for the motivation to comply was, “When it comes to exercise vigorously, how much do you want to do what your friends think you should do exercise vigorously for at least 30 minutes three times per week over the next five weeks during leisure time?”.



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*Control beliefs.* These are the salient beliefs that refer to the presence of factors facilitating or impeding behavioural performance and the perceived power of these factors in behavioural performance. Four control beliefs items were identified from the elicitation study. As with behavioural beliefs and normative beliefs, control beliefs were calculated by multiplying each control belief by its corresponding perceived power and then treating each product as an individual belief. To assess control beliefs, respondents were asked to evaluate the effect of four control beliefs (time, weather, appropriate places, and facilities) on seven-point scales ranging from (1) ‘strongly disagree’ to (7) ‘strongly agree’. An example of a control belief item was, “I don’t have time to exercise vigorously for at least 30 minutes three times per week over the next five weeks during leisure time”. Four items were used to measure perceived power on seven-point scales ranging from (1) ‘much more difficult’ to (7) ‘much easier’. An example item was as follow: “For me, having spare time will be ... to exercise vigorously for at least 30 minutes 3 times per week over the next five weeks during leisure time”.

### **Additional Variables**

*Self-identity.* Five items (Azjen, 2002) were used to obtain a measure of self-identity. The items were as follows: “I see myself as sporty person who participates in sport at least 30 minutes 3 times per week over the next five weeks during leisure time”, “I would feel at a loss if I were forced to give up exercising vigorously for at least 30 minutes 3 times per week over the next five weeks during leisure time”, “I am the type of person who enjoys exercising vigorously for at least 30 minutes three times per week over the next five weeks during leisure time”, “I see myself as a physically active person who exercises vigorously for at least 30 minutes 3 times per week over the next five weeks during leisure

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time”, and “I think of myself as someone who exercises vigorously for at least 30 minutes 3 times per week over the next five weeks during leisure time”. These items were measured on a 7-point scale ranging from (1) ‘strongly disagree’ to (7) ‘strongly agree’.

*Descriptive norms.* Three items (Ajzen, 2002) were used to measure this variable. The items were as follows: “Most people who are important to me will exercise vigorously for at least 30 minutes 3 times per week over the next five weeks during leisure time”, “The people in my life whose opinions I value will exercise vigorously for at least 30 minutes three times per week over the next five weeks during leisure time”, and “All of the people I know will exercise vigorously for at least 30 minutes 3 times per week over the next five weeks during leisure time”. All items were measured on 7-point scales ranging from (1) ‘strongly disagree’ to (7) ‘strongly agree’.

*Self-efficacy.* Three items (Ajzen, 2002) were used to obtain a measure of self-efficacy. The items were, “How confident are you that you will be able to exercise exercising vigorously for at least 30 minutes 3 times per week over the next five weeks during leisure time?” This item was measured on a 7-point scale ranging from (1) ‘very unconfident’ to (7) ‘very confident’. The other items were as follows: “I believe I have the ability to exercise vigorously for at least 30 minutes 3 times per week over the next five weeks during leisure time”, and “I am confident that I would be able to exercise vigorously for at least 30 minutes 3 times per week over the next five weeks during leisure time”. These items were measured on a 7-point scale ranging from (1) ‘strongly disagree’ to (7) ‘strongly agree’.

*Past behaviour.* Two items (Ajzen, 2002) were used to measure past behaviour. The items were, “Please estimate how often you have exercised vigorously for at least 3 times per week in the past five weeks during leisure time?” This item was measured on a 7-point

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scale ranging from (1) 'never' to (7) 'very often'. "On average, please estimate how often you have exercised vigorously for at least 3 times per week in the past five weeks". This item was measured on a 7-point scale ranging from (1) 'almost never' to (7) 'every day'.

*Intention.* Three items (Ajzen, 2002) were used to obtain a measure of intentions. The items were, "I intend to exercise vigorously for at least 30 minutes three times per week over the next five weeks during leisure time", "I will try to exercise vigorously for at least 30 minutes 3 times per week over the next five weeks during leisure time", and "I plan to exercise vigorously for at least 30 minutes three times per week over the next five weeks during leisure time". These items were measured on a 7-point scale ranging from (1) 'strongly disagree' to (7) 'strongly agree'.

**Reliability.** In this study, Cronbach's alpha was used to assess the internal consistency of the measurement scales in the survey instrument (i.e. attitude, subjective norms, perceived behavioural control, descriptive norms, self-identity, self-efficacy, intention, past behaviour, and behaviour) using the entire sample, as well as both males and females separately. These reliability coefficients are displayed in tables 4.1-4.3.

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TABLE 4.1 Reliability and Correlations for TPB and Additional Variables (Whole sample)

Variables	Items	$\alpha$	1	2	3	4	5	6	7	8	9	10	11	12
Attitude	7	.91	1.00											
Indirect attitude	4	.58	.61 **	1.00										
Subjective norms	3	.71	.40 **	.33 **	1.00									
Indirect subjective	6	.81	.37 **	.46 **	.58 **	1.00								
PBC	3	.68	.37 **	.35 **	.48 **	.46 **	1.00							
Indirect PBC	4	.57	.33 **	.47 **	.25 **	.48 **	.55 **	1.00						
Descriptive norm	3	.72	.25 **	.16 **	.43 **	.17 **	.37 **	.10 **	1.00					
Self-identity	5	.81	.41*	.31 **	.47 **	.28 **	.60 **	.23 **	.45 **	1.00				
Self-efficacy	3	.77	.38 **	.36 **	.50 **	.42 **	.52 **	.34 **	.35 **	.63 **	1.00			
Past behaviour	2	.92	.25 **	.17 **	.35 **	.18 **	.35 **	.13 **	.40 **	.43 **	.35 **	1.00		
Intention	3	.83	.45 **	.39 **	.60 **	.37 **	.59 **	.30 **	.41 **	.53 **	.43 **	.60 **	1.00	
Behaviour	2	.73	.03	.09	.10	.02	.16 **	-.03	.06	.11	.10	.18 **	.21 **	1.00

\* Correlation is significant at the 0.05 level (2-tailed). \*\* Correlation is significant at the 0.01 level (2-tailed).

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TABLE 4.2 Reliability and Correlations for TPB and Additional Variables (Male Sample)

Variables	Items	$\alpha$	1	2	3	4	5	6	7	8	9	10	11	12
Attitude	7	.90	1.00											
Indirect attitude	4	.61	.60**	1.00										
Subjective norms	3	.74	.41**	.29**	1.00									
Indirect subjective	6	.80	.30**	.38**	.57**	1.00								
PBC	3	.79	.34**	.28**	.40**	.48**	1.00							
Indirect PBC	4	.56	.26**	.44**	.23**	.43**	.54**	1.00						
Descriptive norm	3	.67	.28**	.20**	.42**	.17*	.38**	.09	1.00					
Self-identity	5	.79	.36*	.26**	.43**	.31**	.53**	.30**	.40**	1.00				
Self-efficacy	3	.78	.30**	.24**	.47**	.42**	.51**	.36**	.32**	.54**	1.00			
Past behaviour	2	.89	.20**	.15*	.23**	.18**	.28**	.17*	.38**	.35**	.25**	1.00		
Intention	3	.80	.37**	.31**	.54**	.31**	.52**	.28**	.40**	.37**	.35**	.52**	1.00	
Behaviour	2	.71	.10	.09	.10	.11	.14*	.06	.11	.09	.12	.24**	.27**	1.00

\* Correlation is significant at the 0.05 level (2-tailed). \*\* Correlation is significant at the 0.01 level (2-tailed).

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TABLE 4.3 Reliability and Correlations for TPB and Additional Variables (Female Sample)

Variables	Items	$\alpha$	1	2	3	4	5	6	7	8	9	10	11	12
Attitude	7	.93	1.00											
Indirect attitude	4	.57	.63**	1.00										
Subjective norms	3	.65	.37**	.34**	1.00									
Indirect subjective	6	.82	.42**	.43**	.58**	1.00								
PBC	3	.60	.39**	.39**	.48**	.44**	1.00							
Indirect PBC	4	.59	.40**	.50**	.30**	.45**	.58**	1.00						
Descriptive norm	3	.73	.21**	.09	.36**	.15*	.29**	.13	1.00					
Self-identity	5	.81	.44**	.34**	.45**	.23**	.56**	.18**	.44**	1.00				
Self-efficacy	3	.78	.42**	.43**	.46**	.41**	.50**	.35**	.30**	.64**	1.00			
Past behaviour	2	.96	.28**	.16*	.39**	.16*	.36**	.10	.36**	.45**	.39**	1.00		
Intention	3	.84	.50**	.39**	.61**	.41**	.60**	.34**	.36**	.61**	.45**	.64**	1.00	
Behaviour	2	.72	-.04	.06	.09	-.06	.02	-.12	.17*	.07	.16*	.20**	.22**	1.00

\* Correlation is significant at the 0.05 level (2-tailed). \*\* Correlation is significant at the 0.01 level (2-tailed)

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Tables 4.1-4.3 present the reliability scores for the whole sample as well as for males and females separately. As shown, attitude, subjective norm, perceived behavioural control, indirect attitude, indirect subjective norms, indirect perceived behavioural control, descriptive norms, self identity, intention, past behaviour, and behaviour displayed satisfactory levels of reliability. That the alpha coefficients of these variables were greater than .60 indicates that the scales used in this study are satisfactory to measure the constructs of interest, except indirect measures.

I conducted an exploratory factor analysis (EFA) to examine the factorial structure of items measuring attitudes, subjective norms, behavioural control, descriptive norms, self-identity, self-efficacy, and intentions. It is important to conduct factor analysis in cross-cultural research in order to ascertain construct validity of the underlying constructs (Kline, 1993).

**Principal components analysis.** Item Analysis: for the item analysis, the statistical programme SPSS 15.0 (Statistical Package for SPSS) was used. Principal components analysis was applied to examine the structure of the theory of planned behaviour and the additional variables questionnaire. Therefore, the results of the factor analysis will prove that the items selected for the questionnaire are discriminatory for the factors and that all these variables are independent factors in the model. List-wise deletion for missing values was used. Items were retained if the factor loading was equal to or greater than .40, and there were no ambiguous loadings (the difference between the highest loading and the next highest loading on any other item was not less than 0.1). With 8 factors (theory of planned behaviour variables and additional variables) to be tested, the number of factors to be extracted was fixed at eight. Oblique rotation was used, with delta set at 0 for direct oblimin rotation. The principal components analysis for constructs involved 29 items, in which 7

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items are items of attitudes; 5 are items of construct of self-identity; 3 are items of the construct of norms, intention, self-efficacy, descriptive norms, and perceived behavioural control; and 2 are items of past behaviour. Factor loadings of the construct items are presented in table 4.4.

Table 4.4 Principal components analysis

Item-component loadings	Components							
	1	2	3	4	5	6	7	8
How much control do you believe you have			-.73					
I have control whether or not I exercise			-.78					
Completely up to me			-.79					
How confident/unconfident/ confident			-.30					0.44
I am confident				.36				0.54
Believe ability								0.73
Intend to exercise	.76							
Try to exercise	.66							
Plan to exercise	.83							
Enjoys exercising				.47				
Feel at a loss if I were forced to give up				.50				
See myself as a physically active person				.84				
See myself as sporty person				.60				
Think of myself as someone who exercises				.77				
Pleasant		-.70						
Interesting		-.84						
Valuable		-.86						
Beneficial		-.80						
Good		-.82						
Enjoyable		-.75						
Necessary		-.79						
Expected from me to exercise								0.48
People think I exercise								0.82
People whose opinions I value think I exercise								0.85
People I know exercise					0.81			
People who are important to me exercise					0.60	-0.32		
People whose opinions I value exercise					0.83			
Estimate how often you have exercised								-0.74
How many times have you exercised								-0.92

Note: n=413. for clarity, only item-component loadings of 0.30 or more are shown.



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Table 4.4 presents items grouped as a result of principal component analysis, with their respective factor loadings. Eight factors explained 69.4% of the total variance in this particular analysis. The first factor represents intention and explained 34.0%; the second, attitude, explained 10.1%; the third, perceived behaviour control, explained 5.8%; the fourth, self-identity, explained 5.2%; the fifth, descriptive norms, explained 4.6%; the sixth, past behaviour, explained 3.8%; the seventh, subjective norms, explained 3.1%; and the eighth, self-efficacy, explained 2.6% of the total variance in this particular analysis.

**Correlation.** Tables 4.1-4.3 present correlations between psychological variables for the whole sample as well as for males and females separately. As shown, the correlations supported positive relationships between indirect measures of attitude, subjective norms, and perceived behavioural control, with direct measures of attitude, subjective norms, and perceived behavioural control for the whole sample, males and females. In addition, direct measures of attitude, subjective norms and perceived behavioural control, and descriptive norms, self-identity, self-efficacy, and past behaviour were positively associated with intentions in both the male and female sample. Furthermore, the correlations between intention, perceived behavioural control, and past behaviour were positively associated with exercise behaviour for the whole sample, males and females.

**Two-way ANOVA.** Two-way ANOVAs were used to examine main effects for the five age groups and both genders and their interactions, see Table 4.5 In these analyses of variance, gender (male versus female) and age (13, 14, 15, 16 and 17) were the independent variables and attitudes, subjective norms, perceived behavioural control, self-efficacy descriptive norms, self-identity intentions, and past behaviour were the dependent variables. The analyses showed a significant main effect for age on self-efficacy only ( $F_{4,403} = 4.95$ ;  $P < .01$ ). There were significant main effects for

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gender on all theory of planned behaviour variables ( $F_{1,403} = 9.77-20.83, p=.02$ )

except for attitude ( $F_{1,403} = 0.29; P= .58$ ). None of the interactions were significant.

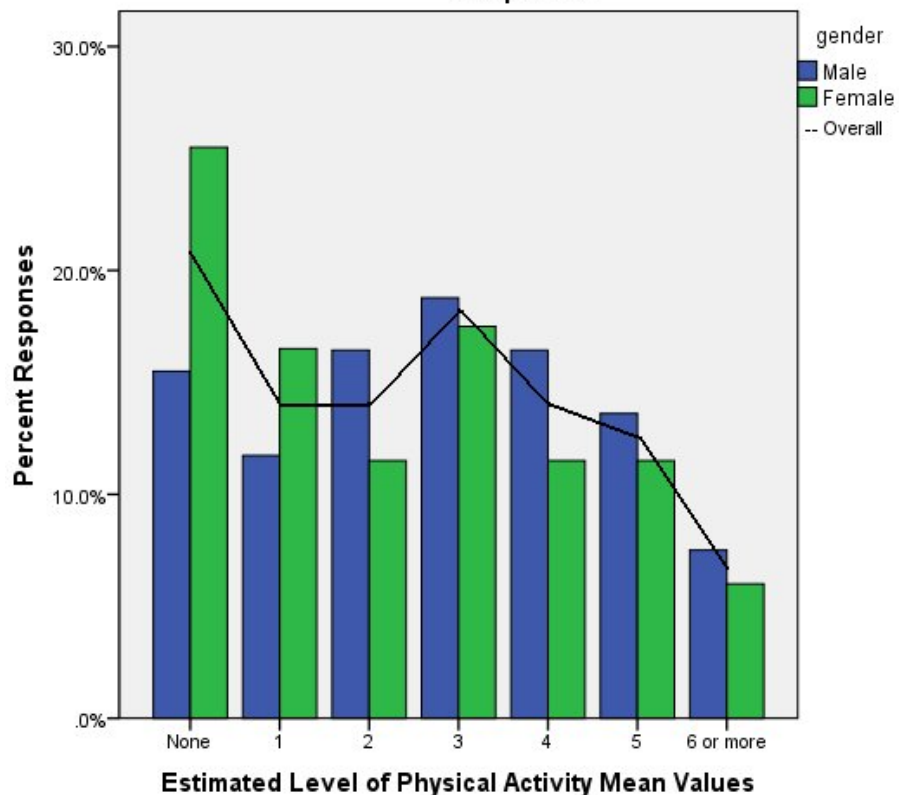
Table 4.5 Two-way ANOVA for the TPB Constructs and Additional variables for Gender, Age, and the Interaction

Variables		df	F	Sig.
Attitude	Age	4,403	00.97	.44
	Gender	1,403	00.29	.58
	age * gender	4,403	01.91	.10
Subjective norms	Age	4,403	02.30	.05
	Gender	1,403	15.58	.00
	age * gender	4,403	01.50	.19
Perceived behavioural control	Age	4,403	01.40	.23
	Gender	1,403	09.77	.02
	age * gender	4,403	00.55	.69
intention	Age	4,403	00.55	.69
	Gender	1,403	10.46	.00
	age * gender	4,403	00.65	.62
Self-efficacy	Age	4,403	04.95	.00
	Gender	1,403	20.83	.00
	age * gender	4,403	00.13	.86
Self-identity	Age	4,403	01.98	.59
	Gender	1,403	14.08	.00
	age * gender	4,403	00.36	.83
Descriptive norms	Age	4,403	00.99	.41
	Gender	1,403	14.33	.00
	age * gender	4,403	00.93	.44
Past behaviour	Age	4,403	01.72	.14
	Gender	1,403	09.87	.00
	age * gender	4,403	00.601	.66

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**Current level of Physical activity.** Assessment of the current level of physical activity was made by computing the proportion of Saudi adolescents from Riyadh who participated in this study, based on three times or more days per week of exercise vigorously for at least 30 minutes over the next five weeks during leisure time. The overall percentage of Saudi adolescents who participated in vigorous physical activity for at least 30 minutes on three or more occasions per week over the last five weeks was 48.3% (54.4% for males and 42.2% for females). The percentage of the physical activity questionnaire mean responses for whole sample, males and females appear in Figure 4.1.

**FIGURE 4.1 Percentage of Estimated Level of Physical Activity Mean Responses**



Lower mean scores reflect a lower frequency of physical activity per week over the last five weeks (i.e., none or 1 time per week), whereas higher mean scores reflect greater frequency of physical activity per week over the last five weeks (i.e., 6 times or

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more per week). Using mean scores of three or above on the physical activity questionnaire as the criterion of participation in vigorous physical activity for at least 30 minutes on three or more per week over the last five weeks.

### **Discussion**

The findings in the theory of planned behaviour study provided satisfactory levels of reliability since the alpha coefficients of the theory of planned behaviour variables were greater than .60. However, the reliability of indirect attitude and indirect perceived behavioural control was not satisfactory. These low reliabilities may undermine the predictive validity of indirect attitude and indirect perceived behavioural control. Therefore, it is important to bear in mind low reliabilities when interpreting the predictive validity of indirect attitude and indirect perceived behavioural control.

One important finding raised by the exploratory factor analysis is that items measuring attitudes, subjective norms, perceived behavioural control, self-identity, self-efficacy, descriptive norms intentions, and past behaviour converged to indicate eight distinct factors. These results are consistent with tenets of the theory of planned behaviour that advocate discriminant validity between attitudes, intentions, perceived behavioural control, and subjective norms (Ajzen, 1991). Importantly, results from this analysis support the construct validity of the Arabic version of measures of the theory of planned behaviour because the solution of the exploratory factor analysis is consistent with theoretical tenets of that theory. Results regarding the extended theory of planned behaviour model indicated that self-efficacy and perceived behavioural control loaded on two different factors, and subjective norms and descriptive norms loaded on two different factors. Results concerning self-efficacy and perceived behavioural control support discriminant validity between these two constructs (Trafimow et al., 2004) and suggest that these constructs are empirically distinct. Results regarding subjective norms

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and descriptive norms support discriminant validity between these two constructs (Hagger and Chatzisarantis, 2005).

Results show the correlations for the theory of planned behaviour variables and additional variables were significantly correlated with intentions for the whole sample, males and females. As with previous research, applying the theory of planned behaviour to participating in physical activity (e.g., Armitage and Conner, 2001; Biddle, Fekadu and Kraft, 2001; Bissonnette and Contento, 2001; Charng et al., 1988; Conner et al., 1999; Sparks et al., 1992; Sparks and Guthrie, 1998), attitudes, subjective norms, perceived behavioural control, self-identity, self-efficacy, descriptive norm intentions, and past behaviour were significantly positively associated with intention.

Prior to any further work with these measures, we ran a series of Two-way ANOVAs to examine effects of gender and age on attitudes, subjective norms, perceived behavioural control, self-efficacy, self-identity, descriptive norms, intentions, and past behaviour. The results showed a significant main effect for age on self-efficacy only. There were significant main effects for gender on all theory of planned behaviour variables except for attitude. Few studies have investigated gender within the theory of planned behaviour and physical activity. One study that investigated the theory of planned behaviour relationship among children reported that gender did not show a robust relationship with physical activity or intention (Rhodes, Macdonald, and McKay, 2006). Similarly Nigg, Lippke, and Maddock (2009) showed no significant differences were observed across the genders. However, Abrams, Jorgensen, Southwell, Geller, and Emmons (2003) found that male and female adults differed on all of the theory of planned behaviour constructs for sunscreen use. Wardle, Haase, Steptoe, Nillapun, and Jonwutiwes (2004) examined food choice behaviours in a large sample of young adults

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from 23 countries and investigated explanatory mechanisms for the gender differences.

These results revealed that significant differences existed between males and females.

The main finding is that nearly half of Saudi adolescents in the present thesis were sufficiently vigorously active, based on 3 or more days per week of vigorous activities for at least 30 minutes over the last five weeks. Such a level of vigorous physical activity has been recommended as a minimum level of physical activity for children and adolescents (USDHHS, 1996). In addition, males reported higher physical activity levels than females. Males scored higher on the physical activity questionnaires and rated themselves higher on the estimated level of physical activity than females. Consistent with previous research (Alhazza, 2004), a recent survey conducted on a sample of adolescent boys in Riyadh city, the rate of inactive adolescents (exercising for 1 day or less per week) was approximately 50% (Al-Rukban, 2003). In a brief review by Alhazza, seven out of eight reported studies using questionnaires showed that the total rate of inactivity ranged from 43.3% to 99.5%. Only two studies included data for both males and females and their findings indicated that females were much less active than males.

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### **Chapter Five: Exploring Saudi Adolescents' Beliefs and Intentions about Exercising Vigorously**

#### **Introduction**

Attitude, subjective norms, and perceived behavioural control can be assessed using direct measures, by asking respondents to rate each overall construct on a set of scales (Ajzen, 2002a). They can also be measured indirectly by asking respondents specifically about their beliefs. By utilising predictor variables connected to the beliefs participants hold, it is possible to understand why people hold certain overall attitudes, subjective norms, and perceived behavioural control (Ajzen, 2002b).

The goals of this study were to explore what beliefs Saudi adolescents have about exercising vigorously by exploring the antecedents of behavioural intention (beliefs, attitudes, subjective norms, and perceptions of control). Specific objectives were to 1) determine what beliefs, attitudes, subjective norms, and perceptions of control Saudi adolescents have about participation in physical activity; 2) examine whether attitudes, subjective norms, and/or perceived behavioural control predict intentions to participate in physical activity, and in accordance with the tenets of the theory of planned behaviour (Ajzen, 1991) and previous physical activity research, it is expected that attitudes, subjective norms and perceived behavioural control will predict intentions; and 3) investigate whether an extended model that includes self-efficacy, self-identity, descriptive norms, and past behaviour explains intentions better than a non-extended model.

In the social psychology and exercise literature, a number of studies have made explicit the distinction between perceived behavioural control and self-efficacy, and between subjective norms and descriptive norms (Armitage and Conner, 1999a; Manstead and van Eekelen, 1998; Terry and O'Leary, 1995). These studies have also found the effects of descriptive norms have been less consistent. Several studies have

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included self-identity as an independent predictor of intentions in the theory of planned behaviour, and have demonstrated its explanatory value and conceptual distinction from attitudes (Armitage and Conner, 2001; Bissonnette and Contento, 2001; Conner et al., 1999). In accordance with previous research investigating effects of self-efficacy, self-identity, and descriptive norms, it is expected that these beliefs will explain intentions in a Saudi context.

Several studies have examined the effects of past behaviour on intentions. In general, because past behaviour reflects effects from innumerable antecedents of intentions, such as habit and automatic processes (Ajzen, 2002), it has become typical practice to include past behaviour in evaluations of the theory of planned behaviour (Hagger et al., 2002). If past behaviour does not add to the prediction of intentions over and above attitudes, subjective norms, and perceptions of control then it can be suggested that the theory of planned behaviour is sufficient for capturing antecedents of intentions. However, if past behaviour does indeed add to the prediction of intentions, then this would imply that the theory of planned behaviour is insufficient to explain intentions alone. Therefore, I included past behaviour in this study. In addition, gender differences on intention formation and underlying beliefs were examined.

No previous research has been found that addressed adolescents' beliefs about exercising vigorously in a Saudi context. Therefore, it is important to explore the attitudes, perceived behavioural control, and subjective norms of adolescents simultaneously in an attempt to better understand the antecedents of their intentions relative to exercising vigorously. The overall goal of this study was to assess the theory of planned behaviour model in predicting Saudis' intention to exercise vigorously. Specific hypotheses included:

- Hypothesis 1: Young Saudis' attitudes about exercising vigorously will be significantly associated with their intentions to exercise.



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- Hypothesis 2: Young Saudis' subjective norms about exercising vigorously will be significantly associated with their intentions to exercise.
- Hypothesis 3: Young Saudis' perceived behaviour control about exercising vigorously will be significantly associated with their intentions to exercise.
- Hypothesis 4: Young Saudis' self-efficacy about exercising vigorously will be significantly associated with their intentions to exercise.
- Hypothesis 5: Young Saudis' self-identity about exercising vigorously will be significantly associated with their intentions to exercise.
- Hypothesis 6: Young Saudis' descriptive norms about exercising vigorously will be significantly associated with their intentions to exercise.
- Hypothesis 7: Young Saudis' past behaviour about exercising vigorously will be significantly associated with their intentions to exercise.
- Hypothesis 8: Young Saudis' behavioural beliefs toward exercising vigorously will be significantly associated with attitude about exercising vigorously.
- Hypothesis 9: Young Saudis' normative beliefs toward exercising vigorously will be significantly associated with subjective norms about exercising vigorously.
- Hypothesis 10: Young Saudis' control beliefs toward exercising vigorously will be significantly associated with perceived behaviour control about exercising vigorously.

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### Method

**Participants and procedure.** The target population in this study were young Saudi students who ranged in age from fourteen to eighteen years old. With the coordination of the Saudi education ministry, I was given a permission to distribute the theory of planned behaviour questionnaires to male and female students at four different secondary and high schools in Riyadh\*, Saudi Arabia. Questionnaires were distributed to 455 students (N = 455, male = 234, female = 221, age M = 15.6 years, SD = 1.4). 42 did not complete the questionnaires and were therefore excluded from analysis, giving a final sample of 413 students (N = 413, male = 212, female = 201, age M = 15.8 years, SD = 1.3). The data were collected from the students during class lectures. All participants were assured that their participation was voluntary, their responses confidential, and that only the researchers would have access to the raw data.

**Study design.** A cross-sectional design was used for this investigation. Participants completed a questionnaire that indirectly assessed attitude, subjective norms and perceived behaviour control, and intentions; additional variables were obtained in this study and were phrased specifically to reflect exercising in vigorous physical activity for at least 30 minutes, 3 times per week, during leisure time.

**Instrument development.** The questionnaire was developed based on the theory of planned behaviour (Ajzen, 2002), and based on the results of the elicitation study, all initial measurement items were kept for the main questionnaire. The final version of the questionnaire included 55 questions to measure the components of the theory of planned behaviour, additional variables, and demographic information (See Appendix C). Part 1 collected direct and indirect measures of the theory of planned behaviour and additional

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\* The Saudi students are aged between 13 to 15 years in the middle school and 16 to 18 in high school. The targeted ages in this study were between 14-18 years

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variables. Part 2 included seven questions to measure the demographic information such as sex, weight, height, age, and class.

**Translation of the Questionnaire.** The questionnaire was first constructed in English. The questionnaire was translated into Arabic and the method of back-translation was used to compare the Arabic and English versions (Brislin, 1986). Items were presented in the same order as those in the English version. A panel of two Arab professors reviewed the English and Arab versions. Appropriate changes were made to the instrument where necessary regarding survey format and wording, such as items that were difficult to answer or not fully understood.

### Measures

#### Direct Measures

An *attitude* represents a positive or negative evaluation of performing the behaviour. A direct measure of attitudes was obtained using seven bipolar adjectives (Ajzen, 2002) on a semantic differential scale (adjective pairs included ‘good-bad’, ‘valuable-worthless’, ‘beneficial-harmful’, ‘enjoyable-unenjoyable’, ‘necessary-unnecessary’, ‘interesting-boring’, and ‘pleasant-unpleasant’). An example item was as follows: “For me to exercise vigorously for at least 30 minutes three times per week over the next five weeks during leisure time will be . . .”. This item was measured on a 7-point scale ranging from (1) ‘bad’ to (7) ‘good’.

*Subjective norms* reflect the perceived social pressure to perform or not perform the behaviour. Three items (Ajzen, 2002) were used to obtain a direct measure of subjective norms. The items were the following: “Most people who are important to me think that I . . . exercise vigorously for at least 30 minutes three times per week over the next five weeks”. This item was measured on seven-point scale ranging from (1) ‘should not’ to (7) ‘should’. “The people in my life whose opinions I value would . . . of

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my exercising vigorously for at least 30 minutes 3 times per week over the next five weeks during leisure time”. This item was measured on seven-point scale ranging from (1) ‘disapprove’ to (7) ‘approve’. “It is ... expected from me that I exercise for at least 30 minutes 3 times per week over the next five weeks during leisure time”. This item was measured on a seven-point scale ranging from (1) ‘Extremely unlikely’ to (7) ‘Extremely likely’.

*Perceived behavioural control* refers to the degree to which an individual feels that performance is under his or her control. Three items (Ajzen, 2002) were developed to assess perceived behavioural control based on those typically used in tests of the theory of planned behaviour (see Ajzen and Madden, 1986; Beale and Manstead, 1991). The items to assess perceived behavioural control were, “How much control do you have over whether you exercise vigorously for at least 30 minutes three times per week over the next five weeks?” This item was measured on a 7-point scale ranging from (1) ‘no control’ to (7) ‘complete control’. “I have control whether or not I exercise vigorously for at least 30 minutes 3 times per week over the next five weeks during leisure time”. This item was measured on a 7-point scale ranging from (1) ‘not at all’ to (7) ‘very much’. “Whether or not I exercise vigorously for at least 30 minutes 3 times per week over the next five weeks during leisure time is completely up to me ...”. This item was measured on a 7-point scale ranging from (1) ‘Strongly disagree’ to (7) ‘Strongly agree’.

### **Indirect Measures**

*Behavioural beliefs*. These are beliefs about the likely outcomes of the behaviour and the evaluations of these outcomes. Attitudinal indirect measures were calculated by multiplying each behavioural belief with its corresponding evaluation and then treating each product as an individual belief. Four items “weight control”, “being active and body energy”, “fitness”, and “cause fatigue”, were drawn from the elicitation study for

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measuring behavioural beliefs toward physical activity participation, and their outcome evaluations. To assess behavioural beliefs, respondents indicated the likelihood that four different outcomes would be likely consequences of exercising vigorously for at least 30 minutes three times per week over the next five weeks during leisure time. All items were assessed on seven-point scales ranging from (1) 'strongly disagree' to (7) 'strongly agree'. An example of a behavioural belief item was, "I believe that exercising vigorously for at least 30 minutes three times per week over the next five weeks during leisure time will help me lose weight". To assess outcome evaluations, respondents were asked to evaluate each of the beliefs on a scale ranging from (1) 'extremely bad' to (7) 'extremely good'. An example item for the outcome evaluations was, "Controlling my weight as a result of exercising vigorously for at least 30 minutes three times per week over the next five weeks during leisure time will be...".

*Normative beliefs.* These are salient beliefs about the normative expectations of others and motivation to comply with these expectations. Normative indirect measures were calculated by multiplying each normative belief by its corresponding motivation to comply and then treating each product as an individual belief. Five items were identified through the elicitation study. Normative beliefs were assessed by asking respondents the likelihood that salient others (five different referents, including father, mother, family, brother, and friends) would think that he/she should exercise vigorously for at least 30 minutes three times per week over the next five weeks during leisure time. All items were assessed on seven-point scales ranging from (1) 'should not' to (7) 'should'. An example of a normative belief item was, "my friends think that I ... exercise vigorously for at least 30 minutes three times per week over the next five weeks during leisure time". Meanwhile, participants' motivation to comply was assessed by asking them, in general, how willing were they to do what each of the referents wanted them to do on seven-point scales: (1) 'not at all' to (7) 'very much'. An example item for the

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motivation to comply was, “When it comes to exercise vigorously, how much do you want to do what your friends think you should do exercise vigorously for at least 30 minutes three times per week over the next five weeks during leisure time?”.

*Control beliefs.* These are the salient beliefs that refer to the presence of factors facilitating or impeding behavioural performance and the perceived power of these factors in behavioural performance. Four control beliefs items were identified from the elicitation study. As with behavioural beliefs and normative beliefs, control beliefs were calculated by multiplying each control belief by its corresponding perceived power and then treating each product as an individual belief. To assess control beliefs, respondents were asked to evaluate the effect of four control beliefs (time, weather, appropriate places, and facilities) on seven-point scales ranging from (1) ‘strongly disagree’ to (7) ‘strongly agree’. An example of a control belief item was, “I don’t have time to exercise vigorously for at least 30 minutes three times per week over the next five weeks during leisure time”. Four items were used to measure perceived power on seven-point scales ranging from (1) ‘much more difficult’ to (7) ‘much easier’. An example item was as follow: “For me, having spare time will be ... to exercise vigorously for at least 30 minutes 3 times per week over the next five weeks during leisure time”.

### **Additional Variables**

*Self-identity.* Five items (Ajzen, 2002) were used to obtain a measure of self-identity. The items were as follows: “I see myself as sporty person who participates in sport at least 30 minutes 3 times per week over the next five weeks during leisure time”, “I would feel at a loss if I were forced to give up exercising vigorously for at least 30 minutes 3 times per week over the next five weeks during leisure time”, “I am the type of person who enjoys exercising vigorously for at least 30 minutes three times per week

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over the next five weeks during leisure time”, “I see myself as a physically active person who exercises vigorously for at least 30 minutes 3 times per week over the next five weeks during leisure time”, and “I think of myself as someone who exercises vigorously for at least 30 minutes 3 times per week over the next five weeks during leisure time”. These items were measured on a 7-point scale ranging from (1) ‘strongly disagree’ to (7) ‘strongly agree’.

*Descriptive norms.* Three items (Ajzen, 2002) were used to measure this variable. The items were as follows: “Most people who are important to me will exercise vigorously for at least 30 minutes 3 times per week over the next five weeks during leisure time”, “The people in my life whose opinions I value will exercise vigorously for at least 30 minutes three times per week over the next five weeks during leisure time”, and “All of the people I know will exercise vigorously for at least 30 minutes 3 times per week over the next five weeks during leisure time”. All items were measured on 7-point scales ranging from (1) ‘strongly disagree’ to (7) ‘strongly agree’.

*Self-efficacy.* Three items (Ajzen, 2002) were used to obtain a measure of self-efficacy. The items were, “How confident are you that you will be able to exercise exercising vigorously for at least 30 minutes 3 times per week over the next five weeks during leisure time?” This item was measured on a 7-point scale ranging from (1) ‘very unconfident’ to (7) ‘very confident’. The other items were as follows: “I believe I have the ability to exercise vigorously for at least 30 minutes 3 times per week over the next five weeks during leisure time”, and “I am confident that I would be able to exercise vigorously for at least 30 minutes 3 times per week over the next five weeks during leisure time”. These items were measured on a 7-point scale ranging from (1) ‘strongly disagree’ to (7) ‘strongly agree’.

*Past behaviour.* Two items (Ajzen, 2002) were used to measure past behaviour. The items were, “Please estimate how often you have exercised vigorously for at least 3

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times per week in the past five weeks during leisure time?” This item was measured on a 7-point scale ranging from (1) ‘never’ to (7) ‘very often’. “On average, please estimate how often you have exercised vigorously for at least 3 times per week in the past five weeks”. This item was measured on a 7-point scale ranging from (1) ‘almost never’ to (7) ‘every day’.

*Intention.* Three items (Ajzen, 2002) were used to obtain a measure of intentions. The items were, “I intend to exercise vigorously for at least 30 minutes three times per week over the next five weeks during leisure time”, “I will try to exercise vigorously for at least 30 minutes 3 times per week over the next five weeks during leisure time”, and “I plan to exercise vigorously for at least 30 minutes three times per week over the next five weeks during leisure time”. These items were measured on a 7-point scale ranging from (1) ‘strongly disagree’ to (7) ‘strongly agree’.

### **Data Analytic Procedures**

Separate multiple regression analyses for the whole sample and for males and females separately were run for exercise data to answer research hypotheses one through ten. The effects of attitudes, subjective norms, perceived behavioural control, descriptive norms, self-identity, self-efficacy, and past behaviour on intentions were examined through hierarchical regression analyses for the whole sample and for males and females separately (Ajzen, 1991). In those hierarchical regression analyses and according to the theory of planned behaviour, intention was the dependent variable, while attitudes, subjective norms, and perceived behavioural control were independent variables in the first step. Self-identity, self-efficacy and descriptive norms were entered as independent variables in the second step, and past behaviour was entered as independent variable in the third step. In addition, simple linear regression models were used to examine the effects of expectancy x value models on attitudes, subjective



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norms, and perceived behavioural control. Attitude was regressed on the product of behavioural beliefs and outcome evaluations. Subjective norms were regressed on the product of normative beliefs and motivation to comply with referents. Perceived behavioural control was regressed on the products of control beliefs and perception of ease/difficulty of factors. The data were analysed using the Statistical Package for the Social Sciences (SPSS) 15.

## **Results**

### **Preliminary Analysis**

Prior to analysis, the data were examined for missing values, of which there were none. Using the standardized residuals and leverage values, no values were found two standard deviations away from the mean, suggesting the absence of outliers. Outliers may or may not affect the estimation of a regression line; however, if they do so, they are called influential cases (Tabachnick and Fidell, 2001). Cook's distance of all the independent variables was  $< 1$ , indicating the absence of influential data points.

The following assumptions of multiple regression were examined to ensure that they were not violated and to ensure proper use of parametric statistics: (1) zero mean, (2) independence, (3) normal distribution of residuals, (4) homoscedasticity, (5) multicollinearity, and (6) linearity of the relationship between the independent and the dependent variable. Zero mean and independence are two assumptions that cannot be violated for multiple regressions. The assumption of zero mean was met by determining a constant in the equations and by checking the mean and the standard deviation of the standardized residuals which was 0. Independence was evaluated by examining the Durbin-Watson statistic which was 1.84. These values were not  $> 2.5$  and  $< 1.5$ , indicating no violation of this assumption.

Data from the descriptive statistics were screened and examined for normality.

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Normal distribution was evaluated by examining histograms, P-P plots, and values of skewness for each variable. The shape of the histograms indicated normal distribution and the P-P plots were close to straight lines. Homoscedasticity of the variance of the residuals was also evaluated by examining the residual scatter plots for even distribution of points across the reference line (Tabachnick and Fidell, 2001). This assumption was not violated since there was an approximately even random scatter of values across the reference line. Multicollinearity was examined by checking the tolerance and variance inflation factor (VIF). None of the independent variables were calculated greater than .8 (in absolute value). All independent variables had Tolerance values  $>.10$  and VIF  $<10$ , indicating no multicollinearity. Finally, the assumption of linearity was also met. The bivariate and residual scatter plots revealed linear relationships between the independent and the dependent variables.

### **Hierarchical Regression Analyses**

Multiple linear regression was then used to test the hypotheses and the relationships between intention (dependent variable) and attitude (Hypothesis 1), subjective norms (Hypothesis 2), perceived behavioural control (Hypothesis 3), self-efficacy (Hypothesis 4), self-identity (Hypothesis 5), descriptive norms (Hypothesis 6), and past behaviour (Hypothesis 7) as independent variables.

**Whole sample.** In the first step, the resulting model was significant ( $F=116.25$ ,  $R^2=.46$ ,  $p \leq .00$ ) (Table 5.1), explaining 46% of the variance in intentions. All independent variables in the model were significant: attitude ( $\beta=0.21$ ,  $p \leq .00$ ), subjective norms ( $\beta = 0.44$ ,  $p \leq .00$ ), and perceived behavioural control ( $\beta = 0.22$ ,  $p \leq .00$ ). These results provide initial support for hypotheses 1-3. The second step of the analysis showed that the resulting model was significant ( $F=77.03$ ,  $\Delta R^2= .07$ ,  $p \leq .00$ ), explaining 7% of the variance in intentions over and above the effect of attitude, subjective norms and perceived behavioural control. This effects was primarily attributable to self-efficacy

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( $\beta=0.27, p \leq .00$ ) and descriptive norms ( $\beta= 0.08, p \leq .03$ ), but not self-identity ( $\beta= 0.07, p \leq .09$ ). These results provide initial support for hypotheses 4 and 6, but not hypothesis 5.

TABLE 5.1. Evaluating TPB and Additional Variables in Predicting Intentions (Whole Sample)

Model		$R^2$	$\Delta R^2$	$\beta$	$t$	$P$
1	Attitude	.46	.46*	.21	5.33*	.00
	Subjective norms			.45	10.19*	.00
	PBC			.22	5.60*	.00
2	Attitude	.53	.07*	.14	3.84*	.00
	Subjective norms			.31	7.22*	.00
	PBC			.08	2.17*	.03
	Self-efficacy			.27	5.57*	.00
	self-identity			.07	1.67	.09
	Descriptive norms			.08	2.15*	.03
3	Attitude	.54	.01*	.14	3.79*	.00
	Subjective norms			.29	6.98*	.00
	PBC			.08	2.05*	.04
	Self-efficacy			.26	5.48*	.00
	self-identity			.05	1.08	.27
	Descriptive norms			.06	1.41	.16
	Past behaviour			.13	3.30*	.00

*Note: Parameters with an asterisk are statistically significant at .05 alpha level. PBC= perceived behavioural control*

The third step of the regression analysis pointed out that past behaviour did improve the prediction of intentions ( $F=69.18, \Delta R^2= .01, p \leq .00, \beta = 0.13, p \leq .00$ ) explaining 1% of the variance in intentions over and above the effects of all other variables already included. There was therefore some support for Hypothesis 7.

Taken together, these results provided some evidence that attitude, perceived behavioural control, self-efficacy, subjective norms, descriptive norms and past behaviour contributed to the prediction of intention. Self-identity did not contribute to the prediction of intention (see Table 5.1).

**Male sample.** In the first step, with respect to Saudi males, the resulting model

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was significant ( $F = 45.25, \Delta R^2 = .39, p < .05$ ) explaining 39% of the variance in intentions. All independent variables in the model were significant: attitude ( $\beta=0.18, p \leq .02$ ), subjective norms ( $\beta = 0.44, p \leq .00$ ), and perceived behavioural control ( $\beta=0.27, p \leq .00$ ). These results provide initial support for hypotheses 1-3. The second step of the analysis showed that the resulting model was significant ( $F=26.30, \Delta R^2 = .03, p < .05$ ) explaining 3 % of the variance in intentions over and above the effects of attitude, subjective norms and perceived behavioural control. This effect was primarily attributable to self-efficacy ( $\beta=0.24, p \leq .00$ ), but not descriptive norms or self-identity ( $\beta = 0.06, p \leq .09$  and  $\beta = -0.04, p = .56$ ). These results provide initial support for hypothesis 4 but not hypotheses 5 and 6.

TABLE 5.2 Evaluating TPB and Additional Variables in Predicting Intentions

(Male Sample)

Model		$R^2$	$\Delta R^2$	$B$	$t$	$P$
1	Attitude	.39	.39*	.18	3.83*	.02
	Subjective norms			.44	7.42*	.00
	PBC			.27	4.84*	.00
2	Attitude	.42	.03*	.15	2.20*	.03
	Subjective norms			.33	4.97*	.00
	PBC			.16	2.45*	.01
	Self-efficacy			.24	3.27*	.00
	Self-identity			-.04	-.57	.56
	Descriptive norm			.06	0.91	.09
3	Attitude	.45	.02*	.12	1.64*	.04
	Subjective norms			.32	5.04*	.00
	PBC			.14	2.35*	.02
	Self-efficacy			.23	3.31*	.00
	Self-identity			-.07	-1.04	.29
	Descriptive norm			.07	1.22	.22
	Past behaviour			.16	2.72*	.01

Note: Parameters with an asterisk are statistically significant at .05 alpha level.  
PBC= perceived behavioural control

The third step of the regression analysis pointed out that past behaviour did improve the prediction of intentions ( $F=24.31, \Delta R^2= .02, p \leq .00, \beta = .16, p \leq .01$ )

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explaining 2% of the variance in intentions over and above the effects of all other variables already included. There was therefore some support for Hypothesis 7.

Taken together, these results provide some evidence that attitude, perceived behavioural control, self-efficacy, and past behaviour contributed to the prediction of intention. Self-identity and descriptive norms did not contribute to the prediction of intention (see Table 5.2 ).

**Female sample.** With regard to the female sample, in the first step, the resulting model was significant ( $F = 61.26, R^2 = .48, p < .05$ ), explaining 48% of the variance in intentions. All independent variables in the model were significant: attitude ( $\beta=0.30, p \leq .00$ ), subjective norms ( $\beta = 0.43, p \leq .00$ ), and perceived behavioural control ( $\beta = 0.17, p \leq .02$ ). These results provide initial support for hypotheses 1-3. The second step of the analysis showed that the resulting model was significant ( $F=46.34, \Delta R^2 = .08, p \leq .00$ ), explaining 8% of the variance in intentions over and above the effects of attitude, subjective norms and perceived behavioural control. This effect was primarily attributable to self-efficacy ( $\beta=0.26, p \leq .00$ ), but not descriptive norms or self-identity ( $\beta= 0.04, p \leq .41$  and  $\beta = 0.12, p = .07$ ). These results provide initial support for hypothesis 4 but not hypotheses 5 and 6.

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TABLE 5.3 Evaluating TPB and Additional Variables in Predicting Intentions

(Female Sample)

Model		<i>R</i>	$\Delta R^2$	$\beta$	<i>t</i>	<i>p</i>
1	Attitude	.48	.48*	.30	5.82*	.00
	Subjective norms			.43	7.42*	.00
	PBC			.17	3.14*	.02
2	Attitude	.56	.08*	.17	3.24*	.02
	Subjective norms			.30	5.35*	.00
	PBC			.02	0.45	.91
	Self-efficacy			.26	3.87*	.00
	self-identity			.12	2.56	.07
	Descriptive norm			.04	0.81	.41
3	Attitude	.56	.00	.15	2.64*	.03
	Subjective norms			.28	5.00*	.00
	PBC			.05	1.03	.30
	Self-efficacy			.25	3.69*	.00
	self-identity			.07	1.56	.11
	Descriptive norm			.02	0.50	.61
	Past behaviour			.09	1.76	.08

*Note: Parameters with an asterisk are statistically significant at .05 alpha level.  
PBC= perceived behavioural control*

The third step of the regression analysis pointed out that past behaviour did not improve the prediction of intentions ( $F=40.60$ ,  $\Delta R^2= .00$ ,  $p > .05$ ,  $\beta = .09$ ,  $p = .08$ ). Therefore, Hypothesis 7 was rejected.

Taken together, these results provide some evidence that attitude, subjective norms, perceived behavioural control, and self-efficacy contributed to the prediction of intention. It should be noted, in the second equation perceived behavioural control became non significant. It might be therefore that with the additional of self-efficacy, the effect of perceived behavioural control becomes less important. Self-identity, descriptive norms and past behaviour did not contribute to the prediction of intention (see Table 5.3).

### Indirect Measures

As attitude, subjective norms, and perceived behavioural control were predictors of intention to exercise vigorously, the importance of the underlying beliefs of the attitude, subjective norms, and perceived behavioural control were examined using multiple regression analyses.

**Whole sample.** Three multiple regression models were used to examine the relationships between the attitudes (Hypothesis 8), subjective norms (Hypothesis 9), and perceived behavioural controls (Hypothesis 10) as dependent variables and their underlying beliefs as independent variables. The regression of the behavioural belief on attitude (Hypothesis 8) ( $F = 28.08, p < .00$ ), the regression of normative beliefs on the subjective norms (Hypothesis 9) ( $F=21.24, p \leq .00$ ), and the regression of control beliefs on perceived behavioural control (Hypothesis 10) ( $F=15.91, p \leq .00$ ) were significant and thus, hypotheses eight, nine, and ten were supported.

Regressions of attitude towards exercising vigorously onto the behavioural beliefs accounted for 22% of the variability. Being active, maintaining fitness, and controlling weight were significant independent predictors of attitude ( $t = 5.11, p < .00, t = 3.57, p < .00$  and  $t = 3.09, p < .00$  respectively), with being active being a stronger predictor ( $\beta = .26$ ) than fitness ( $\beta = .18$ ) and weight control ( $\beta = .15$ ). The fourth belief that exercise causes fatigue had no independent influence in predicting attitude toward exercising vigorously ( $t = .30, p = .75$ ) (see Table 5.4).

Regressions of subjective norms towards exercising vigorously onto the normative beliefs accounted for 21% of the variability. Friends, mother, and brother were significant independent predictors of subject norms ( $t = 6.19, p < .00, t = 3.77, p < .00$  and  $t = 3.68, p < .00$  respectively) with friends being a stronger predictor ( $\beta =$

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.28) than mother ( $\beta = .19$ ) and brother ( $\beta = .18$ ). The participants wish to comply more with what friends, mother, and brother think they should be doing in terms of exercising vigorously than with what other groups want them to do. Neither family nor father had independent influence in predicting subjective norms toward exercising vigorously ( $t = -.79, p = .42$  and  $t = .76, p = .45$  respectively) (see Table 5.5).

Regression of the four independent variables (control beliefs) contributed a fair level of prediction and together explained 14% of the variance in perceived behavioural control to exercise vigorously. Availability of place, availability of time, and bad weather were significant independent predictors of perceived behavioural control ( $t = 5.76, p < .00, t = 3.55, p < .00$  and  $t = 3.39, p < .00$  respectively) with availability of place being a stronger predictor ( $\beta = .26$ ) than availability of time ( $\beta = .17$ ) and bad weather ( $\beta = .15$ ). The participants thought that having a place available made it easier for them to exercise vigorously. The belief about availability of sport equipment making it easier for them to exercise vigorously had no independent influence in predicting perceived behavioural control to exercise vigorously ( $t = 1.74, p = .08$ ) (see Table 5.6).

TABLE 5.4. Regression Analysis for Behavioural Beliefs in Predicting Attitudes (Whole Sample)

Model	<i>R</i>	<i>R</i> <sup>2</sup>	$\beta$	<i>t</i>	<i>p</i>
1					
Weight control	.47	.22*	.15	3.09*	.00
Being active			.26	5.11*	.00
Cause fatigue			.01	.30	.75
Fitness			.18	3.57*	.00



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TABLE 5.5 Regression Analysis for Normative Beliefs in Predicting Subjective Norms (Whole Sample)

Model		<i>R</i>	<i>R</i> <sup>2</sup>	$\beta$	<i>t</i>	<i>p</i>
1	Friends	.46	.21*	.28	6.19*	.00
	Family			.04	.79	.42
	Father			.03	.76	.45
	Mother			.19	3.77*	.00
	Brother			.18	3.68*	.00

TABLE 5.6 Regression Analysis for Control Beliefs in Predicting Perceived Behaviour Control (Whole Sample)

Model		<i>R</i>	<i>R</i> <sup>2</sup>	$\beta$	<i>t</i>	<i>p</i>
1	Lack availability of place	.37	.14*	.26	5.76*	.00
	Lack availability of time			.17	3.55*	.00
	Lack availability of sport equipment			.08	1.74	.08
	Bad weather			.15	3.39*	.00

**Male sample.** With respect to Saudi men, regressions of attitude towards exercising vigorously onto the behavioural beliefs accounted for 12% of the variability. The overall regression equation was statistically significant ( $F = 6.75, p < .00$ ) (see Table 5.7). Only being active was an independent significant predictor ( $\beta = .27$ ) of attitude ( $t = 3.58, p < .00$ ). Fitness, weight control, and cause fatigue had no independent influence in predicting attitude toward exercising vigorously ( $t = 1.69, p = .09, t = -.17, p = .86$ , and  $t = 0.04, p = .96$  respectively).

Regressions of subjective norms towards exercising vigorously onto the

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normative beliefs accounted for 20% of the variability. The overall regression equation was statistically significant ( $F = 10.80, p < .00$ ) (see Table 5.8). Friends, family, father, and brother were significant independent predictors of subject norms ( $t = 3.16, p < .00, t = 2.09, p = .03, t = 2.75, p < .00$  and  $t = 3.09, p < .00$ ) respectively. Saudi males wish to comply more with what friends, mother, and brother think they should be doing in terms of exercising vigorously than with what their father or family more generally think they should do. Mother had no independent influence in predicting subjective norms toward exercising vigorously ( $t = 1.44, p = .15$ ).

Regressions of the four independent variables (control beliefs) contributed a fair level of prediction and together explained 15% of the variance in perceived behavioural control to exercise vigorously. The overall regression equation was statistically significant ( $F = 9.00, p < .00$ ) (see Table 5.9). Availability of place, availability of time, and bad weather were significant independent predictors of perceived behavioural control ( $t = 2.95, p < .00, t = 2.23, p = .02$ , and  $t = 2.02, p = .04$  respectively). Saudi males thought that having a place, time, sports equipment, and nice weather available made it easier for them to exercise vigorously. The belief that the availability of sports equipment made it easier for them to exercise vigorously had no independent influence in predicting perceived behavioural control to exercise vigorously ( $t = .07, p = .09$ ).

TABLE 5.7 Regression Analysis for Behavioural Beliefs in Predicting Attitudes (Male Sample)

Model	<i>R</i>	<i>R</i> <sup>2</sup>	<i>β</i>	<i>t</i>	<i>p</i>
1	.34	.12*			
Weight control			-.01	-.17	.86
Being active			.27	3.58*	.00
Cause fatigue			.00	.04	.96
Fitness			.12	1.69	.09

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TABLE 5.8 Regression Analysis for Normative Beliefs in Predicting Subjective Norms (Male Sample)

Model		<i>R</i>	<i>R</i> <sup>2</sup>	$\beta$	<i>t</i>	<i>p</i>
1	Friends	.45	.20*	.22	3.16*	.00
	Family			.17	2.09*	.03
	Father			.22	2.75*	.00
	Mother			.11	1.44	.15
	Brother			.23	3.09*	.00

TABLE 5.9 Regression Analysis for Control Beliefs in Predicting Perceived Behaviour Control (Male Sample)

Model		<i>R</i>	<i>R</i> <sup>2</sup>	$\beta$	<i>t</i>	<i>p</i>
1	Lack availability of place	.38	.15*	.20	2.95*	.00
	Lack availability of time			.15	2.23*	.02
	Lack availability of sport equipment			.07	1.43	.09
	Bad weather			.13	2.02*	.04

**Female sample.** With respect to Saudi females, regressions of attitude towards exercising vigorously onto the behavioural beliefs accounted for 33% of the variability. The overall regression equation was statistically significant ( $F = 23.00, p < .00$ ) (see Table 5.10). Being active, fitness, and weight control were independent significant predictors of attitude ( $t = 2.89, p < .00, t = 2.69, p = .00$  and  $t = 4.41, p < .00$  respectively). Only cause fatigue had no independent influence in predicting attitude toward exercising vigorously ( $t = .60, p = .054$ ).

Regressions of subjective norms towards exercising vigorously onto the normative beliefs accounted for 32% of the variability. The overall regression

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equation was statistically significant ( $F = 15.40, p < .00$ ) (see Table 5.11). Friends, family, father, mother, and brother were significant independent predictors of subject norms ( $t = 3.29, p < .00, t = -2.31, p = .021, t = 3.06, p < .00, t = 3.16, p < .00$  and  $t = 2.21, p < .02$  respectively). Saudi females wish to comply more with what friends, family, father, mother, and brother think they should be doing in terms of exercising vigorously than with what their family more generally thinks they should do.

The four independent variables (control beliefs) contributed a fair level of prediction and together explained 14% of the variance in perceived behavioural control to exercise vigorously. The overall regression equation was statistically significant ( $F = 8.00, p < .00$ ) (see Table 5.12). Availability of place, availability of time, and bad weather were significant independent predictors of perceived behavioural control ( $t = 2.84, p < .00, t = 2.95, p = .00$  and  $t = 2.07, p = .02$  respectively). Saudi females thought that having a place, time, and nice weather available made it easier for them to exercise vigorously. The belief that the availability of sport equipment made it easier for them to exercise vigorously had no independent influence in predicting perceived behavioural control to exercise vigorously ( $t = -.11, p = .91$ ).

TABLE 5.10 Regression Analysis for Behavioural Beliefs in Predicting Attitudes (Female Sample)

Model		<i>R</i>	<i>R</i> <sup>2</sup>	<i>β</i>	<i>t</i>	<i>p</i>
1	Weight control	.57	.33*	.32	4.41*	.00
	Being active			.20	2.89*	.00
	Cause fatigue			.03	.60	.54
	Fitness			.18	2.69*	.00

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TABLE 5.11 Regression Analysis for Normative Beliefs in Predicting Subjective Norms (Female Sample)

Model		<i>R</i>	<i>R</i> <sup>2</sup>	$\beta$	<i>t</i>	<i>p</i>
1	Friends	.54	.32*	.22	3.29*	.00
	Family			-.17	-2.31*	.02
	Father			.24	3.06*	.00
	Mother			.23	3.16*	.00
	Brother			.16	2.21*	.02

TABLE 5.12 Regression Analysis for Control Beliefs in Predicting Perceived Behaviour Control (Female Sample)

Model		<i>R</i>	<i>R</i> <sup>2</sup>	$\beta$	<i>t</i>	<i>p</i>
1	Lack availability of place	.37	.14*	.22	2.84*	.00
	Lack availability of time			.21	2.95*	.00
	Lack availability of sport equipment			.03	0.11	.91
	Bad weather			2.07	2.07*	.03

**Discussion**

**Direct Measures**

The purpose of this study was to examine the utility of the theory of planned behaviour (e.g. attitude, subjective norms, and perceived behavioural control) and additional variables (e.g. self-identity, self-efficacy, descriptive norms, and past behaviour) in predicting intentions to exercise vigorously.

The results of the current study provide some support for the efficacy of the theory of planned behaviour model in predicting adolescent physical activity. In the first step of the regression equation, attitude, subjective norms, and perceived

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behavioural control significantly predicted adolescent intentions to engage in physical activity. These findings suggest that adolescents who have more favourable attitudes toward performing physical activity perceive pressure from important referents to perform physical activity, and those who believe they have more confidence in their ability to perform physical activity, will have stronger intentions to engage in vigorous physical activity. The three independent variables explained a good level of prediction and together explained 46 % of the variance in intention to exercise vigorously. This finding is consistent with hypotheses 1, 2, and 3 of the present study that predicted effects of attitudes, subjective norms, and perceptions of control on intentions. The finding that attitude, subjective norms, and perceived behavioural control are significant predictors of intention to exercise vigorously are consistent with reviews of the theory of planned behaviour with multiple behaviours (Armitage and Conner, 2001; Notani, 1998; Sutton, 1998), with health-related behaviours (Godin and Kok, 1996), and with physical activity (Hagger et al., 2002; Symons Downs and Hausenblas, 2005).

Interestingly, subjective norms had a greater impact on intention in the present study than did attitude and perceived behaviour control. By contrast, previous studies among general populations of young people found that subjective norms made a much smaller contribution in predicting intention than did attitude and perceived behaviour control (Hagger et al., 2002; Ravis and Sheeran, 2003). This might be attributed to the differences between collectivist cultures as compared to the more individualistic Western cultures (Triandis, 1993). Support for this hypothesis came from Hagger et al. (2007), who also found that subjective norm relations with intention was lower in their individualistic samples (e.g. Great Britain, Greece) compared to their Eastern Europe collectivist sample (Hungary).

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Another important finding raised by the present study is concerned with effects of self-efficacy, self-identity, and descriptive norms on intentions. These additional variables accounted for 7% of the variance in exercise intentions over and above the influence of the theory of planned behaviour constructs. In support of Hypotheses 4 and 6, results showed that self-efficacy and descriptive norms improved the prediction of intention for the whole population. The findings are generally consistent with previous research (see Hagger et al., 2001). Self-efficacy was a stronger predictor of intention than perceived behavioural control. Perceived behavioural control reflects perceived control over external barriers that may prevent individuals' behaviours and self-efficacy reflects individuals' internal ability or capability to perform a behaviour. The significant influence of self-efficacy and perceived behaviour control on intentions supports the notion that the use of both measures augmented the theory of planned behaviour research in the individual physical activity context.

Our findings relating to descriptive norms are also worthy of mention. The fact that descriptive norms made a significant contribution to the variance in intentions, over and above subjective norms and the other theory of planned behaviour constructs supports the evidence for a distinction between subjective norms and descriptive norms (Cialdini et al., 1990). A meta-analysis by Ravis and Sheeran (2009) found that the descriptive norm–intention relationship was stronger for samples of adolescents than for older adults. Specifically, our findings suggest that adolescents' exercise behaviour is motivated not only through the possibility of gaining approval or disapproval from significant others for their intentions, but also by significant others showing them what is the typical or normal thing to do. In contrast, the inclusion of self-identity did not contribute significantly to the prediction of intentions to exercise. Relationships between self-identity and intention have not been reported to be particularly large and the relationship might be more important for other behaviours (Connor and Armitage,

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1998). Researchers have debated the benefits of including self-identity in the theory of planned behaviour model and questioned whether it overlaps with other theory of planned behaviour constructs, such as attitudes or past behaviour (Fekadu and Kraft, 2001).

With regard to the past behaviour, as hypothesised, past behaviour accounted for additional variance in intentions beyond what attitudes, subjective norms, perceived behavioural control, and additional variables were able to explain. Some research has shown that the inclusion of past behaviours results in attenuated effects of attitude, subjective norms, and perceived behavioural control when predicting intentions. In contrast to those findings, the present results revealed that after controlling for the theory of planned behaviour variables, past behaviour was able to predict only 1% of the variance in adolescents' intentions. A study of physical activity among young adults by Hagger and colleagues (2001) also found that past behaviour added little to the prediction of intentions. The small effect of past behaviour in the present study is also considerably smaller than the average effect (7% explained variance in intentions) that has been shown in other studies.

The second and third steps of the regression analysis also pointed out some interesting implications for the utility of the theory of planned behaviour and the additional variables. Overall, the theory of planned behaviour variables (attitude, subjective norms and perceived behavioural control) remained significant across all steps of the analysis. However, although at the second step, self-efficacy and descriptive norms added significantly to the additional variance explained on intentions, when past behaviour was added (at the third step) descriptive norms become non-significant.

More importantly, results from this study also point out gender differences. That is, while Saudi males appear to consider past behaviour in addition to attitudes, subjective norms, perceived behaviour control, and self efficacy when forming



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intentions, this is not the case for Saudi females, who consider attitudes, subjective norms, perceived behaviour control, and self efficacy only. However, although at the first step, perceived behavioural control added significantly to the additional variance explained on intentions, when self-efficacy and descriptive norms was added (at the second step) perceived behavioural control become non-significant. Overall, it seems that the theory of planned behaviour may provide a useful framework for identifying antecedents of intentions in an Arabic population. Saudi Arabian people base their intentions to exercise vigorously on a consideration of attitudes, perceptions of control, subjective norms, self efficacy, descriptive norms and past behaviour.

### **Indirect Measures**

#### **Prediction of attitude, subjective norm, and perceived behavioural control.**

With respect to the whole sample, the behavioural beliefs accounted for 22% of variance in attitude toward exercising vigorously. Being active, fitness, and weight control were the predictors of attitude toward exercising vigorously. Being active was an important influence on the participants to exercise vigorously. Fitness ranked second in predicting attitude toward exercising vigorously. The participants thought that exercising made them physically fit. There were also important gender differences in attitude formation. That is, while female attitudes were functions of beliefs relating to weight control, being active, and fitness, male attitudes were concerned with being active only.

With respect to the whole sample, the regression analysis showed that normative beliefs accounted for 21% of variance in subjective norms. Friends, mother, and brother were independent significant predictors of subjective norms for exercising vigorously, with participants wishing to comply more with what friends, mother, and brother think they should be doing with regard to exercise than what someone else in the family and

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father think. Results also showed that while female subjective norms were functions of beliefs relating to friends, family, father, mother, and brother, male subjective norms were concerned with friends, family, father, and brother.

With respect to the whole sample, the regression analysis showed that control beliefs accounted for 14% of variance in perceived behaviour control. Availability of place, availability of time, and bad weather were the predictors of perceived behavioural control to exercise vigorously. The participants thought that having place, time, and nice weather available made it easier for them to exercise. Availability of sport equipment had no independent influence in predicting perceived behaviour control. Interestingly, results did not point out important gender differences. That is, the regression analysis showed that influences from availability of place, availability of time, and bad weather predicted perceived behaviour control for both Saudi males and females.

**Introduction**

The theory of planned behaviour (Ajzen, 1985, 1991) is considered a particularly efficacious theoretical model in the physical activity domain, producing some of the most promising research on social cognitive determinants of physical activity behaviour (Hagger, Chatzisarantis, and Biddle, 2002; Downs and Hausenblas, 2005). Briefly, the theory of planned behaviour asserts that the most important determinant of behaviour is an individual's behavioural intention, which is affected by attitude toward the behaviour, subjective norms, and perceived behavioural control. In turn, attitude toward the behaviour is influenced by behavioural beliefs and evaluations of the outcomes of performing the behaviour, subjective norms are affected by normative beliefs and motivation to comply with normative referents and perceived behavioural control is affected by control beliefs and perceived power. Within this model, perceived obstacles and beliefs about one's ability to overcome them play a key role in the performance of the actual behaviour.

The theory of planned behaviour has been applied to explaining individuals' intentions to participate in physical activity and their actual physical activity behaviours. Several researchers examined the theory of planned behaviour and physical activity among young adults (Hagger, Chatzisarantis, Biddle, and Orbell 2001; Saunders, Motl, Dowda, Dishman and Pate, 2004; Symons Downs, Graham, Yang, Bargainnier and Vasil, 2006). Results were equivocal in several applications of the theory of planned behaviour in this population.

Other researchers have reported that both intention and perceived behavioural control are important correlates of exercise behaviour (Troost, Pate et al., 2002; Trost, Saunders et al., 2002). For example, Trost, Saunders, and Ward (2002) observed that

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perceived behavioural control and intention accounted significantly for just over 6% of the variance in moderate or vigorous physical activity. In both studies by Hagger, Chatzisarantis, Biddle et al. (2001), the researchers found intention to be the sole significant predictor of behaviour. In a recent meta-analysis, Symons, Downs, and Hausenblas (2005) found 83 theory of planned behaviour studies specifically focused on exercise and physical activity. This most recent meta-analysis supported the main relationships between the theory of planned behaviour variables in the physical activity domain. Intention and perceived behavioural control contributed 21% of the variance in exercise behaviour. This supports the hypotheses of the theory of planned behaviour that theory of planned behaviour can serve as useful predictor of behaviour under certain conditions.

Another potential constraint of the theory of planned behaviour is that studies have shown that in some situations, past behaviour is a good predictor of future behaviour (Ouellette and Wood, 1998). Past behaviour has been found to add unique variance to the prediction of behaviour. In particular, in their meta-analysis, Conner and Armitage (1998) reported as much as 13% of the variance in behaviour could be accounted for by past behaviour after controlling for the effects of intention and perceived behavioural control. In terms of predicting physical activity behaviour, several studies have reported a significant role for past behaviour (Bozionelos and Bennett, 1999; Godin, Valois, and Lepage, 1993; Norman and Smith, 1995). The process by which past behaviour directs future behaviour may depend on the frequency of the behaviour (Ouellette and Wood, 1998). The more frequently a behaviour was performed in the past, the more the behaviour is assumed to be habitual. Several studies found that the inclusion of a measure of past exercise behaviour significantly improved the prediction of future exercise behaviour, beyond the prediction of theory of planned behaviour (Bozionelos and Bennett, 1999; Hagger et al., 2001, 2002).

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The goal of this study was to assess the theory of planned behaviour model in predicting Saudis' exercise behaviour. Hypotheses regarding the variables that would predict exercise and physical activity behaviours were as follows:

- Hypothesis 1: Young Saudis' intentions to exercise vigorously will significantly predict their exercising behaviour.
- Hypothesis 2: Young Saudis' perceived behavioural control to exercise vigorously will significantly predict their exercising behaviour.
- Hypothesis 3: Young Saudis' past behaviour to exercise vigorously will significantly predict their exercising behaviour.

In addition, attitude, subjective norms, descriptive norms, self-efficacy, and self-identity were entered into the regression analysis to examine whether these variables explained further variance in exercise behaviour.

### **Method**

#### **Research Participants and Procedure**

The target population in this study were young Saudi students who ranged in age from fourteen to eighteen years old. With the coordination of the Saudi education ministry, I was given a permission to distribute the theory of planned behaviour questionnaires to male and female students at four different secondary and high schools in Riyadh\*, Saudi Arabia. Questionnaires were distributed to 455 students (N = 455, male = 234, female = 221, age M = 15.6 years, SD = 1.4). 42 did not complete the questionnaires and were therefore excluded from analysis, giving a final sample of 413 students (N = 413, male = 212, female = 201, age M = 15.8 years, SD = 1.3). The data were collected from the students during class lectures. All participants were assured that

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\* The Saudi students are aged between 13 to 15 years in the middle school and 16 to 18 in high school. The targeted ages in this study were between 14-18 years

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their participation was voluntary, their responses confidential, and that only the researchers would have access to the raw data.

### **Study Design**

A prospective design was used for this investigation. At time 1, Participants completed a questionnaire that assessed measures of the main theory of planned behaviour and additional variable constructs. Five weeks later, a self-reported behavioural measure was assessed at Time 2 of data collection, phrased specifically to reflect taking part in vigorous physical activity for at least 30 minutes, three times per week, during leisure time in the past five weeks.

### **Instrument Development**

The questionnaire was developed based on the theory of planned behaviour (Ajzen, 2002), and based on the results of the elicitation study, all initial measurement items were kept for the main questionnaire. The final version of the questionnaire included 55 questions to measure the components of the theory of planned behaviour, additional variables, and demographic information (See Appendix C). Part 1 collected direct and indirect measures of the theory of planned behaviour and additional variables. Part 2 included seven questions to measure the demographic information such as sex, weight, height, age, and class.

### **Translation of the Questionnaire**

Standard back translation techniques (Brislin, 1986) were used to develop Arabic questionnaires. The questionnaire was first constructed in English. The questionnaire (see appendices) had to be translated into Arabic because indicators have not been used in Arabic studies before. The method of back-translation was used to compare the Arabic and English versions. Items were presented in the same order as those in the English version. A panel of two Arab professors reviewed the English and Arab versions. Appropriate changes

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were made to the instrument where necessary regarding survey format and wording, such as items that were difficult to answer or not fully understood.

### Measures

At Time 1, participants completed a questionnaire that contained measures of the main theory of planned behaviour and additional variable constructs, in line with Azjen's (2002) recommendations and in line with previous researchers (Hagger et al., 2001; Norman and Smith, 1995). Five weeks later, a self-reported behavioural measure was assessed at Time 2 of data collection.

An *attitude* represents a positive or negative evaluation of performing the behaviour. A direct measure of attitudes was obtained using seven bipolar adjectives (Azjen, 2002) on a semantic differential scale (adjective pairs included 'good-bad', 'valuable-worthless', 'beneficial-harmful', 'enjoyable-unenjoyable', 'necessary-unnecessary', 'interesting-boring', and 'pleasant-unpleasant'). An example item was as follows: "For me to exercise vigorously for at least 30 minutes three times per week over the next five weeks during leisure time will be . . .". This item was measured on a 7-point scale ranging from (1) 'bad' to (7) 'good'.

*Subjective norms* reflect the perceived social pressure to perform or not perform the behaviour. Three items (Azjen, 2002) were used to obtain a direct measure of subjective norms. The items were the following: "Most people who are important to me think that I ... exercise vigorously for at least 30 minutes three times per week over the next five weeks". This item was measured on seven-point scale ranging from (1) 'should not' to (7) 'should'. "The people in my life whose opinions I value would ... of my exercising vigorously for at least 30 minutes 3 times per week over the next five weeks during leisure time". This item was measured on seven-point scale ranging from (1) 'disapprove' to (7) 'approve'. "It is ... expected from me that I exercise for at least

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30 minutes 3 times per week over the next five weeks during leisure time”. This item was measured on a seven-point scale ranging from (1) ‘Extremely unlikely’ to (7) ‘Extremely likely.’

*Perceived behavioural control* refers to the degree to which an individual feels that performance is under his or her control. Three items (Ajzen, 2002) were developed to assess perceived behavioural control based on those typically used in tests of the theory of planned behaviour (see Ajzen and Madden, 1986; Beale and Manstead, 1991). The items to assess perceived behavioural control were, “How much control do you have over whether you exercise vigorously for at least 30 minutes three times per week over the next five weeks?” This item was measured on a 7-point scale ranging from (1) ‘no control’ to (7) ‘complete control’. “I have control whether or not I exercise vigorously for at least 30 minutes 3 times per week over the next five weeks during leisure time”. This item was measured on a 7-point scale ranging from (1) ‘not at all’ to (7) ‘very much’. “Whether or not I exercise vigorously for at least 30 minutes 3 times per week over the next five weeks during leisure time is completely up to me ...”. This item was measured on a 7-point scale ranging from (1) ‘Strongly disagree’ to (7) ‘Strongly agree’.

### **Additional Variables**

*Self-identity.* Five items (Ajzen, 2002) were used to obtain a measure of self-identity. The items were as follows: “I see myself as sporty person who participates in sport at least 30 minutes 3 times per week over the next five weeks during leisure time”, “I would feel at a loss if I were forced to give up exercising vigorously for at least 30 minutes 3 times per week over the next five weeks during leisure time”, “I am the type of person who enjoys exercising vigorously for at least 30 minutes three times per week over the next five weeks during leisure time”, “I see myself as a physically active person who exercises vigorously for at least 30 minutes 3 times per week over the next



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five weeks during leisure time”, and “I think of myself as someone who exercises vigorously for at least 30 minutes 3 times per week over the next five weeks during leisure time”. These items were measured on a 7-point scale ranging from (1) ‘strongly disagree’ to (7) ‘strongly agree’.

*Descriptive norms.* Three items (Ajzen, 2002) were used to measure this variable. The items were as follows: “Most people who are important to me will exercise vigorously for at least 30 minutes 3 times per week over the next five weeks during leisure time”, “The people in my life whose opinions I value will exercise vigorously for at least 30 minutes three times per week over the next five weeks during leisure time”, and “All of the people I know will exercise vigorously for at least 30 minutes 3 times per week over the next five weeks during leisure time”. All items were measured on 7-point scales ranging from (1) ‘strongly disagree’ to (7) ‘strongly agree’.

*Self-efficacy.* Three items (Ajzen, 2002) were used to obtain a measure of self-efficacy. The items were, “How confident are you that you will be able to exercise exercising vigorously for at least 30 minutes 3 times per week over the next five weeks during leisure time?” This item was measured on a 7-point scale ranging from (1) ‘very unconfident’ to (7) ‘very confident’. The other items were as follows: “I believe I have the ability to exercise vigorously for at least 30 minutes 3 times per week over the next five weeks during leisure time”, and “I am confident that I would be able to exercise vigorously for at least 30 minutes 3 times per week over the next five weeks during leisure time”. These items were measured on a 7-point scale ranging from (1) ‘strongly disagree’ to (7) ‘strongly agree’.

*Past behaviour.* Two items (Ajzen, 2002) were used to measure past behaviour. The items were, “Please estimate how often you have exercised vigorously for at least 3 times per week in the past five weeks during leisure time?” This item was measured on a 7-point scale ranging from (1) ‘never’ to (7) ‘very often’. “On average, please estimate

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how often you have exercised vigorously for at least 3 times per week in the past five weeks". This item was measured on a 7-point scale ranging from (1) 'almost never' to (7) 'every day'.

*Intention.* Three items (Ajzen, 2002) were used to obtain a measure of intentions. The items were, "I intend to exercise vigorously for at least 30 minutes three times per week over the next five weeks during leisure time", "I will try to exercise vigorously for at least 30 minutes 3 times per week over the next five weeks during leisure time", and "I plan to exercise vigorously for at least 30 minutes three times per week over the next five weeks during leisure time". These items were measured on a 7-point scale ranging from (1) 'strongly disagree' to (7) 'strongly agree'.

*Physical activity behaviours.* A self-reported behavioural measure was assessed at Time 2 of data collection through an adaptation of Godin and Shephard's (1985) Leisure-Time Exercise Questionnaire. The students were asked to consider an average week (seven days) and to report how many times per week they engaged in vigorous physical activity for at least 30 minutes. The instructions made it clear that we requested them to report leisure time activities and not activities in a physical education context. The questions included the following: "On average, how many times per week did you participate in physical activity during the last five weeks?" and "On average week, please estimate how many days you have exercised vigorously over the past five weeks during leisure time?" These items were measured in a 7-point scale ranging from (1) "almost never" to (7) "every day".

### **Data Analytic Procedures**

The effects of intention, perceived behavioural control, past behaviour, attitude, subjective norms, descriptive norms, self-efficacy, and self-identity on exercising behaviour were examined through a series of hierarchical regression analyses for the

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whole sample, and for males and females separately (Ajzen, 1991). In those hierarchical regression analyses, exercise behaviour was the dependent variable; intention, perceived behavioural control, attitude, subjective norms, descriptive norms, self-efficacy, self-identity, and past behaviour were the independent variables. In order to test the predictors of exercise behaviour, a four-step hierarchical regression analysis was preformed. According to the theory of planned behaviour, intention is the most proximal predictor of behaviour and, thus, the researcher entered the measure of intention in the first step in this regression model. In the theory of planned behaviour, perceived behavioural control is expected to add to the prediction of behaviour and so was entered in the second step. Attitude, subjective norms, descriptive norms, self-efficacy, and self-identity were entered in the third step. Finally, the researcher entered the measure of past behaviour as a fourth step in the regression analyses to examine whether the effect of past behaviour would add to the prediction of exercise behaviour. The data were analysed using the Statistical Package for the Social Sciences (SPSS) 15.

## **Results**

### **Preliminary Analysis**

Prior to analysis, the data were examined for missing data, of which there were none. Using the standardized residuals and leverage values, no values were found two standard deviations away from the mean, suggesting the absence of outliers. Outliers may or may not affect the estimation of a regression line; however, if they do so, they are called influential cases (Tabachnick and Fidell, 2001). Cook's distance of all the independent variables was  $< 1$ , indicating the absence of influential data points.

The following assumptions of multiple regression were examined to ensure that they were not violated and to ensure proper use of parametric statistics: (1) zero

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mean, (2) independence, (3) normal distribution of residuals, (4) homoscedasticity, (5) multicollinearity, and (6) linearity of the relationship between the independent and the dependent variable. Zero mean and independence are two assumptions that cannot be violated for multiple regressions. The assumption of zero mean was met by determining a constant in the equations and by checking the mean and the standard deviation of the standardized residuals which was 0. Independence was evaluated by examining the Durbin-Watson statistic which was 1.84. These values were not  $> 2.5$  and  $< 1.5$ , indicating no violation of this assumption.

Data from the descriptive statistics were screened and examined for normality. Normal distribution was evaluated by examining histograms, P-P plots, and values of skewness for each variable. The shape of the histograms indicated normal distribution and the P-P plots were close to straight lines. Homoscedasticity of the variance of the residuals was also evaluated by examining the residual scatter plots for even distribution of points across the reference line (Tabachnick and Fidell, 2001). This assumption was not violated since there was an approximately even random scatter of values across the reference line. Multicollinearity was examined by checking the tolerance and VIF. None of the independent variables were calculated greater than .8 (in absolute value). All independent variables had Tolerance values  $> .10$  and VIF  $< 10$ , indicating no multicollinearity. Finally, the assumption of linearity was also met. The bivariate and residual scatter plots revealed linear relationships between the independent and the dependent variables.

### **Hierarchical Regression Analyses**

**Whole sample.** In the first step, the model was significant ( $F=67.070$ ,  $R^2= .14$   $p \leq .000$ ) (Table 4.1). A total of 14.0% of the variance in exercise behaviour was explained by intention with a significant beta weight ( $\beta=0.37$ ,  $p \leq .00$ ). Thus, Hypothesis 1 was supported. The second step of the analysis showed that the resulting

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model was not significant ( $F=70.47, p \leq .06$ ) (Table 6.1). Although the variance increased by 1% with the addition of perceived behavioural control, it was not significant ( $\beta = 0.096, \Delta R^2 = .01, p = .064$ ). Thus, Hypothesis 2 was rejected. The third step of the regression analysis indicated that attitude, subjective norms, descriptive norms, self-efficacy and self-identity explained significantly 5% of the variance in exercise behaviour ( $F=80.97, \Delta R^2 = .05, p \leq .00$ ). The fourth step of the regression analysis pointed out that past behaviour explained significantly 6% of the variance in exercise behaviour ( $F=115.67, \Delta R^2 = .06, p \leq .00$ ). Thus, Hypothesis 3 was supported (see Table 6.1).

TABLE 6.1. Evaluating TPB and Additional Variables in Predicting Exercise Behaviour (Whole Sample)

Model		$R^2$	$\Delta R^2$	$\beta$	$t$	$p$
1	Intention	.14	.14*	.37	8.19*	.00
2	Intention	.15	.01	.33	6.63*	.00
	Perceived behavioural control			.09	1.85	.06
3	Intention	.20	.05*	.18	2.82*	.00
	Perceived behavioural control			.05	1.07	.28
	Attitude			.04	0.77	.43
	Subjective norms			.16	2.70*	.00
	Descriptive norms			.05	1.08	.27
	Self-efficacy			.14	2.50*	.01
	Self-identity			-.04	-0.67	.49
4	Intention	.26	.06*	.10	1.66	.09
	Perceived behavioural control			.04	0.85	.39
	Attitude			.03	0.70	.48
	Subjective norms			.13	2.32*	.02
	Descriptive norms			.01	0.03	.97
	Self-efficacy			.12	2.31*	.02
	Self-identity			-.05	-0.83	.40
	Past behaviour			.30	6.16*	.00

Note: Parameters with an asterisk are statistically significant at .05 level.

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Overall, the results of this hierarchical regression analysis revealed 26% of the variance in exercise behaviour to be accounted for by intention, perceived behavioural control, attitude, subjective norms, descriptive norms, self-efficacy, self-identity, and past behaviour (see Table 6.1). Intention became non-significant when past behaviour added in the final equation.

**Male sample.** With respect to Saudi males, in the first step, the model was significant ( $F=20.78, p \leq .00$ ) (Table 6.2). A total of 9% of the variance in exercise behaviour was explained by intention with significant beta weight ( $\beta = 0.30, p \leq .00$ ). Thus, Hypothesis 1 was supported. The second step of the analysis showed that the resulting model was significant ( $F=27.312, p \leq .012$ ) (Table 6.2). The addition of perceived behavioural control explained 2% of the variance in exercise behaviour ( $\beta = 0.17, p \leq .01$ ). Thus, Hypothesis 2 was supported. The third step of the regression analysis indicated that attitude, subjective norms, descriptive norms, self-efficacy, and self-identity explained 3% of the variance in exercise behaviour ( $F=35.67, p = .91$ ). The fourth step of the regression analysis pointed out that past behaviour produced a significant increment of 6% in the variance explained in exercise behaviour ( $F=51.85, p \leq .00$ ). Thus, Hypothesis 3 was supported (see Table 6.2).

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TABLE 6.2 Evaluating TPB and Additional Variables in Predicting Exercise

Behaviour (Male Sample)

Model		$R^2$	$\Delta R^2$	$\beta$	$t$	$p$
1	Intention	.09	.09*	.30	4.55*	.00
2	Intention	.11	.02*	.22	3.20*	.00
	Perceived behavioural control			.17	2.52*	.01
3	Intention	.14	.03	.13	1.57	.11
	Perceived behavioural control			.18	2.48*	.01
	Attitude			.03	0.50	.61
	Subjective norms			.15	1.88	.06
	Descriptive norms			-.05	-0.62	.53
	Self-efficacy			.00	0.02	.98
	Self-identity			.00	0.03	.97
4	Intention	.20	.06*	.06	0.77	.44
	Perceived behavioural control			.17	2.35*	.02
	Attitude			.03	0.42	.67
	Subjective norms			.15	1.94	.06
	Descriptive norms			-.09	-1.29	.19
	Self-efficacy			.00	0.04	.96
	Self-identity			-.02	-0.29	.77
	Past behaviour			.27	4.00*	.00

Note: Parameters with an asterisk are statistically significant at .05 level

Overall, the results of this hierarchical regression analysis revealed 20% of the variance in exercise behaviour to be accounted for by intention, perceived behaviour control, attitude, subjective norms, descriptive norms, self-efficacy, self-identity, and past behaviour (see Table 6.2).

**Female sample.** With regard to the female sample, in the first step, the model was significant ( $F=32.45, p \leq .00$ ) (Table 6.3). A total of 14% of the variance in exercise behaviour was explained by intention with a significant beta weight ( $\beta=0.37, p \leq .00$ ). Thus, Hypothesis 1 was supported. The second step of the analysis showed that

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the resulting model was not significant ( $F=32.46, p \leq .92$ ) (Table 6.3). Examining the beta weights for perceived behaviour control revealed no significant effect on exercise behaviour ( $\beta = 0.00, p \leq .92$ ). Thus, Hypothesis 2 was rejected. The third step of the regression analysis indicated that attitude, subjective norms, descriptive norms, self-efficacy, and self-identity explained 11% of the variance in exercise behaviour ( $F=42.45, p \leq .00$ ). The fourth step of the regression analysis demonstrated that past behaviour produced a significant increment of 6% in the variance explained in exercise behaviour ( $F=59.57, p \leq .00$ ). Thus, Hypothesis 3 was supported (see Table 6.3).

TABLE 6.3 *The TPB and Additional Variables in Predicting Exercise*

*Behaviour (Female Sample)*

Model		$R^2$	$\Delta R^2$	$\beta$	$t$	$p$
1	Intention	.14	.14*	.37	5.69*	.00
2	Intention	.14	.00	.37	5.15*	.00
	Perceived behavioural control			.01	0.08	.92
3	Intention	.25	.11*	.15	1.66	.09
	Perceived behavioural control			-.05	-0.74	.45
	Attitude			.06	0.88	.37
	Subjective norms			.18	2.28*	.02
	Descriptive norms			.10	1.44	.15
	Self-efficacy			.30	3.69*	.00
	Self-identity			-.16	-1.74	.08
4	Intention	.31	.06*	.09	0.95	.34
	Perceived behavioural control			-.05	-0.73	.46
	Attitude			.05	0.73	.46
	Subjective norms			.13	1.61	.10
	Descriptive norms			.05	0.71	.47
	Self-efficacy			.25	3.16*	.00
	Self-identity			-.13	-1.45	.14
	Past behaviour			.29	4.14*	.00

*Note: Parameters with an asterisk are statistically significant at .05 alpha level.*



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Overall, the results of this hierarchical regression analysis revealed 31% of the variance in exercise behaviour to be accounted for by intention, perceived behavioural control, attitude, subjective norms, descriptive norms, self-efficacy, self-identity, and past behaviour (see Table 6.3). In general, results point out important gender differences. That is, intention, subjective norms, and past behaviour were significant for predicting exercise behaviour for the male sample. While, intention, perceived behavioural control, past behaviour, and self-efficacy were significant for predicting exercise behaviour for the female sample.

### **Discussion**

This study examined the utility of the theory of planned behaviour as a theoretical model for understanding and predicting adolescents' exercise behaviour in a Saudi context.

With respect to the prediction of exercise behaviour, the hierarchical regression analysis revealed 26% of the variance in exercise behaviour to be accounted for by intention, perceived behavioural control, attitude, subjective norms, descriptive norms, self-efficacy, self-identity, and past behaviour. This was slightly lower than the value of 27.4% reported by Hagger et al. (2002). Although the main effect of intention suggested that it did add significantly to the prediction of physical activity; this effect becomes nonsignificant when past behaviour was entered into the equation.

The results of the current study provide some support for the efficacy of the theory of planned behaviour model in predicting adolescent physical activity. Support for the theory of planned behaviour model is consistent with a meta-analytic finding in the exercise domain (Hagger et al., 2002b; Symons Downs and Hausenblas, 2005). It should be noted, however, that perceived behavioural control did not emerge as a

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significant predictor of behaviour, a finding that is inconsistent with previous adolescent physical activity research (e.g. Trost, Saunders, and Ward, 2002). According to Ajzen (1991) the strength of perceived behavioural control in determining behaviour is dependent on perception of control being reflective of actual control. Research in the exercise domain has shown that individuals generally overestimate their control over the behaviour (Trost, Saunders, and Ward, 2002). The result of the current study also revealed that subjective norms and self-efficacy were significant predictors of exercise behaviour, whereas the attitude, descriptive norms and self-identity were not found to be significant predictors of exercise behaviour.

A meta-analytic path analysis by Hagger et al. (2002) has shown that self-efficacy contributes independent predictive value for exercise intention and behaviour in the theory of planned behaviour model when results were amalgamated across 12 studies. The relationship between self-efficacy and exercise (or any) activity is complex because not only does self-efficacy predict exercise activity, exercise activity has also been found, in turn, to predict physical self-efficacy (McAuley and Blissmer, 2000). The evidence above suggests self-efficacy predicts exercise behaviour very strongly.

Consistent with previous research, the addition of past behaviour significantly increased (9%) the variance in exercise behaviour (Bozionelos and Bennett, 1999; Hagger et al., 2002; Milne et al., 2002). This value was slightly lower than the 13% additional variance in behaviour reported by Conner and Armitage (1998) across seven studies of different behaviours. Conner and Armitage (1998) believe that “there do appear to be good empirical and theoretical reasons to incorporate habit measures (frequency of past behaviour) as predictors of behaviour in the theory of planned behaviour” (p. 1439). Past behaviour has a moderate relationship with physical activity behaviours, supporting the notion of automaticity in human

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behaviour, that is, part of human behaviour may not be consciously formulated and may be determined by past habit. The non-significant effect of perceived behavioural control was not consistent with the findings of Hagger et al. (2002). However, it was consistent with the results of Terry and O'Leary (1995).

Results also point out important gender differences. That is, while Saudi males appear to consider intention, perceived behavioural control, and past behaviour, when predicting exercising behaviour, this is not the case for Saudi females, who consider intention, subjective norms, self-efficacy and past behaviour only. The reason that perceived behavioural control did not predict exercise behaviour may be related to the fact that physical activity is experienced on average as being under volitional control. Alternatively, the low prediction obtained by perceived behavioural control may be due to the low reliability displayed by this measure (see chapter 4). The results are not surprising given that perceived behavioural control has no direct relationship with behaviour (e.g. Jackson et al., 2003). Future research should explore why perceived behavioural control is a direct predictor of physical activity behaviour in some studies and not in others.

Overall, it seems therefore that the theory of planned behaviour may provide some evidence for using this framework in predicting exercise behaviour in an Arabic population. Subjective norms, self-efficacy and past behaviour predicted physical activity participation, but, not attitude, perceived behavioural control, descriptive norms or self-identity. Also, there are important gender differences. That is, while Saudi males appear to consider perceived behavioural control and past behaviour when predicting exercising behaviour, this is not the case for Saudi females, who consider self-efficacy and past behaviour only.

### **Chapter Seven: General Discussion**

This thesis represents an attempt to examine theoretical determinants of vigorous leisure time physical activity in a Saudi Arabian context. Below, results from the studies are discussed in relation to the tenets of the theory of planned behaviour.

#### **The Content of Behavioural, Normative and Control Beliefs**

One purpose of the present thesis was to investigate the content of modal salient behavioural, normative, and control beliefs of Saudi Arabian adolescents. The importance of eliciting such beliefs is paramount because not everyone shares the same thoughts and feelings about behavioural phenomena such as physical activity (Downs and Hausenblas, 2005). In line with the recommendations of Ajzen and his colleagues (Ajzen, 2002b; Ajzen and Fishbein, 1980), an elicitation study was conducted in order to obtain the appropriate attributes of exercise behaviour from a sample of the target population. In particular, participants identified the advantages/disadvantages of exercise behaviour, people who they believed would approve/disapprove of them engaging in such behaviour, and factors that would make engaging in exercise behaviour easy/difficult. Results from the elicitation study showed that Saudi Arabian males and females endorsed a limited number of beliefs. Specifically, both Saudi Arabian males and females endorsed behavioural beliefs that reflected weight control, fitness, being active and body energy. Only one behavioural disadvantage or health problem was mentioned, fatigue. These findings indicate that people have a variety of positive and negative behavioural beliefs about exercise. In a systematic review of exercise behavioural beliefs, Downs and Hausenblas (2005) found that the most salient beliefs of the advantages and disadvantages of engaging in exercise were related to the

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physical and psychological realms of health. Such findings are similar to those found here.

The fact that Saudi Arabian adolescents endorsed a limited number of beliefs is inconsistent with Ajzen and Fishbein's (1980) initial proposition that attitudes are a function of eight behavioural beliefs. Results of the elicitation study are more consistent with the view that individuals consider a limited number of beliefs during attitude formation (Haddock and Zanna, 1998; van der Pligt and Eiser, 1984). In general, because human capacity for information processing is limited (van der Pligt and Eiser, 1984), Saudi adolescents consider only three behavioural beliefs when forming attitudes. Considering that Saudi adolescents do not recall more than four behavioural beliefs, it can be suggested that in a Saudi Arabian context, models of attitude formation that include a small set of beliefs have greater heuristic value than models that include a large number of beliefs, because small models reflect better the actual process underlying attitude formation than large models (van der Pligt and Eiser, 1984).

There were important gender differences in attitude formation. That is, while female attitudes were functions of beliefs relating to weight control, being active, and fitness, male attitudes were concerned with being active only. Saudi females appeared to consider outcomes related to weight control during attitude formation to a greater extent than males. This may be because obesity rates are higher among women than men. Indeed, Al-Nuaim et al. (1997) showed that the prevalence of obesity was higher in Saudi females than Saudi males, and lower in subjects living in rural areas with traditional lifestyles than those in more urbanised environments. This may be due to the fact that modern living does not provide plenty of opportunities for physical activity. In addition, Binhamed, Larbi and Absood (1991) indicated that, as in some other Western societies, traditional Arabian people associate a slim female body with beauty, and that could be

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an important reason why Saudi women consider weight control during attitude formation.

Another important finding raised by the elicitation study is concerned with the content of normative beliefs. Here, once again, an elicitation study points out important differences between Saudi males and Saudi females in the content of normative beliefs. Specifically, while females endorsed friends, family, mother, father, and brother as important sources of social influence, Saudi Arabian males endorsed only friends, family and father as a source of social influence. Downs and Hausenblas (2005) found that the most salient beliefs regarding important others were family members and friends. There were also important gender differences in subjective norms formation. Results showed that while female subjective norms were functions of beliefs relating to friends, family, father, mother, and brother, male subjective norms were concerned with friends, family, father, and brother.

Turning now to the content of control beliefs, while Saudi Arabian men endorsed lack of time, lack of place, and bad weather as barriers to exercise, Saudi Arabian females endorsed lack of sport equipment and facilities in addition to bad weather, lack of time, and lack of places as barriers to exercise. However, the fact that lack of time is considered to be a barrier by Saudi Arabian men and women may be associated with the rapid economic growth of Saudi Arabia (Sultan, 1992). Such rapid growth might have resulted in excessive workloads that unfortunately reduce leisure time and perceptions of control over physical activity. The fact that Saudi Arabian men and women also consider lack of places and facilities when forming general perceptions of control is surprising given that the Saudi Arabian government invested heavily in sporting facilities over the past ten years. A reason why Saudi Arabian men and women are concerned with lack of facilities may be related to the fact that exercise facilities have been presented more as sporting facilities in which people can participate in

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competitive sports, rather than as exercise facilities in which individuals from all walks of life can engage in physical activity. It seems that the presentation of these facilities as leisure facilities has been inadequate, and for this reason, Saudi Arabian men might have endorsed lack of place and facilities as a barrier to exercise.

### **Psychometric Properties**

A pilot study was conducted with 42 volunteers from a Saudi school in Riyadh, Saudi Arabia. Feedback was obtained about the length of the instrument, the format of the scales, content validity, and question clarity.

The initial research instrument was developed based on the review of literature and the elicitation study. The final version of the questionnaire included 55 questions that measured the components of the theory of planned behaviour and demographic information. The sample population for this study included 455 male and female students at secondary and high schools in Riyadh, Saudi Arabian. Due to incomplete and missing data, a total of 413 students responses were usable ( $N = 413$ , male = 212, female = 201, age  $M = 15.8$  years,  $SD = 1.3$ ).

Cronbach's alpha was used to assess the internal consistency of the measurement scales in the survey instrument (i.e., attitude, subjective norm, perceived behavioural control, descriptive norms, self identity, self-efficacy, intention, past behaviour, and behaviour) using the entire sample, as well as males and females separately. The findings in the theory of planned behaviour study provided satisfactory levels of reliability since the alpha coefficients of the theory of planned behaviour variables were greater than .60. However, the reliability of indirect attitude and indirect perceived behavioural control was not satisfactory. These low reliabilities may undermine the predictive validity of indirect attitude and indirect perceived behavioural control. Therefore, it is important to bear in mind low reliabilities when interpreting the predictive validity of indirect attitude and indirect perceived behavioural control. This

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indicated that the scales used in the study successfully measured the consistency of results across items.

The items were subjected to principal component analysis with oblique rotation, with delta set at 0 for direct oblimin rotation. Principal components analysis was applied to examine the factorial structure of items measuring attitudes, subjective norms, perceived behavioural control, descriptive norms, self-identity, self-efficacy, and intentions. Results showed that eight factors explained 69.4% of the total variance in this particular analysis. The first factor represents intention and explained 34.0%; the second, attitude, explained 10.1%; the third, perceive behaviour control, explained 5.8%; the fourth, self-identity, explained 5.2%; the fifth, descriptive norms, explained 4.6%; the sixth, past behaviour, explained 3.8%; the seventh, subjective norms, explained 3.1%; the eighth, self-efficacy, explained 2.6% of the total variance in this particular analysis. These results are consistent with tenets of the theory of planned behaviour that advocate discriminant validity between attitudes, intentions, perceived behavioural control, and subjective norms (Ajzen, 1991). Results regarding the extended theory of planned behaviour model indicated that self-efficacy and perceived behavioural control loaded on two different factors, and subjective norms and descriptive norms also loaded on two different factors. Results concerning self-efficacy and perceived behavioural control support discriminant validity between these two constructs (Trafimow et al., 2004) and suggest that these constructs are empirically distinct. Results regarding subjective norms and descriptive norms support discriminant validity between these two constructs (Hagger & Chatzisarantis, 2005).

Prior to any further work with these measures, we ran a series of Two-way ANOVAs to examine effects of gender and age on attitudes, subjective norms, perceived behavioural control, self-efficacy, self-identity, descriptive norms, intentions,



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and past behaviour. Two-way ANOVAs were used to examine main effects for the five ages and gender and their interactions. The analyses showed a significant main effect for age on self-efficacy only ( $F_{4,403} = 4.95; P < .01$ ). There were significant main effects for gender on all theory of planned behaviour variables ( $F_{1,403} = 9.77-20.83, p < .02$ ), except for attitude ( $F_{1,403} = 0.29; P = .58$ ). None of the interactions were significant. Few studies have investigated gender within the theory of planned behaviour and physical activity. One study that investigated the theory of planned behaviour relationship among children reported that gender did not show a robust relationship with physical activity or intention (Rhodes, Macdonald, and McKay, 2006). Similarly Nigg, Lippke, and Maddock (2009) showed no significant differences were observed across the genders. However, Abrams, Jorgensen, Southwell, Geller, and Emmons (2003) found that male and female adults differed on all of the theory of planned behaviour constructs for sunscreen use. Wardle, Haase, Steptoe, Nillapun, and Jonwutiwes (2004) examined food choice behaviours in a large sample of young adults from 23 countries and investigated explanatory mechanisms for the gender differences. These results revealed that significant differences existed between males and females.

Results show the correlation for the theory of planned behaviour variables and additional variables; all constructs were significantly correlated with intentions, and intentions were significantly correlated with physical activity behaviour for the whole sample, males and females. The correlations for the whole sample appear to fall in the line with theoretical prediction (see chapter 4). As with previous research applying the theory of planned behaviour to participating in physical activity (e.g. Armitage and Conner, 2001; Biddle, Fekadu and Kraft, 2001; Bissonnette and Contento, 2001; Charng et al., 1988; Conner et al., 1999; Sparks et al., 1992; Sparks and Guthrie, 1998), attitudes, subjective norms, perceived behavioural control, self-identity, self-efficacy,

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descriptive norms, intentions, and past behaviour were significantly positively associated with intention.

### **The Effects of Attitudes, Subjective Norms, Perceived Behavioural Control and Additional Variables on Intentions to Exercise**

Identifying and examining predictors of physical activity in adolescents is an important consideration in developing more effective interventions to maximize both exercise adoption and adherence (Baranowski, Anderson, and Carmack, 1998). The findings from study provide support for the effectiveness of the theory of planned behaviour in predicting Saudi adolescents' intentions to exercise. Multiple linear regression indicated that attitude, subjective norms, and perceived behavioural control yielded a good level of prediction and together explained 46% of the variance in intention, which is larger than the 37% average amount of variance found in Armitage and Conner's (2001) meta-analysis of 185 studies using the theory of planned behaviour framework.

Interestingly, subjective norms had a greater impact on intention in the present study than did attitude and perceived behaviour control. By contrast, previous studies among general populations of young people found that subjective norms made a much smaller contribution to predicting intention than did attitude and perceived behaviour control (Hagger et al., 2002; Rivas and Sheeran, 2003). This might be attributed to the differences between collectivist cultures as compared to the more individualistic Western cultures (Triandis, 1993). Support for this hypothesis came from Hagger et al. (2007), who also found that subjective norm relations with intention was lower in their individualistic samples (e.g. Great Britain, Greece) compared to their Eastern Europe collectivist sample (Hungary). However, in an early study investigating intentions in relation to five leisure activities, subjective norms made a significant contribution to the

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prediction of intentions for jogging, mountain climbing, and boating, but not for going to the beach or biking (Ajzen and Driver, 1992). More recently, Bryan et al. (2002) found a significant effect on intention for aerobic as well as resistance exercises.

Another important finding in chapter 5 is concerned with the effects of self-efficacy, self-identity, and descriptive norms on intentions. These additional variables accounted for 7% of the variance in exercise intentions over and above the influence of the theory of planned behaviour constructs. In support of Hypotheses 4 and 6, results showed that self-efficacy and descriptive norms improved the prediction of intention for the whole population. The findings are generally consistent with previous research (see Hagger et al., 2001). Self-efficacy was a stronger predictor of intention than perceived behavioural control. The significant influence of self-efficacy and perceived behavioural control on intentions supports the notion that the use of both measures augments theory of planned behaviour research in an individual physical activity context.

Our findings relating to descriptive norms are also worthy of mention. The fact that descriptive norms made a significant contribution to the variance in intentions, over and above subjective norms and the other theory of planned behaviour constructs supports the evidence for a distinction between subjective norms and descriptive norms (Cialdini et al., 1990). A meta-analysis by Ravis and Sheeran (2009) found that the descriptive norm–intention relationship was stronger for samples of adolescents than for older adults. Specifically, our findings suggest that adolescents' exercise behaviour is motivated not only by the possibility of gaining approval or disapproval from significant others for their intentions, but also by significant others showing them what is the typical or normal thing to do. In contrast, the inclusion of self-identity did not contribute significantly to the prediction of intentions to exercise. Relationships between self-identity and intention have not been reported to be

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particularly strong and the relationship might be more important for other behaviours (Connor and Armitage, 1998). Researchers have debated the benefits of including self-identity in the theory of planned behaviour model and questioned whether it overlaps with other theory of planned behaviour constructs, such as attitudes or past behaviour (Fekadu and Kraft, 2001).

The addition of past behaviour accounted for 1% of variance in intention to exercise over and above the influence of the theory of planned behaviour constructs and additional variables. This finding is consistent with past theory of planned behaviour research (Hagger et al., 2001; Smith et al., 2007), and although the amount of variance captured was relatively small, the results still indicated that past behaviour's ability to capture additional variance above and beyond self-identity, self-efficacy, descriptive norms, and the standard theory of planned behaviour constructs. The 1% additional variance was much lower than the average of 7.2% Conner and Armitage (1998) found in their meta-analysis of 11 theory of planned behaviour studies that examined past behaviour, but it was in line with Ajzen (1991), who reported that, across three studies, past behaviour accounted for 2% additional variance.

Results from chapter 5 also point out important gender differences with regard to past behaviour. That is, while Saudi males appeared to consider past behaviour in addition to attitudes, subjective norms, perceived behaviour control, and self efficacy when forming intentions, this is not the case for Saudi females who considered attitudes, subjective norms, perceived behavioural control, and self-efficacy only. Overall, it seems that the theory of planned behaviour may provide a useful framework for identifying antecedents of intentions in an Arabic population. Saudi Arabian people base their intentions to exercise vigorously on a consideration of attitudes, perceptions of control, subjective norms, self efficacy, descriptive norms

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and past behaviour.

Overall, these theory of planned behaviour measures accounted for 54% of the variance in physical activity intentions for this sample of Saudi adolescents. The amounts of variance explained are typical and supported the efficacy of the theory of planned behaviour in this study. Armitage and Conner (2001) found that on average, 39% of the variance in intentions was explained by the theory of planned behaviour measures (not including past behaviour), and Hagger et al. (2002) reported 44.5% of variance explained by the theory of planned behaviour measures (with past behaviour and self-efficacy).

### **The Effects of Intention, PBC, Past Behaviour and additional variables on Exercise Behaviour**

This study examined the utility of the theory of planned behaviour as a theoretical model for understanding and predicting adolescents' exercise behaviour in a Saudi context. With respect to the prediction of exercise behaviour, the hierarchical regression analysis revealed 26% of the variance in exercise behaviour to be accounted for by intention, past behaviour, perceived behavioural control, and additional variables. This was slightly lower than the value of 27.4% reported by Hagger et al. (2002). Although the main effect of intention suggested that it did add significantly to the prediction of physical activity, this effect became non-significant when past behaviour was entered into the equation.

The results of the current study provide some support for the efficacy of the theory of planned behaviour model in predicting adolescent physical activity. Support for the theory of planned behaviour model is consistent with a meta-analytic finding in the exercise domain (Hagger et al., 2002b; Symons Downs and Hausenblas, 2005). It should be noted, however, that perceived behavioural control did not emerge as a

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significant predictor of behaviour, a finding that is inconsistent with previous adolescent physical activity research (e.g. Trost, Saunders, and Ward, 2002). According to Ajzen (1991) the strength of perceived behavioural control in determining behaviour is dependent on perception of control being reflective of actual control. Research in the exercise domain has shown that individuals generally overestimate their control over the behaviour (Trost, Saunders, and Ward, 2002). The result of the current study also revealed that subjective norms and self-efficacy were significant predictors of exercise behaviour, whereas the attitude, descriptive norms and self-identity were not found to be significant predictors of exercise behaviour.

A meta-analytic path analysis by Hagger et al. (2002) has shown that self-efficacy contributes independent predictive value for exercise intention and behaviour in the theory of planned behaviour model when results were amalgamated across 12 studies. The relationship between self-efficacy and exercise (or any) activity is complex because not only does self-efficacy predict exercise activity, exercise activity has also been found, in turn, to predict physical self-efficacy (McAuley and Blissmer, 2000). The evidence above suggests self-efficacy predicts exercise behaviour very strongly.

Consistent with previous research, the addition of past behaviour significantly increased (9%) the variance in exercise behaviour (Bozionelos and Bennett, 1999; Hagger et al., 2002; Milne et al., 2002). This value was slightly lower than the 13% additional variance in behaviour reported by Conner and Armitage (1998) across seven studies of different behaviours. Conner and Armitage (1998) believe that “there do appear to be good empirical and theoretical reasons to incorporate habit measures (frequency of past behaviour) as predictors of behaviour in the theory of planned behaviour” (p. 1439). Past behaviour has a moderate relationship with physical activity behaviours, supporting the notion of automaticity in human

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behaviour, that is, part of human behaviour may not be consciously formulated and may be determined by past habit. The non-significant effect of perceived behavioural control was not consistent with the findings of Hagger et al. (2002). However, it was consistent with the results of Terry and O'Leary (1995).

Results also point out important gender differences. That is, while Saudi males appear to consider intention, perceived behavioural control and past behaviour, when predicting exercising behaviour, this is not the case for Saudi females, who consider intention, past behaviour, and self-efficacy only. The results are not surprising given that perceived behavioural control has no direct relationship with behaviour (e.g. Jackson et al., 2003). Future research should explore why perceived behavioural control is a direct predictor of physical activity behaviour in some studies and not in others. Overall, the results are generally consistent with previous research. It seems therefore that the theory of planned behaviour provides some evidence for using this framework in predicting exercise behaviour in an Arabic population.

### **Theoretical implications**

Results of the present thesis provide some evidence for the capacity of the theory of planned behaviour to predict participants' physical activity intention and behaviour. This adds to the literature using the theory of planned behaviour as a model for predicting intentions towards a range of behaviours (Ajzen, 1991; Armitage and Conner, 2001). Past behaviour emerged as the strongest predictor of intention and physical activity behaviour in this research, a finding that is consistent with evidence regarding the role of past behaviours in the theory of planned behaviour (e.g. Norman & Smith, 1995). The present results suggest that it may be important for past behaviour to be included in the theoretical model more often, particularly in relation to physical activity behaviours.

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Although the main effect of intention suggested that it did add significantly to the prediction of physical activity, this effect became non-significant when past behaviour was entered into the equation. These results are obtained after past behaviour is included in the model, which lowers the intention-behaviour relationship.

It is clear from this evidence that the influence of past behaviour cannot be denied and is indicative that adolescents do account for their previous physical activity behaviour when making estimations of their prospective participation in physical activities.

According to the TPB, the role of past behaviour is a test of sufficiency of the theory, because past behaviour should theoretically lead to increase perceptions of control and therefore influence current behaviour (largely) through PBC and intention (Ajzen, 1991). However, when a measure of past behaviour is included in addition to intention and other TPB variables, the effects of intention tend to diminish or even disappear (Hagger, Charzisarantis, Biddle, & Orbell, 2001). Based on our results, therefore, we can assume that physical activity participation is somewhat habitual. To validate the role of past experience in predicting physical activity participation, replications of the study using different samples would be necessary.

Subjective norms were also a significant predictor of intentions to participate in physical activity and physical activity behaviour. As discussed in chapter five, much previous physical activity research found that subjective norms were the weakest predictor amongst the three components of TPB, but this study found that subjective norms played a moderately significant role in predicting physical activity participation intention and behaviour. This significant finding can be an important theoretical contribution. Therefore, future research should focus on subjective norms when examining Saudi adolescents.

Our findings relating to descriptive norms are also worthy of mention. The fact that descriptive norms made a significant contribution to the variance in intentions, over



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and above subjective norms and the other theory of planned behaviour constructs supports the evidence for a distinction between subjective norms and descriptive norms (Cialdini et al., 1990). Specifically, our findings suggest that adolescents' exercise behaviour is motivated not only by the possibility of gaining approval or disapproval from significant others for their intentions, but also by significant others showing them what is the typical or normal thing to do. Future research should extend the TPB model to include both subjective norms and descriptive norms.

With regard to perceived behavioural control and self-efficacy, self-efficacy was a significant predictor of intentions and physical activity behaviour, while perceived behavioural control was only a significant predictor of intention to participate in physical activity. This lends limited or inconsistent support for the direct relationship between perceived behavioural control and physical activity behaviour. Self-efficacy was a stronger predictor of intention than perceived behavioural control. Unlike many previous studies (see Armitage & Conner, 1999 for a review), this study conceptualized perceived behavioural control as perceived control over external barriers that may prevent individuals' behaviours and self-efficacy as individuals' internal ability or capability to perform a behaviour. The significant influence of self-efficacy and perceived behavioural control on intentions supports the notion that the use of both measures augmented TPB research in the individual physical activity context. Future research should extend the TPB model to include both perceived behavioural control and self-efficacy with a focus on self-efficacy and with less emphasis on perceived behavioural control when examining Saudi adolescents' physical activity behaviour.

With regard to the additional variables, an implication that emerged from the findings of this research (Chapters 5 and 6) is that the TPB should be modified when examining Saudi adolescents. Specifically, it should be extended to include self-

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efficacy, descriptive norms and past behaviour for predicting exercise intentions and self-efficacy and past behaviour for predicting physical activity behaviour alongside the original constructs of the TPB.

Finally, the findings from the qualitative portion of this thesis identified the most important salient beliefs among Saudi adolescents (chapter 3) which were slightly different from western cultures (Hagger et al., 1997). The results of the qualitative research presented here can be used to inform future research directions.

### **Applied Implications**

The present thesis has a number of important applied implications for physical activity participation. One important implication of the present thesis is concerned with physical activity interventions and promotion of physical activity participation. This research has shown that subjective norms, attitudes, perceived behavioural control, self-efficacy, descriptive norms and past behaviour constitute the most important antecedents of physical activity intentions, and that participants' past behaviours, subjective norms and self-efficacy predict their physical activity behaviours; it can be recommended that health campaigns aiming to change physical activity intentions and behaviour of Saudi Arabian youngsters should target these variables. Because individuals' past behaviours are not open to change, health officials may make use of individuals' attitude toward physical activity, subjective norms and self-efficacy. That is, campaigns may increase the magnitude of the positive attitude that individuals feel, their subjective norms and perceived self-efficacy. Health educators, through their presence in schools, can assume a leading role as educators and actively participate in state-mandated health education programs tailored to adolescents.

Results of the present thesis (chapter 5) suggest that in relation to intention the strategies adopted should be different for males than for females. That is, while Saudi males appeared to consider past behaviour in addition to attitudes, subjective norms,

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perceived behaviour control, and self efficacy when forming intentions, this is not the case for Saudi females who considered attitudes, subjective norms, and self-efficacy only.

Results (chapter 6) point out that in relation to actual behaviour important gender differences also exist. That is, while Saudi males appear to consider perceived behavioural control, and past behaviour, when predicting exercising behaviour, this is not the case for Saudi females, who consider self-efficacy and past behaviour only.

Exploring and understanding factors that explain why people are active or inactive is of major importance in physical activity research. Effective intervention strategies aimed at increasing the prevalence of physical activity will be partly dependent on a good understanding of the factors that influence physical activity. The findings of the qualitative research (chapter 3) and quantitative research (chapter 5) can suggest implications for interventions to increase physical activity among Saudi Arabian people and to provide programme planners terminology and words in the language of the population of interest to use in these interventions. These findings can help us to understand the relationship between beliefs and participation in adolescent physical activity. First, the finding demonstrated that behavioural beliefs associated with weight control, fitness and being active. It can be suggested that programmes for promoting physical activity engagement should focus on increasing positive attitudes. This suggests that promoting a positive feeling of being active, weight control and fitness could be an effective way of encouraging participation in regular physical activity. Second, normative beliefs were related to friends, family, father, mother, and brother. Consequently, campaigns should focus on strategies that openly show friends and family approving of adolescents performing physical activity. Finally, inspection of the control beliefs revealed that adolescents perceived factors such as lack of time, lack of place, and bad weather as barriers to exercise. Accordingly, strategies to increase

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physical activity should focus on providing alternative activities that could be performed under different weather conditions and assisting adolescents to find ways to increase their motivation and make time to be physically active. Such strategies may help Saudi adolescents overcome barriers that prevent them from performing physical activity, in turn, helping them to achieve personal control over their physical activity behaviour.

Physical activity interventions can change subjective norms, attitudes, and perceived behavioural control by using persuasive communication targeting salient normative beliefs, behavioural beliefs, and control beliefs (Ajzen & Fishbein, 1980). Persuasive communications can take the form of written text that focuses on salient beliefs and advocates the benefits of physical activity and the costs of physical inactivity (Chatzisarantis & Hagger, 2005). It can be suggested that the content of persuasive communication targeting behavioural beliefs and attitudes should advocate the utility of physical activity in controlling weight, fitness, and being active. In addition, persuasive communication targeting normative beliefs and subjective norms should advocate the utility of physical activity in pleasing friends, family, father, mother, and brother. Finally, persuasive communication targeting control beliefs and perceived behavioural control needs to overcome peoples' perceived barriers for health change such as bad weather, lack of time, and lack of availability of place.

In physical activity contexts, researchers have examined the persuasive process primarily by investigating how mass media messages, direct mailing campaigns, video training, seminars, and a variety of other interventions have been able to influence peoples' attitudes about physical activity, knowledge of the benefits of physical activity, and adoption of physical activity behaviours. Indeed, a recent mass media campaign (the VERB campaign), aimed at promoting physical activity among children aged from 9 to 14 years and developed and tested by the Centres for Disease Control and

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Prevention (CDC), showed positive results. This mass media intervention, based on TPB and Social Cognitive Theory was designed to encourage playing, promote physical activity as fun, cool, and socially appealing behaviour, and to provide abilities to overcome barriers to physical activity (Wong, Huhman, & Heitzler, 2004). After one year, their results indicated that children who were aware of the campaign were involved in 34% more free-time physical activity periods than children who were not aware of the campaign (Huhman, Wong, Banspach, Duke, & Heitzler, 2005). Also, children exposed and aware of the campaign remained more active and had more positive attitudes toward physical activity behaviour after follow-up two years later (Huhman, Potter, Duke, Judkins, Heitzler, & Wong, 2007).

The Theory of Planned Behaviour can help health educators to better understand the factors that motivate adolescents to engage in physical activity. Health educators already know that it is important to educate students on the benefits of physical activity to transform their beliefs about the favourable health benefits such as improving fitness, well-being, and healthy weight management. It has been documented that weight gain is common in the middle and high school years. Given the prevalence of adolescents who are overweight or obese and the associated health problems that affect 50% of the Saudi Arabia population (Al-Hazzaa, 2004), health educators can perhaps increase their impact with an increased understanding of factors that motivate students from different groups.

All of the middle and high schools should be educated on the benefits of physical activity and incorporate some aspect of it into their course curriculum. As professional educators, it is our role to: (a) find out what motivates our students to participate in physical activity, (b) find out who are the important people in their lives who would support their participation; and (c) uncover their perceived barriers which prevent them from taking 30 minutes, three time a week out of a typical day to improve

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their health. This can be done easily through a carefully-designed course curriculum. By increasing the perceived health benefits of physical activity, decreasing the barriers, students would be more likely to increase their physical activity.

### **Recommendations for future research**

The results of the studies suggest recommendations for future research with respect to the design. Future studies should take things one step further, using longitudinal and experimental studies in diverse populations. In addition, although the sample size of the studies was reasonably large, other studies have need for larger samples. Therefore, future studies should attempt to replicate results of the present thesis by using much larger sample sizes. Although it can be said that the present studies took into consideration effects from many antecedents of intentions through past behaviour (Ajzen, 2002), future studies should investigate effects of other additional variables within the theory of planned behaviour (i.e., moral norms, anticipated regret, and social support). Moreover, the results of the present study do not generalise to all parts of Saudi Arabia or to adult people (e.g., people who are older than 18 years of age). Therefore, it is recommended that future studies should investigate whether the results of the present thesis transfer to older people and to other regions of Saudi Arabia. What is more, samples across cultures (individualism/collectivism data) could be generated in future studies. This would allow one to establish whether there are important cross-cultural differences across Saudi and Western people that can account for the results. Reliability for the measure of perceived behavioural control was generally low and might have undermined the predictive validity of this construct. Consequently, future research might usefully generate additional items measuring perceived behavioural control with a view to improving the reliability and predictive validity of this construct.

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Furthermore, a different method of measuring physical activity is recommended for future research. Self-report measures of physical activity are potentially susceptible to bias due to limitations in terms of accuracy of recall. Future research should use multiple measurements as opposed to the unitary measure adopted by the present research (self-report). This would allow for a more accurate assessment of the relationship between social-cognitive variables and physical activity. Such measures should include both subjective and objective measures of physical activity in relation to intensity and duration (e.g. accelerometers). Moreover, it is generally agreed that self-efficacy has been an important construct in studying physical activity (Wood 2008) and from this research. Evidently, the concept of self-efficacy has been included into several social psychology models such as TTM, HBM, and TPB (Biddle & Nigg 2000) as an additional variable in predicting health behaviour. However, Ajzen (1991) argues that the self-efficacy construct is synonymous with perceived behavioural control within the TPB framework. Future research should consider the concept of self-efficacy in examining physical activity behaviour. Also, the distinctions between PBC and self-efficacy should be made clear before conclusion can be drawn.

Furthermore, through the development of a TPB questionnaire, TPB constructs are anchored in the specific beliefs of the population being studied. Thus, there is room for cultural, racial, ethnic norms and religious to be represented in the way that the constructs are operationally defined. Moreover, some researchers have already identified differences in exercise behaviours of people from different cultures, racial and ethnic groups (specifically Fahlman et al., 2006; Despues & Friedman, 2007). Students who participated in this research showed that they do indeed have different behavioural beliefs, normative beliefs, and control beliefs comparing to results from previous studies when it comes to their intentions to participate in physical activity. The connection between physical activity habits and race, ethnicity, and culture needs to be fully

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explored in future research. Based upon this information, a specific plan to target identified beliefs within these various groups could be designed and included in the future interventions. In view of the problems associated with the use of multiplicative composites to compose attitude, subjective norms and perceived behavioural control scores (i.e., behavioural beliefs X outcome evaluations, normative beliefs X motivation to comply and control beliefs X perceived power), future research may want to consider alternative scoring approaches. Although this may conceptually not entirely align with Maddux's theory (1993), Conner and Sparks (2005) commented that no satisfactory solution has been found to alleviate problems associated with multiplicatively combined calculations, and as such this issue requires more attention by TPB researchers. Finally, this research showed that intention became less important in the prediction of physical activity behaviour. Future research should examine the mediating effect of past behaviour in relationship between intention and physical activity behaviour. In addition, although the standard TPB variables and additional variables predicted physical activity in this research, it is evident that 73% of the variability in physical activity behaviour is unexplained and thus other factors outside of the TPB help determine physical activity behaviour in this population. Future research might want to consider using a post-intentional approach, such as implementation intention in addition to the TPB. In this approach, participants are not just asked what they intend to do, but are also asked to formulate a very specific plan about how they are going to attain their goal. In this way, an individual is forced to think about the realities of their behavioural plan, which may often be rather vague. Implementation intentions may better predict exercise behaviour than intentions (Ziegelmann, Luszczynska, Lippke, & Schwarzer, 2007).



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### **Strengths and Limitations**

**Strengths.** A major strength of this thesis is that it has contributed to the theoretical literature on physical activity behaviour. The study used the theory of planned behaviour as the basis of the investigation, because the efficacy of the theory of planned behaviour to predict intentions and behaviour has been demonstrated within numerous contexts, including that of physical activity (Ajzen, 1991; Armitage and Conner, 2001). However, the literature review revealed that it may be possible to improve the predictive validity of the theory of planned behaviour by including additional measures of social influence (Ajzen, 1991; Armitage and Conner, 2001). Therefore, self-efficacy, self-identity, descriptive norms, and past behaviour were included in the model to see if these variables explained additional variance once the theoretical constructs had been considered. Also, the present research adopted qualitative methods (i.e. the elicitation study) that allowed an in-depth exploration of students' physical activity beliefs. Quantitative methods were employed to examine the interplay between the psychosocial factors in predicting students' physical activity intentions and behaviour. Thus, it uses both qualitative and quantitative methodologies to guide the psychosocial examination of individuals' decision-making for physical activity behaviours.

**Limitations.** As with all studies, this study has its own set of limitations. First, the majority of data collection occurred in the summer when there was exceptionally hot weather. As a result, participation in physical activity may have been decreased because young people were spending more time at home. Second, these findings should not be generalised to all parts of Saudi Arabia or to older adults, because the study was conducted among a convenience sample recruited in specific schools in Riyadh. Therefore, it is recommended that future studies should investigate whether the results of the present thesis generalize to older adults and to other regions of Saudi Arabia.

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Third, the measurement of physical activity is difficult. There are more than 30 different methods for measuring physical activity and no one method is ideal. All measures have advantages and disadvantages. Physical activity behaviours in this thesis were measured by the frequency of participating in physical activity in the past using self-report measures. Subjective measures of physical activity, such as those obtained by self-reported questionnaire, have been most often used in population based research due to their low cost, ease of use, overall feasibility, and they can be helpful for covering a large percentage of the researched population. Self-report measures were found to be acceptably reliable and demonstrated low-moderate validity when compared with objective measures of physical activity behaviours (Godin et al., 1993), especially when one performs such behaviours repeatedly and in a predictable and calculable manner (Menon, 1993). Additionally, a meta-analysis has demonstrated that the TPB predicts self-reported behaviours as well as objectively-measured behaviours (Conner & Armitage, 1998). Though some confidence can be inferred from the above studies, self-reports have some limitations that may affect the accuracy of the results, those limitations are evident when self report measures are used with children. The major sources of error identified are: the human cognitive processes, the definition of the desired variables, inadequate length of assessment and failure to account for weekday versus weekend and seasonal variations (Baronowski, 1988; Cale, 1994). Other studies demonstrated that the use of self-reports may affect the accuracy of physical activity assessment in children and adolescents in terms of frequency and duration (Kohl et al., 2000).

Children and adolescents tend to over-estimate their time spent being active either through a misunderstanding of what is considered vigorous intensity activity or by a social desirability bias. Consequently, because adolescents and children are sensitive to social desirability bias, they could have responded more favourably to

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psychosocial variables and overestimated their physical activity participation. This thesis undertook a period of five weeks and this may have caused poor recall of physical activity behaviour participation. Fourth, this research investigated the impact of only four additional variables in predicting intentions. Although it can be said that the present studies took into consideration effects from many antecedents of intentions through past behaviour (Ajzen, 2002), future studies should investigate effects of other additional variables within the theory of planned behaviour (e.g., moral norms, anticipated regret, and social support).

Fifth, this research examined internal consistency, and not test-retest reliability, which should also be assessed in order to determine the stability of the scale over time. It is strongly recommended that future studies also use confirmatory factor analysis rather than principal components analysis, as the aim is to identify latent constructs underlying a set of items. In addition, this research relied on exploratory data analysis techniques such as regression analysis. The use of structural equation modelling (SEM) techniques in examining physical activity behaviour is gaining popularity. To overcome the limitations associated with the traditional multivariate analysis (Byrne 2001), SEM technique should be used in future studies to specify, estimate and test a hypothesised model effectively (Bentler 1990). A final limitation to be addressed is that in the elicitation study and pilot study, the current physical activity level measures were not available.

### **Conclusions**

To conclude, the purposes of the study were to investigate the antecedents of participants' intentions and behaviour to participate in physical activity. The present thesis points out the following findings regarding the antecedents of physical activity intentions and behaviour among Saudi Arabian people:

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- Subjective norms and attitudes are important determinants of physical activity intentions among Saudi Arabian men and women.
- The effects of perceived behavioural control on intentions were less consistent across studies. This is perhaps because of conceptual and measurement similarities between perceived behavioural control and self-efficacy.
- Self-efficacy, descriptive norms, and past behaviour contributed to the prediction of participation in physical activity intentions.
- There are differences in intention formation across Saudi Arabian men and women. That is, while Saudi males appear to consider past behaviour in addition to attitudes, subjective norms, perceived behaviour control, and self efficacy when forming intentions, this is not the case for Saudi females, who consider attitudes, subjective norms, perceived behaviour control, and self efficacy only.
- Past behaviour, and self-efficacy are important determinants of physical activity behaviour among Saudi Arabian men and women.
- There are differences in the prediction of physical activity behaviour across Saudi Arabian men and women. That is, while Saudi males appear to consider intention, perceived behavioural control, subjective norms, and past behaviour when predicting exercising behaviour, this is not the case for Saudi females, who consider intention, subjective norms, past behaviour and self-efficacy only.
- There are important gender differences in the prediction of behavioural and normative beliefs which should be considered when designing interventions. Specifically, while the attitudes of Saudi Arabian men are a function of beliefs reflecting being active only, Saudi Arabian women's attitudes towards physical activity are a function of beliefs reflecting controlling weight, fitness, and being active. In addition, while the subjective norms of Saudi Arabian men are a function of beliefs reflecting friends, family, father, and brother, Saudi Arabian

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women's subjective norms are a function of beliefs reflecting friends, family, mother, father, and brother.

## APPENDICES

A	Letters to commence the studies and distribute the questionnaires
B	Bilingual Open-ended questionnaire
C	Cover letter and TPB questionnaire in English
D	Cover letter and TPB questionnaire in Arabic

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Appendix A  
LETTERS TO COMMENCE THE STUDIES AND DISTRIBUTE  
THE QUESTIONNAIRES

(Letter to Saudi Attaché in London)

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ  
Saudi Arabian Cultural Bureau  
29 Belgrave Square  
London  
SW1X 8QB

12<sup>th</sup> January 2007

Re: Abdullah Alselaimi- Field trip for data collection

To Whom It May Concern:

I am writing to confirm that Mr. Abdullah Alselaimi is registered with this University for Ph.D programme in School of Sport and Health Sciences. His research proposal has been approved by University' Research Degrees Committee, and I am pleased to inform you that his work is well underway and progressing according to the specified plan.

As part of his study, Mr. Alselaimi is required to collect data from Saudi national. I understand that Mr. Al-selaimi intends to go to Saudi Arabia from 15<sup>th</sup> June to 14<sup>th</sup> August 2007 in order to collect data relevant to his initial studies as significant part of his thesis that is concerned with attitude and behavior of Saudi nationals toward participation in exercise and sport.

I would be grateful if you could make the appropriate arrangement for Mr. Alselaimi and facilitate his endeavors during this scientific mission. In case you require any additional information please contact me.

Sincerely

Dr Brett Smith  
(Supervisor)

& Dr. Nikos Chatzisarantis  
(Supervisor)

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## Appendix B BILINGUAL OPEN-ENDED QUESTIONNAIRE (ELICITATION STUDY)

January 2007

أخي الكريم، أختي الكريمة،  
سلام الله عليكم ورحمته وبركاته،  
سأكون ممتناً بتفضلك بالمشاركة بالإجابة على الاسئلة التالية وبتوضيح مفصل قدر المستطاع والتي تتعلق  
بمجال بحثي لمرحلة الدكتوراة داعياً المولى عزّ وجلّ أن يُجزيك عني خيراً الجزاء وأن يوفقنا وإياكم لما فيه  
الخير والصلاح انشاء الله  
ملاحظة: ان لم تكف المساحة المعطاه، ارجو عدم التردد في استخدام الجزء الخلفي من الصفحة.

Dear Madam/Sir,

I am conducting this survey, the purpose of which is to determine the perceptions toward exercise and physical activity. Your assistance is requested by answering the survey questions in details as possible.

As for the open-ended questions, please feel free to use the back of the papers if the space provided was not enough. And please note that the more you explain and express your thoughts, the more will be helpful to perceive your perceptions in this study.

Your participation is entirely voluntary. You may be assured of complete confidentiality. The survey will NOT be made available to anyone other than the researcher. Individual responses will not be identified or reported. Upon completion, please return the survey to the researcher directly or to the person who asked you to fill it out.

Your participation in this pilot study is highly appreciated. Please, feel free to contact me if you have any questions for concerns. Thank you.

Researcher,  
Abdullah Alselaimi

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### Exercise and Physical Activity Questionnaire

1. What do you think are the advantages of your exercising or participating in physical activities for at least three times a week, 30 minutes, during the leisure time (out of school)?  
1) في رأيك ما هي الإيجابيات المكتسبة من خلال ممارستك التمرينات والأنشطة البدنية؟
2. What do you think are the disadvantages of your exercising or participating in physical activities for at least three times a week, 30 minutes, during the leisure time (out of school)?  
2) في رأيك ما هي السلبيات المكتسبة من جراء ممارستك التمرينات والأنشطة البدنية؟
3. Is there anything else you associate with your participation in physical activity or exercise for at least three times a week, 30 minutes, during the leisure time (out of school)?  
3) هل هناك أي شيء آخر ترى ان له علاقة بممارستك للتمرينات والأنشطة البدنية؟
4. Which individuals or groups would approve of your participating in physical activity or exercising for at least three times a week, 30 minutes, during the leisure time (out of school)?  
4) من هم الأفراد أو الجماعات الذين تعتقد أنهم يوافقون على ممارستك للتمرينات والأنشطة البدنية؟



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5. Which individuals or groups would disapprove of your participating in physical activity or exercising for at least three times a week, 30 minutes, during the leisure time (out of school)?  
(5) من هم الأفراد أو الجماعات الذين تعتقد أنهم لا يوافقون على ممارستك للتمارين والأنشطة البدنية (school)?
  
6. Are there any other individuals or groups who come to mind when you think about participating in physical activity or exercising for at least three times a week, 30 minutes, during the leisure time (out of school)?  
(6) هل هناك افراد او جماعات اخرى يخطر على بالك عند التفكير في المشاركة في التمرينات والأنشطة البدنية؟
  
7. What factors or circumstances would enable you to participate in physical activity or exercise for at least three times a week, 30 minutes, during the leisure time (out of school)?  
(7) ما الحقائق او الامور التي تعتقد أنها تيسر وتسهل ممارستك للتمارين والأنشطة البدنية؟
  
8. What factors or circumstances would make it difficult or impossible for you to participate in physical activity or exercise for at least three times a week, 30 minutes, during the leisure time (out of school)?  
(8) ما الحقائق او الامور التي تجعل من ممارستك للتمارين والأنشطة البدنية صعبة أو مستحيلة؟

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9. Are there any other issues that come to mind when you think about the difficulty of participating in physical activity or exercise for at least three times a week, 30 minutes, during the leisure time (out of school)?

9) هل هناك نقاط اخرى تتبادر الى ذهنك عند التفكير في صعوبة أو استحالة ممارسة التمرينات والأنشطة البدنية؟

10. What is your:

a) Age? ( ) years (أ) العمر

b) Gender? Male ( ) Female ( ) (ب) الجنس

Thank you so much for your participation.

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Appendix C

COVER LETTER AND TPB QUESTIONNAIRE IN ENGLISH



**SCHOOL OF SPORT AND HEALTH SCIENCES**

Dear Students,

I am writing to you to solicit your collaboration on my PhD project that required conducting this questionnaire to perceive the perceptions toward regular exercise participation, as well as to investigate the psychological determinants that constrain the participation of vigorous exercise. Your assistance is requested in helping in this study by simply completing the enclosed questionnaire.

Your participation is entirely voluntary. You may refuse to answer any questions and may withdraw from completing the questionnaire at any time. You may be assured of complete confidentiality. The questionnaire will not be made available to anyone other than the researcher. Individual responses will not be identified or reported. Any discussion of results will be based on group data. It is estimated that the questionnaire will take approximately 20 minutes to complete.

Your participation in this study is highly appreciated. Please feel free to contact me if you have any questions for concerns. Thank you.

Sincerely,

Abdullah Alselaime  
School of Sport & Exercise Science  
The University of Exeter  
Email: [aa280@exeter.ac.uk](mailto:aa280@exeter.ac.uk)

## PHYSICAL ACTIVITY PARTICIPATION

### EXERCISE PARTICIPATION QUESTIONNAIRE

This questionnaire has been designed to assess your perceptions toward vigorous exercise during leisure time such as (swimming, soccer, running). Vigorous exercise refers to any physical activity that makes you become out of breath (i.e. breath heavier).

I would therefore be grateful if you complete it. All information you provide will be treated in the strictest confidence and your replies will be completely anonymous.

#### INSTRUCTION

On the following pages there are number of statements about vigorous exercise during leisure time, which is defined as "vigorous exercise during leisure time for at least 30 minutes, three times per week over the next five weeks"

Please circle the number that best represents your view using the following scale:

1	Exercising vigorously for at least 30 minutes 3 times per week over the next five weeks during leisure time will improve my overall fitness.	Strongly disagree	1	2	3	4	5	6	7	Strongly Agree
2	Exercising vigorously for at least 30 minutes 3 times per week over the next five weeks during leisure time will help me control my weight.	Strongly disagree	1	2	3	4	5	6	7	Strongly Agree
3	Lack of time will prevent me from exercising vigorously for at least 30 minutes 3 times per week over the next five weeks during leisure time.	Strongly disagree	1	2	3	4	5	6	7	Strongly Agree
4	Exercising vigorously for at least 30 minutes 3 times per week over the next five weeks during leisure time will cause me fatigue (tired).	Strongly disagree	1	2	3	4	5	6	7	Strongly Agree
5	Exercising vigorously for at least 30 minutes 3 times per week over the next five weeks during leisure time will make me feel more active and energetic.	Strongly disagree	1	2	3	4	5	6	7	Strongly Agree
6	Lack of appropriate place and facility will prevent me from exercising vigorously for at least 30 minutes 3 times per week over the next five weeks during leisure time.	Strongly disagree	1	2	3	4	5	6	7	Strongly Agree
7	Bad weather (very hot/cold) will prevent me from exercising vigorously for at least 30 minutes 3 times per week over the next five weeks during leisure time.	Strongly disagree	1	2	3	4	5	6	7	Strongly Agree
8	Lack of availability of sport equipment will prevent me from exercising vigorously for at least 30 minutes 3 times per week over	Strongly disagree	1	2	3	4	5	6	7	Strongly Agree

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	the next five weeks during leisure time..										
9	Keeping fit as a result of exercise is	Extremely bad	1	2	3	4	5	6	7		Extremely Good
10	Controlling my weight as a result of exercise is	Extremely bad	1	2	3	4	5	6	7		Extremely Good
11	Feeling more active and energetic as a result of exercise is	Extremely bad	1	2	3	4	5	6	7		Extremely Good
12	Feeling fatigue and being tired as a result of exercise is	Extremely bad	1	2	3	4	5	6	7		Extremely Good
13	My friends think that	I should not	1	2	3	4	5	6	7		I should
			exercise vigorously for at least 30 minutes 3 times per week over the next five weeks during leisure time								
14	When it comes to exercise vigorously, how much do you want to do what your friends think you should do?	Not at all	1	2	3	4	5	6	7		Very much
15	My family thinks that	I should not	1	2	3	4	5	6	7		I should
			exercise vigorously for at least 30 minutes 3 times per week over the next five weeks during leisure time								
16	When it comes to exercise vigorously, how much do you want to do what your family thinks you should do?	Not at all	1	2	3	4	5	6	7		Very much
17	My father thinks that	I should not	1	2	3	4	5	6	7		I should
			exercise vigorously for at least 30 minutes 3 times per week over the next five weeks during leisure time								
18	When it comes to exercise vigorously, how much do you want to do what your father thinks you should do?	Not at all	1	2	3	4	5	6	7		Very much
19	My mother thinks that	I should Not	1	2	3	4	5	6	7		I should
			exercise vigorously for at least 30 minutes 3 times per week over the next five weeks during leisure time								
20	When it comes to exercise vigorously, how much do you want to do what your mother thinks you should do?	Not at all	1	2	3	4	5	6	7		Very much
21	My brothers think that	I should Not	1	2	3	4	5	6	7		I should
			exercise vigorously for at least 30 minutes 3 times per week over the next five weeks during leisure time								
22	When it comes to exercise vigorously, how much do you want to do what your brothers think you should do?	Not at all	1	2	3	4	5	6	7		Very much

23	For me, in bad weather it will be		1	2	3	4	5	6	7	
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PHYSICAL ACTIVITY PARTICIPATION

		Much more difficult	to exercise vigorously for at least 30 minutes 3 times per week over the next five weeks during leisure time							Much easier
24	For me, having spare time will be	Much more difficult	1	2	3	4	5	6	7	Much easier
25	If the sport equipments are available, exercising vigorously for at least 30 minutes 3 times per week over the next five weeks during leisure time will be	Much more difficult	1	2	3	4	5	6	7	Much easier
26	If the place and facility are available, exercising vigorously for at least 30 minutes 3 times per week over the next five weeks during leisure time will be	Much more difficult	1	2	3	4	5	6	7	Much easier
27	Whether or not I exercise vigorously for at least 30 minutes 3 times per week over the next five weeks during leisure time is completely up to me	Strongly disagree	1	2	3	4	5	6	7	Strongly Agree
28	I have control whether or not I exercise vigorously for at least 30 minutes 3 times per week over the next five weeks during leisure time.	Not at all	1	2	3	4	5	6	7	Very much
29	How much control do you believe you have over exercising vigorously for at least 30 minutes 3 times per week over the next five weeks during leisure time?	No control	1	2	3	4	5	6	7	Complete control
30	I believe I have the ability to exercise vigorously for at least 30 minutes 3 times per week over the next five weeks during leisure time.	Strongly disagree	1	2	3	4	5	6	7	Strongly Agree
31	How confident are that you will be able to exercise vigorously for at least 30 minutes 3 times per week over the next five weeks during leisure time?	Very unconfident	1	2	3	4	5	6	7	Very confident
32	I am confident that I would be able to exercise vigorously for at least 30 minutes 3 times per week over the next five weeks during leisure time.	Strongly disagree	1	2	3	4	5	6	7	Strongly Agree
33	I intend to exercise vigorously for at least 30 minutes 3 times per week over the next five weeks during leisure time.	Extremely unlikely	1	2	3	4	5	6	7	Extremely Likely
34	I will try to exercise vigorously for at least 30 minutes 3 times per week over the next five weeks during leisure time.	Definitely false	1	2	3	4	5	6	7	Definitely True
35	I plan to exercise vigorously for at least 30 minutes 3 times per week over the next five weeks during leisure time.	Strongly disagree	1	2	3	4	5	6	7	Strongly Agree
36	I am the type of person who enjoys exercising vigorously for at least 30 minutes 3 times per week over the next five weeks during leisure time.	Strongly disagree	1	2	3	4	5	6	7	Strongly Agree

PHYSICAL ACTIVITY PARTICIPATION

37	I would feel at a loss if I were forced to give up exercising vigorously for at least 30 minutes 3 times per week over the next five weeks during leisure time.	Strongly Disagree	1	2	3	4	5	6	7	Strongly Agree
38	I see myself as sporty person who participates in sport at least 30 minutes 3 times per week over the next five weeks during leisure time.	Strongly Disagree	1	2	3	4	5	6	7	Strongly Agree
39	I see myself as a physically active person who exercises vigorously for at least 30 minutes 3 times per week over the next five weeks during leisure time.	Strongly Disagree	1	2	3	4	5	6	7	Strongly Agree
40	I think of myself as someone who exercises vigorously for at least 30 minutes 3 times per week over the next five weeks during leisure time.	Strongly Disagree	1	2	3	4	5	6	7	Strongly Agree

41-47	For me to exercise vigorously for at least 30 minutes 3 times per week over the next five weeks during leisure time will be	Unpleasant	1	2	3	4	5	6	7	Pleasant
		Boring	1	2	3	4	5	6	7	Interesting
		Worthless	1	2	3	4	5	6	7	Valuable
		Harmful	1	2	3	4	5	6	7	Beneficial
		Bad	1	2	3	4	5	6	7	Good
		Unenjoyable	1	2	3	4	5	6	7	Enjoyable
		Unnecessary	1	2	3	4	5	6	7	Necessary
48	It is expected from me that I exercise for at least 30 minutes 3 times per week over the next five weeks during leisure time.	Extremely unlikely	1	2	3	4	5	6	7	Extremely Likely
49	The people in my life whose opinions I value would	Disapprove	1	2	3	4	5	6	7	Approve
50	Most people who are important to me think that	I should Not	exercise vigorously for at least 30 minutes 3 times per week over the next five weeks during leisure time							I should
51	On average, how many times per week did you participate in physical activity during the last five weeks?	Never	1	2	3	4	5	6	7	Very often
52	Most people who are important to me exercise vigorously for at least 30 minutes 3 times per week over the next five weeks during leisure time.	Completely false	1	2	3	4	5	6	7	Completely True
53	All of the people I know exercise vigorously for at least 30 minutes 3 times	Extremely Unlikely	1	2	3	4	5	6	7	Extremely Likely

## PHYSICAL ACTIVITY PARTICIPATION

	per week over the next five weeks during leisure time.										
54	Most people in my life whose opinions I value.	Exercise	1	2	3	4	5	6	7	Do not exercise	
			vigorously for at least 30 minutes 3 times per week over the next five weeks during leisure time								
55	On average, please estimate how often you have exercised vigorously for at least three times per week in the past five weeks during leisure time?	Almost never	1	2	3	4	5	6	7	Every day a week	

Please **fill in** the blank space provided and/or **circle** the number that indicates your answer

- A) Date of birth ( \_\_\_\_\_ ) Or Your age: ( \_\_\_\_\_ ) years.
- b) School's Name ( \_\_\_\_\_ ).
- c) Class ( \_\_\_\_\_ ).
- d) Your gender:                    1. Male                    2. Female
- e) Your height: ( \_\_\_\_\_ )
- f) Your weight: ( \_\_\_\_\_ )
- g) First letter of your name \_\_\_\_\_ first letter of your last name \_\_\_\_\_



# PHYSICAL ACTIVITY PARTICIPATION

## EXERCISE BEHAVIOUR QUESTIONNAIRE

This questionnaire has been designed to assess your perceptions toward vigorous exercise during leisure time such as (swimming, soccer, running). Vigorous exercise refers to any physical activity that makes you become out of breath (i.e. breath heavier).

I would therefore be grateful if you complete it. All information you provide will be treated in the strictest confidence and your replies will be completely anonymous.

### INSTRUCTION

On the following pages there are number of statements about vigorous exercise during leisure time, which is defined as "vigorous exercise during leisure time for at least 30 minutes, three times per week over the next five weeks"

Please **circle** the number that best represents your view using the following scale:

On average, how many times per week did you participate in physical activity during the last five weeks?	Never	1	2	3	4	5	6	7	Very often
On average week, please estimate how many days you have exercised vigorously over the past five weeks during leisure time?	Almost never	1	2	3	4	5	6	7	Every day

\* Please **fill in** the blank space provided and/or **circle** the number that indicates your answer

A) Date of birth ( \_\_\_\_\_ ) Or Your age: ( \_\_\_\_\_ ) years.

b) School's Name ( \_\_\_\_\_ ).

c) Class ( \_\_\_\_\_ ).

d) Your gender:            1. Male            2. Female

e) Your height: ( \_\_\_\_\_ )

f) Your weight: ( \_\_\_\_\_ )

g) First letter of your name \_\_\_\_\_ first letter of your last name \_\_\_\_\_

Appendix D

COVER LETTER AND THE QUESTIONNAIRE IN ARABIC



SCHOOL OF SPORT AND HEALTH SCIENCES

أخي الكريم، أختي الكريمة،  
السلام الله عليكم ورحمته وبركاته،  
وبعد

يهدف هذا البحث إلى التعرف على مدى ممارسة (أو محدودية ممارسة) التمرينات والأنشطة البدنية والرياضية بانتظام لدى المجتمع السعودي، بالإضافة إلى التعرف على بعض العوامل السيكولوجية والعوائق المؤثرة في ممارسة التمرينات البدنية بشكل منتظم.  
تتطلب دراستي إجراء إستبانة يجيب عليها أكبر قدر ممكن من الطلاب،

أوافق بشدة	7	6	5	4	3	2	1	لا أوافق بشدة	1. ممارسة النشاط البدني عالي الشدة لمدة 30 دقيقة ثلاث مرات اسبوعيا خلال الخمسة الاسبوع القادمة في وقت الفراغ خارج المدرسة سيحسن لياقتي البدنيه بشكل عام
يجب	7	6	5	4	3	2	1	لا يجب	2. يعتقد أصدقائي بأنه

PHYSICAL ACTIVITY PARTICIPATION

علي	ان امارس نشاط بدني عالي الشدة لمدة 30 دقيقة, على الاقل 3 مرات اسبوعيا, على مدى الخمسة الاسباع القادمة في وقت الفراغ "خارج المدرسة"	علي		
أوافق بشدة	7 6 5 4 3 2 1	لا أوافق بشدة	ممارسة النشاط البدني عالي الشدة لمدة 30 دقيقة ثلاث مرات اسبوعيا خلال الخمسة الاسباع القادمة في وقت الفراغ خارج المدرسة سيساعد على المحافظه على وزني .	.3
اود كثيرا	7 6 5 4 3 2 1	لا اود اطلاقا	عندما يرى والدك بأنه يجب عليك القيام بممارسة نشاط بدني عالي الشدة, فما مدى رغبتك في القيام بما يرون	.4
أوافق بشدة	7 6 5 4 3 2 1	لا أوافق بشدة	عدم وجود الوقت الكافي سيمنعني من ممارسة النشاط البدني عالي الشدة لمدة 30 دقيقة ثلاث مرات اسبوعيا خلال الخمسة الاسباع القادمة في وقت الفراغ خارج المدرسة	.5
سهل جدا	7 6 5 4 3 2 1 ان امارس نشاط بدني عالي الشدة لمدة 30 دقيقة, على الاقل 3 مرات اسبوعيا, على مدى الخمسة الاسباع القادمة في وقت الفراغ "خارج المدرسة"	صعب جدا	عدم وجود الوقت الكافي سيمنعني من ممارسة النشاط البدني عالي الشدة لمدة 30 دقيقة ثلاث مرات اسبوعيا خلال الخمسة الاسباع القادمة في وقت الفراغ خارج المدرسة	.6
جيد جدا	7 6 5 4 3 2 1	سيء جدا	إن الاحساس بالنشاط والحيوية كنتيجة من ممارسة النشاط البدني أمر	.7
أوافق بشدة	7 6 5 4 3 2 1	لا أوافق بشدة	إن عدم توفر أماكن رياضية سيمنعني من ممارسة نشاط بدني عالي الشدة لمدة 30 دقيقة, على الاقل 3 مرات اسبوعيا, على مدى الخمسة الاسباع القادمة في وقت الفراغ "خارج المدرسة"	.8
اود كثيرا	7 6 5 4 3 2 1	لا اود اطلاقا	عندما ترى عائلتك بأنه يجب عليك القيام بممارسة نشاط بدني عالي الشدة, فما مدى رغبتك في القيام بما يرون	.9
اود كثيرا	7 6 5 4 3 2 1	لا اود اطلاقا	عندما يرى اخوك بأنه يجب عليك القيام بممارسة نشاط بدني عالي الشدة, فما مدى رغبتك في القيام بما يرون	.10
أوافق بشدة	7 6 5 4 3 2 1	لا أوافق بشدة	إن ممارسة نشاط بدني عالي الشدة لمدة 30 دقيقة, على الاقل 3 مرات اسبوعيا, على مدى الخمسة الاسباع القادمة في وقت الفراغ "خارج المدرسة" سيصيبني بالارهاق والإعياء والتعب	.11

يجب علي	7 6 5 4 3 2 1 ان امارس نشاط بدني عالي الشدة لمدة 30 دقيقة, على الاقل 3 مرات اسبوعيا, على مدى الخمسة الاسباع القادمة في وقت الفراغ "خارج المدرسة"	لا يجب علي	يعتقد أخي بأنه	12
سهلة جدا	7 6 5 4 3 2 1 ممارسة نشاط بدني عالي الشدة لمدة 30 دقيقة, على الاقل 3 مرات اسبوعيا, على مدى الخمسة الاسباع القادمة في وقت الفراغ "خارج المدرسة"	صعبة جدا	إذا توفر الاماكن الرياضيه فستكون	13
جيد جدا	7 6 5 4 3 2 1	سيء جدا	إن الإحساس بالارهاق والإعياء والتعب كنتيجة من ممارسة النشاط البدني أمر	14
أوافق بشدة	7 6 5 4 3 2 1	لا أوافق بشدة	إن ممارسة نشاط بدني عالي الشدة لمدة 30 دقيقة, على الاقل 3 مرات اسبوعيا, على مدى الخمسة الاسباع القادمة في وقت الفراغ "خارج المدرسة" سيساعدني في المحافظة على وزني	15
اود كثيرا	7 6 5 4 3 2 1	لا اود اطلاقا	عندما يرى اصدقائك بأنه يجب عليك القيام بممارسة نشاط بدني عالي الشدة, فما مدى رغبتك في القيام بما يرون	16
جيد جدا	7 6 5 4 3 2 1	سيء جدا	تعد المحافظة على الوزن كنتيجة من ممارسة النشاط البدني أمر	17
يجب	7 6 5 4 3 2 1	لا يجب	يعتقد أصدقائي بأنه	18

PHYSICAL ACTIVITY PARTICIPATION

علي	ان امارس نشاط بدني عالي الشدة لمدة 30 دقيقة, على الاقل 3 مرات أسبوعيا, على مدى الخمسة الأسابيع القادمة في وقت الفراغ "خارج المدرسة"							علي		
أوافق بشدة	7	6	5	4	3	2	1	لا أوافق بشدة	إن ممارسة نشاط بدني عالي الشدة لمدة 30 دقيقة, على الاقل 3 مرات أسبوعيا, على مدى الخمسة الأسابيع القادمة في وقت الفراغ "خارج المدرسة" ستجعلني اشعر بالنشاط والحيوية	19
يجب علي	ان امارس نشاط بدني عالي الشدة لمدة 30 دقيقة, على الاقل 3 مرات أسبوعيا, على مدى الخمسة الأسابيع القادمة في وقت الفراغ "خارج المدرسة"							لا يجب علي	تعتقد والدتي بأنه	20

يجب علي	ان امارس نشاط بدني عالي الشدة لمدة 30 دقيقة, على الاقل 3 مرات أسبوعيا, على مدى الخمسة الأسابيع القادمة في وقت الفراغ "خارج المدرسة"							لا يجب علي	يعتقد والدي بأنه	21
أوافق بشدة	7	6	5	4	3	2	1	لا أوافق بشدة	إن الطقس السيء " البارد , الحار, الغبار, أو الممطر" سيمنعني من ممارسة نشاط بدني عالي الشدة لمدة 30 دقيقة, على الاقل 3 مرات أسبوعيا, على مدى الخمسة الأسابيع القادمة في وقت الفراغ "خارج المدرسة"	22
يجب علي	ان امارس نشاط بدني عالي الشدة لمدة 30 دقيقة, على الاقل 3 مرات أسبوعيا, على مدى الخمسة الأسابيع القادمة في وقت الفراغ "خارج المدرسة"							لا يجب علي	تعتقد عائلتي بأنه	23
أوافق بشدة	7	6	5	4	3	2	1	لا أوافق بشدة	عدم توفر الأجهزة الرياضية ستمنعني من ممارسة نشاط بدني عالي الشدة لمدة 30 دقيقة, على الاقل 3 مرات أسبوعيا, على مدى الخمسة الأسابيع القادمة في وقت الفراغ "خارج المدرسة"	24
سهلة جدا	ممارسة نشاط بدني عالي الشدة لمدة 30 دقيقة, على الاقل 3 مرات أسبوعيا, على مدى الخمسة الأسابيع القادمة في وقت الفراغ "خارج المدرسة"							صعبة جدا	إذا كانت الأجهزة الرياضية متوفرة فستكون	25
سهلة جدا	ممارسة نشاط بدني عالي الشدة لمدة 30 دقيقة, على الاقل 3 مرات أسبوعيا, على مدى الخمسة الأسابيع القادمة في وقت الفراغ "خارج المدرسة"							صعبة جدا	إن الطقس السيء " البارد , الحار, الغبار, أو الممطر" ستكون	26

PHYSICAL ACTIVITY PARTICIPATION

لا قيمة لها	1	2	3	4	5	6	7	ذو قيمة	بالنسبة لي ممارسة نشاط بدني عالي الشدة لمدة 30 دقيقة, على الأقل 3 مرات أسبوعيا, على مدى الأربعة الأسابيع القادمة في وقت الفراغ "خارج المدرسة" ستكون	
مضرة	1	2	3	4	5	6	7	مفيدة		
سيئة	1	2	3	4	5	6	7	جيدة		
مملة	1	2	3	4	5	6	7	ممتعة		
غير مرضية	1	2	3	4	5	6	7	مرضية		
غير ضرورية	1	2	3	4	5	6	7	ضرورية		
غير مبهجة	1	2	3	4	5	6	7	مبهجة		
لا أوافق بشدة	1	2	3	4	5	6	7	أوافق بشدة	34	سواء امارس او لا امارس نشاط بدني عالي الشدة لمدة 30 دقيقة, على الأقل 3 مرات أسبوعيا, على مدى الخمسة الأسابيع القادمة في وقت الفراغ "خارج المدرسة" قرار يعتمد كلياً علي
لا يجب علي	1	2	3	4	5	6	7	يجب علي	35	أغلب الأشخاص الذين لهم اهمية لدي يعتقدون أنه
غير واثق تماما	1	2	3	4	5	6	7	واثق تماما	36	نشاط بدني عالي الشدة لمدة مامدى ثقك بقدرتك على ممارسة 30 دقيقة, على الأقل 3 مرات أسبوعيا, على مدى الخمسة الأسابيع القادمة في وقت الفراغ "خارج المدرسة"
غير محتمل جدا	1	2	3	4	5	6	7	محتمل جدا	37	نشاط بدني عالي الشدة لمدة 30 انا لدي النية لممارسة 30 دقيقة, على الأقل 3 مرات أسبوعيا, على مدى الخمسة الأسابيع القادمة في وقت الفراغ "خارج المدرسة"
لا يمارسون	1	2	3	4	5	6	7	يمارسون	38	معظم الأشخاص في حياتي الذين أقدر رأيهم
مستحيلة	1	2	3	4	5	6	7	ممكنة	39	بالنسبة لي , تعد ممارسة نشاط بدني عالي الشدة لمدة 30 دقيقة, على الأقل 3 مرات أسبوعيا, على مدى الخمسة الأسابيع القادمة في وقت الفراغ "خارج المدرسة" ستكون
لا أوافق بشدة	1	2	3	4	5	6	7	أوافق بشدة	40	إنني واثق أنني سأكون قادرا من ممارسة نشاط بدني عالي الشدة لمدة 30 دقيقة, على الأقل 3 مرات أسبوعيا, على مدى الخمسة الأسابيع القادمة في وقت الفراغ "خارج المدرسة"
لا	1	2	3	4	5	6	7	بشدة	41	الرجاء تقدير كم مرة كمتوسط كل اسبوع مارست فيها نشاط البدني عالي الشدة لمدة ثلاثين دقيقة, على مدى الخمس الاسابيع الماضية في وقت الفراغ " خارج المدرسة". ضع دائرة حول الرقم الذي يعكس تقديرك: : 1 _____ : 2 _____ : 3 _____ : 4 _____ : 5 _____ : 6 _____ : 7 _____ ولا مرة مرة واحدة مرتين ثلاث مرات اربع مرات خمس مرات ست مرات سبع مرات بالاسبوع بالاسبوع بالاسبوع بالاسبوع بالاسبوع بالاسبوع بالاسبوع
بدون تحكم	1	2	3	4	5	6	7	تحكم كامل	42	مامدى التحكم والسيطرة الذي تعتقد أنه يتوفر لديك لممارسة نشاط بدني عالي الشدة لمدة 30 دقيقة, على الأقل 3 مرات أسبوعيا, على مدى الخمسة الأسابيع القادمة في وقت الفراغ "خارج المدرسة"

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أوافق بشدة	7	6	5	4	3	2	1	لا أوافق بشدة	أعتقد أنه من الصعوبة ممارسة نشاط بدني عالي الشدة لمدة 30 دقيقة، على الأقل 3 مرات أسبوعياً، على مدى الخمسة الأسابيع القادمة في وقت الفراغ "خارج المدرسة"	43
محتملة بشكل كبير	7	6	5	4	3	2	1	بعيدة الاحتمال	جميع الأشخاص الذين أعرفهم ممارستهم لنشاط بدني عالي الشدة لمدة 30 دقيقة، على الأقل 3 مرات أسبوعياً، على مدى الخمسة الأسابيع القادمة في وقت الفراغ "خارج المدرسة"	44
سهلة جداً	7	6	5	4	3	2	1	صعبة جداً	بالنسبة لي، تعد ممارسة نشاط بدني عالي الشدة لمدة 30 دقيقة، على الأقل 3 مرات أسبوعياً، على مدى الخمسة الأسابيع القادمة في وقت الفراغ "خارج المدرسة"	45
سيطرة كاملة	7	6	5	4	3	2	1	لا توجد سيطرة إطلاقاً	لدي سيطرة على أن أمارس أو أن لا أمارس نشاط البدني عالي الشدة لمدة 30 دقيقة، على الأقل 3 مرات أسبوعياً، على مدى الخمسة الأسابيع القادمة في وقت الفراغ "خارج المدرسة"	46
أوافق بشدة	7	6	5	4	3	2	1	لا أوافق بشدة	أنا أرى نفسي كشخص رياضي ممارسة نشاط بدني عالي الشدة لمدة 30 دقيقة، على الأقل 3 مرات أسبوعياً، على مدى الخمسة الأسابيع القادمة في وقت الفراغ "خارج المدرسة"	47
خطأ بدرجة كبيرة	7	6	5	4	3	2	1	صحيح بدرجة كبيرة	سأحاول أن أمارس نشاط بدني عالي الشدة لمدة 30 دقيقة، على الأقل 3 مرات أسبوعياً، على مدى الخمسة الأسابيع القادمة في وقت الفراغ "خارج المدرسة"	48
أوافق بشدة	7	6	5	4	3	2	1	لا أوافق بشدة	سوف أشعر أن شي ما ينقصني إذا أرغمت على التخلي عن ممارسة نشاط بدني عالي الشدة لمدة 30 دقيقة، على الأقل 3 مرات أسبوعياً، على مدى الخمسة الأسابيع القادمة في وقت الفراغ "خارج المدرسة"	49
صحيح بدرجة كبيرة	7	6	5	4	3	2	1	خطأ بدرجة كبيرة	أغلب الأشخاص المهمين بالنسبة لي يمارسون نشاط بدني عالي الشدة لمدة 30 دقيقة، على الأقل 3 مرات أسبوعياً، على مدى الخمسة الأسابيع القادمة في وقت الفراغ "خارج المدرسة"	50
أوافق بشدة	7	6	5	4	3	2	1	لا أوافق بشدة	أنا أخطط أن أمارس نشاط بدني عالي الشدة لمدة 30 دقيقة، على الأقل 3 مرات أسبوعياً، على مدى الخمسة الأسابيع القادمة في وقت الفراغ "خارج المدرسة"	51
يوافقون	7	6	5	4	3	2	1	لا يوافقوا	الأشخاص في حياتي الذين أقدر رأيهم	52
أوافق بشدة	7	6	5	4	3	2	1	لا أوافق بشدة	أعتقد أنني أملك القدرة على أن أمارس نشاط بدني عالي الشدة لمدة 30 دقيقة، على الأقل 3 مرات أسبوعياً، على مدى الخمسة الأسابيع القادمة في وقت الفراغ "خارج المدرسة"	53
أوافق بشدة	7	6	5	4	3	2	1	لا أوافق بشدة	أنا اعتبر نفسي مثل أي شخص يمارس نشاط بدني عالي الشدة لمدة 30 دقيقة، على الأقل 3 مرات أسبوعياً، على مدى الخمسة الأسابيع القادمة في وقت الفراغ "خارج المدرسة"	54
أوافق بشدة	7	6	5	4	3	2	1	لا أوافق بشدة	أنا اعتبر شخصيتي من النوع الذي يستمتع بمارس النشاط بدني عالي الشدة لمدة 30 دقيقة، على الأقل 3 مرات أسبوعياً، على مدى الخمسة الأسابيع القادمة في وقت الفراغ "خارج المدرسة"	55

(أ) اسم المدرسة: (\_\_\_\_\_).

(ب) الفصل: (\_\_\_\_\_).

(ت) أسم حرف من اسم العائلة (\_\_\_\_\_) والحرف الأول والثاني من اسمك (\_\_\_\_\_)

(ث) تاريخ الميلاد: (\_\_\_\_\_) أو العمر (\_\_\_\_\_) سنة.

(ج) الجنس "ضع دائرة": 1. ذكر 2. أنثى.

(ح) الطول "اختياري": (\_\_\_\_\_).

هذا البحث هو استكمال لمتطلبات درجة الدكتوراة. فطلبي ورجائي أخي الكريم وأختي الكريمة أن أحظى بدقائق من وقتك للإجابة على هذه الإستبانة. بالطبع لك كامل الحرية في إختيار عدم المشاركة، وتؤكد أن جميع البيانات الواردة في هذه الإستبانة ستعامل بسرية تامة ولن تستخدم إلا لأغراض البحث. في حال وجود أي إستفسار، الرجاء عدم التردد في الإتصال بالباحث.

شاكراً ومقدراً تعاونكم وجهودكم الطيبة لإنجاز هذا البحث، سائلاً المولى عز وجل أن يوفقنا إياكم لما فيه الخير.

### تحياتي الخالصة

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### استبانة ممارسة النشاط البدني

تهدف هذه الإستبانة الى تقييم مدى مشاركتك بالإضافة الى معتقداتك تجاه ممارسة التمرينات البدنية بانتظام. سأكون ممنناً بنفضلك بالمشاركة والإجابة على جميع فقرات الاستبانة ، وتؤكد أن جميع المعلومات الواردة ستعامل بسرية تامة ولن تستخدم إلا لأغراض البحث.

أرجو العودة الى التعريف التالي عند الأجابة على فقرات الاستبانة:  
الشاط البدني عالي الشده. هو ذلك النشاط الذي يجعلك تتنفس بشكل عالي وسريع وعميق مثال ذلك : المشي السريع ، الجري الخفيف ، والسباحة. كره القدم

تعليمات: هناك عدد من العبارات في الصفحات التالية تتعلق بممارسة النشاط البدني بانتظام ، والمقصود بذلك الممارسة بشكل متكرر لما لا يقل عن ثلاث مرات اسبوعياً .

معظم الاحيان	7	6	5	4	3	2	1	تقريباً ولا مرة	ارجو تقدير عدد المرات التي مارست فيها نشاط بدني عالي الشدة في الاسبوع لمدة 30 دقيقة, على الاقل 3 مرات اسبوعياً, على مدى الخمسة الاسبوع القادمة في وقت الفراغ "خارج المدرسة"
سبع مرات بالاسبوع	7	6	5	4	3	2	1	ولا مرة	ارجو تقدير عدد المرات التي مارست فيها نشاط بدني عالي الشدة لمدة 30 دقيقة, على الاقل 3 مرات اسبوعياً, على مدى الخمسة الاسبوع القادمة في وقت الفراغ "خارج المدرسة"

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- (د) اسم المدرسة: (\_\_\_\_\_).
- (ذ) الفصل: (\_\_\_\_\_).
- (ر) أسم العائلة فقط (\_\_\_\_\_ ) والحرف الأول والثاني من اسمك (\_\_\_\_\_)
- (ز) تاريخ الميلاد : (\_\_\_\_\_ ) أو العمر (\_\_\_\_\_ ) سنة.
- (س) الجنس " ضع دائرة" : 1. ذكر . 2. انثى .
- (ش) الطول "اختياري" : (\_\_\_\_\_).
- (ص)الوزن "اختياري" : (\_\_\_\_\_).

جزاكم الله خيراً  
لك مني جزيل الشكر والتقدير على مشاركتك في هذه الإستبانة  
فضلاً, عند الانتهاء من إجابة الأسئلة, أرجو إعادتها إلى الباحث.  
شكراً جزيلاً. ( )



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