

Motivating the Baby Boomer Generation: An Application of the Theory of Planned Behaviour,
Exercise Behaviour, and Stages of Change on Physical Activity Intentions

A Thesis
Presented to the
School of Kinesiology
Lakehead University

In Partial Fulfillment
of the Requirements for the
Degree of Master of Science
in
Kinesiology,
With specialization in Gerontology

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Acknowledgements

I would like to acknowledge and thank Dr. Jane Taylor for all of her help and support throughout my Masters degree. Taking me on as a student and always guiding me in the right direction, I would have been lost without you! I would also like to thank my committee members Dr. Joey Farrell and Dr. Margaret McKee for believing in me and always being there when I needed a little extra help. I couldn't have done it without all of you!

Abstract

Background/Objectives: The Baby Boom Generation, born between 1946 and 1964, is creating a shift in Canada towards an aging population. In 2031, 22.8% of the population will be over the age of 65, compared to 14.1 in 2011 (Statistics Canada, 2010). Although it is well known that physical activity is an integral aspect of healthy aging (Swan, Friis, & Turner, 2008) and that the benefits of physical activity far outweigh the risks, less than 50% of baby boomers participated in regular physical activity in 2010 (Statistics Canada, 2011). Theoretical research using the Theory of Planned Behaviour (TPB) and the Stages of Change Model (SCM) has been used extensively in the behavioural health field. To our knowledge, no study has focused on the baby boom population specifically and their behaviour and intentions toward physical activity.

Method: One-hundred and seventy male and female baby boomers (aged 45 to 66) participated in the study. Using questionnaires, stage of change (SCM), demographics, attitudes, subjective norm, perceived behavioural control, behavioural beliefs, normative beliefs, control beliefs (Theory of Planned Behaviour; TPB) and exercise behaviour (Godin Leisure Time Exercise Questionnaire; GLTEQ) were assessed. **Results:** Stepwise regression analyses indicated that the TPB constructs predicted 35.6% of physical activity intention, and intention predicted 29.4% of physical activity behaviour. Statistical differences were seen between the SCM contemplators and preparers and the action and maintainers on the TPB constructs. **Conclusions:** The TPB produced important theoretical insight into the physical activity intentions and behaviours of baby boomers based on participants' stage of change. PBC and attitudes were the strongest predictors of intention. These findings suggest that these constructs should be targeted in interventions designed to increase physical activity participation in the baby boom population.

Table of Contents

Acknowledgements	ii
Abstract.....	iii
List of Figures.....	vii
Introduction	1
Review of Literature.....	6
Physiological Changes with Age.....	9
Psychological Changes with Age	11
The Transtheoretical Model and the Stages of Change Model	12
The Theory of Planned Behaviour	13
Belief Based Structure of the TPB.	15
Application of the TPB.....	17
Baby Boomers, Physical Activity, TPB, and the SCM	22
Purpose	23
Hypotheses	23
Pilot Study	24
Method.....	26
Participants and Procedures.....	26
Instrumentation.....	27
Stages of change.....	27
TPB questionnaire.....	27
Attitude toward the behaviour.....	27
Subjective norm.....	28
Perceived behavioural control.....	28
Intention.....	28
Secondary beliefs.....	29
Exercise Behaviour.....	29
Statistical Analyses.....	29
Results	31
Sample Characteristics	31
Homogeneity of Demographics in Relation to Intention and Behaviour	32
Participation in Physical Activity	33
Differences Between Gender and Age on the SCM.....	37
Differences Between Gender and Age on the Main Constructs of the TPB	37
Differences Between Gender and Age on the Secondary Constructs of the TPB.....	38
Differences between SCM and TPB Constructs	39
Reliability	41
Bivariate Correlations.....	41
Regression Analysis	42
Discussion.....	45
Physical Activity Participation Rates in the Baby Boom Generation	45
Gender, Age, and the SCM.....	47
Gender, Age, and the TPB Constructs.....	48

The Baby Boom Generation, the SCM, and the Main Constructs of the TPB.....	49
Predicting Baby Boomer Physical Activity Intentions.....	51
Predicting Baby Boomer Physical Activity Behaviour.....	52
Conclusion.....	53
Future Considerations.....	55
References.....	56
Appendix A – Information Letter.....	66
Appendix B – Consent Form.....	69
Appendix C - SCM.....	71
Appendix D – Demographics and TPB.....	73
Appendix E – GLTEQ.....	83

List of Tables

Table 1. Frequency of Participants Stage of Change	31
Table 2. Baby Boom Generation Age Grouping	32
Table 3. Main TPB Construct Means Based on Age Group (Years)	38
Table 4. Mean, Standard Deviations, ANOVA Results, and Effect Sizes for TPB Constructs by Stage of Change.....	39
Table 5. Reliability, Mean, and Standard Deviations of the TPB Constructs	41
Table 6. Pearson Product-Moment Correlations Between Measures of the TPB Constructs	42

List of Figures

Figure 1. Theory of Planned Behaviour	13
Figure 2. TPB Results of the Pilot Study	25
Figure 3. Percent Participating in Physical Activity Based on Number of Times/Week	34
Figure 4. Activity Status of Male and Female Participants based on METs.....	35
Figure 5. Participation in Type of Physical Activity Based on GLTEQ	35
Figure 6. Response rate to GLTEQ “In one week, how often do you work up a sweat”	36
Figure 7. Amount of Variance Explained in Intention from TPB Main Constructs	43
Figure 8. Amount of Variance Explained in Intention by TPB Main and Secondary Constructs	44
Figure 9. Theory of Planned Behaviour: Amount of Behavioural Variance Explained.....	44

Introduction

Participating in physical activity throughout one's life is an integral aspect of maintaining a healthy lifestyle (Fiatarone Singh, 2004). Currently, the baby boom generation is in mid-life, but over the next decade, there will be an influx of baby boomers over the age of 65. A baby boomer is an individual born between 1946 and 1964 (Verma & Samis, 2011). Boomers view themselves as different from past cohorts of older adults, having been shaped by a distinctive history that celebrated individuality and freedom from past social mores (Lachman, 2004). In keeping with this historical disregard for the norm, boomers disregard the stereotypical aging process and do not consider themselves as growing old (Swan, Friis, & Turner, 2008). It is predicted that during old age, boomers will continue to defy stereotypes and carry on with the activities they are doing now.

As the Canadian population is seeing a shift in its demographics from young to old and the baby boom generation enters into its retirement years, the move towards an aging population becomes more pronounced. Despite the current reference to boomers as *zoomers* there is still a negative connotation associated with population aging, which perpetuates myths and stereotypes about older Canadians (Zimmerman, 2000). Researchers believe that this negative idea of population aging originated in the United States (Gee & Gutman, 2000). Researchers in the United States believe this overwhelming influx of older adults will lead to greater health care costs (Callahan, 1987), and create intergenerational inequities favouring older adults (Kotlikoff, 1993). On the other hand, some believe that the baby boom generation is going to change how we see aging and completely redefine its concepts.

Redefining the concepts of aging begins with a healthier lifestyle. The overall approach to baby boomers' participation in physical activity should be proactive rather than reactive.

Being active before old age will help prevent early onset of age-related disease and disability (Hartman-Stein & Potkanowicz, 2009). Only one-half of baby boomers are physically active (Horton, 2010). Those who are active understand the benefits of physical activity in maintaining optimal aging including slowing down the aging process altogether. Most boomers (98%) understand the benefits of leisure time physical activity, yet half of them remain inactive (Horton). In addition to lack of involvement in physical activity, baby boomers in general have not made optimal healthy lifestyle choices. Unhealthy behaviour is reflected in eating habits, smoking, and alcohol consumption. Researchers Worsley, Wang, and Hunter found that ex-smokers were more likely to be overweight and obese compared to their non-smoker and smoker counterparts (2011). These results imply that the effects of smoking can be long lasting, past the pharmacological effect of tobacco and nicotine (Worsley, Wang, & Hunter). Therefore, because of unhealthy eating, a higher propensity toward smoking and overconsumption of alcohol, these choices are reflected in levels of obesity and overweight which are considerably higher than those of any other age group (Buckley, 2008).

The prevalence of diabetes is highly correlated with rates of overweight and obesity (Chen, Wright, & Westfall, 2009). Overall, self reported diabetes is 60% higher in males aged 40 or more compared to women (Tang & Chen, 2000). Fifty-six percent of adults 65 years and older are currently overweight and obese compared to 60.8% of baby boomers (Statistics Canada, 2010). These rates have increased from 58.1% since 2005 and will continue yearly into old age. Youth rates of overweight and obesity levels have been coined as an epidemic across the nation (Tremblay & Williams, 2003; Wang & Lobstein, 2006). It is believed that environmental factors such as calorie dense food, excessive video game play, and physical inactivity are major contributors (Tremblay, Shields, Laviolette, Craig, Janssen, & Connor Gorber, 2010; Tremblay

& Williams; Wang & Lobstein). Between 1981 and 1996 the prevalence of obesity in children 7 to 13 years tripled from 5% to 15% (Tremblay & Williams, 2000). While attention to overweight and obesity rates among Canada's youth is important, concern for the health of the baby boomer population is equally important. There is a need to focus on proper health intervention in both the young and old to ensure a healthier population overall. Physical activity is a natural way to reduce obesity rates and increase healthy lifestyles.

Participation and maintenance of regular physical activity is one of the most important health behaviours to reduce and prevent the severity of many chronic diseases (Schutzer & Graves, 2004). Sedentary behaviour is linked to health related problems such as osteoporosis, obesity, type II diabetes mellitus, cardiovascular disease, and types of cancer (Blair & Brodney, 1999; Schutzer & Graves). With exercise, there is a decrease in the risk of these health problems, yet only a minority of the 65 plus age group get sufficient physical activity to maintain optimal health benefits (Statistics Canada, 2005). Common barriers cited are their low self-efficacy, misguided attitude toward the task, discomfort while performing the task, and overall poor balance that increases an individual's fear of injury (Nied & Franklin, 2002). For some individuals, it is not a part of their daily routine so they do not make time for exercise. Others feel too much pressure from peers and rely on the opinion of others, or in some cases do not take their advice. With age, cognitive decline, illness, and fatigue are factors that hinder an individual's performance in physical activity (Nied & Franklin).

Uncertainty of one's own ability to participate in physical activity may act as a barrier and delay baby boomers' participation in physical activity. If an individual were able to change the way he or she feels about a certain task (such as physical activity), he or she would be more inclined to participate. Barriers to physical activity need to be taken into account when planning

exercise intervention. If researchers can pinpoint barriers that affect the inactive baby boom cohort more specifically, a proactive approach to aging can be used to encourage healthy lifestyles and promote effective intervention. An approach researchers use to better understand these barriers is theoretical modelling. Identifying the cause of these barriers, can help researchers apply a more insightful take on effective intervention studies.

An approach that is used in the health and behavioural field is defining an individual's stage of change before they begin a physical activity program. Prochaska and DiClemente (1984) initially designed the Stages of Change Model (SCM) for smoking cessation programs. However, the model was then used for other health behavioural changes including life style counselling and physical activity (CSEP, 2011). Ranging from contemplation to maintenance, understanding where baby boomers are at physically can help guide physical activity interventions in the right direction. Just knowing what stage an individual is in will not necessarily give researchers enough information to develop effective interventions. Understanding why or why not they are active, incorporated with their stage would be an effective way to design a potential intervention.

Researchers use theoretical models to better understand group behaviour. One that has been used in many different domains, including health behaviour, is the theory of planned behaviour (TPB; Ajzen, 1985, 1991). The TPB has been applied to many health behaviours including eating behaviour (Madden et al., 1992), addictive behaviours such as smoking (Borland et al., 1991), driving (Richard et al., 1995), HIV/AIDS (Boyd & Wandersman, 1991), oral hygiene (McCaul et al., 1988), exercise (Courneya, Conner & Rhodes, 2005), and more specifically in the exercise domain, strength training in older adults (Dean, Farrell, Kelley, Taylor, & Rhodes, 2007). The theory has proven validity in its ability to predict behaviour in the exercise domain (Courneya, 1995). The TPB has been applied to samples of older adults and the

results have been promising in predicting exercise behaviour but limited theoretical research has been conducted using the baby boom cohort. Implementation of intervention programs that reflects results of theoretical inquiry may encourage a more positive and long lasting engagement in physical activity for baby boomers.

The SCM and the TPB both provide theoretical information that gives insight into the proper design of intervention studies. Interventions are generally considered preventative or therapeutic in nature (Hennekens & Buring, 1987). Physical activity interventions can be considered both preventative and therapeutic in that they are geared toward reducing the risk for future disease and disability. With those who already suffer from health problems, physical activity is known to reduce the severity and aid in maintenance of health status. The results of this study may provide insight in guiding future investigators in developing interventions focused on baby boomers and improving physical activity levels among the sedentary population using the TPB and SCM. The intention of this research, therefore, is to investigate a cohort of baby boomers, their current stage of physical activity (Stages of Change model), and their overall intention and behaviour towards physical activity (Theory of Planned Behaviour). Once this profile is obtained, future researchers' can use it as a guideline to facilitate baby boomers' entry into older age.

Review of Literature

The increase in population by the baby boom cohort can be attributed to the steady economic growth after WWII and the cost of living being more affordable for growing families (Foot, 1996). During the boom, Canada's immigration levels also increased. Most of these immigrants were of childbearing age and contributed greatly to the influx of children born during this time (Foot). The baby boom came to an end when women began pursuing higher education and focusing on careers, putting family life on hold until they were older and well established. The introduction of the birth control pill in the 1960s made this option easier, and thus the baby boom ended in the mid-1960s (Goldin, 2004).

Beginning in 2011, the baby boom generation began its transition into older adulthood. With the first boomers turning 65 in 2011, there will be an increase from 14.1% of the population 65 years of age or greater, to 22.8% of the population by 2031 (Statistics Canada, 2010). The considerable increase in Canada's aging population compared to previous generations creates a cause for concern. There is a need to allocate resources wisely and ensure the maintenance of a first-class healthcare system. Throughout one's life, the use of Canada's healthcare system fluctuates. At birth, it is vital for life but it is not until someone is between 30 and 40 that the need presents itself again. Pregnant women use the healthcare system more so than men during this time, however nearing 50, men require more attention due to chronic conditions such as cardiovascular disease and coronary artery disease (Reinhardt, 2003). For adults 60 or older, both sexes require the same amount of medical attention. Healthcare workers are predicting an increased need for long-term care as baby boomers start turning 65 and more so when they are all 65 or older. However, researchers Evans, McGrail, Morgan, Barer, and Hertzman (2001) indicated that even though there will be a higher percentage of the population

over the age of 65 in 2031, the need for everyday healthcare will not be as great as previous cohorts. The projected versus actual statistics of acute medical services has decreased since 1969, yet the effects of population aging varies depending on the type of services required (Woods Gordon Management Consultants, 1984). Katzmarzyk, Gledhill, and Shephard (2000) stated that if 10% of individuals who were sedentary became physically active, it would save 150 million Canadian dollars in healthcare costs, sick leave, and lost revenue over a period of one year.

Need for healthcare in active individuals is minimal when compared to sedentary individuals (Swan, Friis, & Turner, 2008). With life expectancy predicted to increase to 85.4 and 88.4 years for males and females respectively by 2036, action is required to promote healthy lifestyles (Statistics Canada, 2010). Since individuals are living longer, the importance of maintaining a healthy lifestyle in the later years becomes even more important. Physical activity can delay the onset of disease (Buckely, 2008; Fiatarone & Singh, 2004). Keeping active will allow an individual to be able to enjoy the later years of life instead of relying on the country's healthcare system. Wetle and Havlik (2005) indicate that although women are living longer than men, during the later years of their lives, women suffer disproportionately from disease and disability. Even if exercise is started later in life, both men and women who are physically active can delay the loss of functional mobility (Blocker, 1992). Older adults with chronic disease such as stroke or heart disease still benefit from forms of physical activity for example walking or other light aerobic activities (Ashe, Miller, Eng, & Noreau, 2009). Physical activity can enhance an individual's quality of life during the aging process (Taylor & Johnson, 2008).

Leading an unhealthy and sedentary lifestyle has major effects on an individual. Unlike active healthy aging, sedentary living is associated with a rapid decline in physical and cognitive functioning (Weir, Baker, & Horton, 2010). Physical activity is being promoted across Canada

and is a priority for public health interventions. Despite the published benefits of regular physical activity, overall participation rates are still low. Statistics Canada (2010) reported that there is an inverse relationship with age and participation in physical activity. Researchers have found that 98% of people over the age of 50 are aware of the importance of physical activity and its positive effects on maintaining health (Ory, Hoffman, Hawkins, Sanner, & Nockenhaupt, 2003).

However, only 49.4% of baby boomers participate in regular leisure time physical activity (Classified as active, moderately active, or inactive based on average daily physical activity over the past three months; Statistics Canada). As individuals age, the percentage of those active continues to decrease. Only 43% of older adults aged 65 or greater participate in physical activity (50% of males, 37% of females; Statistics Canada). Benefits of physical activity outweigh the risks, yet half of baby boomers are not inclined to participate.

Inactivity in older adults can be attributed to internal and external factors. Internal factors that affect one's choice to participate in physical activity include a lack of motivation toward the activity, fear of injury, low levels of self efficacy, cognitive decline and illness/fatigue (Neid & Franklin, 2002), comorbidities (Morey, Pieper, & Cornoni- Huntley, 1998), and lack of knowledge of the benefits related to exercise (Dishman, 1994). External factors include environmental factors (Dishman), such as air quality, accessibility (Taylor & Johnson, 2008), lack of resources, lack of support from social networks (including family, friends, healthcare providers), and lack of time (Crombie et al., 2004). Determining the underlying factors for the reluctance of baby boomers' participation in physical activity could lead to more appropriate intervention studies geared specifically to the baby boomer cohort. Research into the intentions and behaviours baby boomers' have towards physical activity could also lead to more efficient

public health promotion of physical activity for this cohort, as well as helping boomers feel more confident in performing physical activity.

The time commitment to participate in physical activity can be overwhelming. Individuals choose not to participate rather than accommodate exercise in their daily lives. When there is a decrease in older adults' ability to perform activities of daily living and instrumental activities of daily living, caregivers and family members might disengage from these older adults and substitute remedies for activity management such as prescription drug use. Alternatives to physical activity are then used to strive for a healthier lifestyle. Society finds it easier to take prescribed medication to maintain weight, or eat low-fat, pre-packaged meals (Chao, Foy, & Farmer, 2000). Fortunately, more often physical activity is effective in enhancing health, is feasible on a day to day basis, and is safe and inexpensive for the majority of the population (Vuori, 1998). Encouraging baby boomers to stay active into older age can mitigate the physiological and psychological changes seen with aging.

Physiological Changes with Age

As aging occurs, there are typical patterns of change. Decreased muscle mass, decreased bone mass and increased total visceral fat mass (Fiatarone Singh, 2004). The changes in body composition may affect metabolic, cardiovascular, and musculoskeletal function negatively (Hughes, et al., 2001). This loss of function as we age is based on many factors. Sarcopenia, or loss of muscle mass, is associated with a sedentary lifestyle. Other reasons for loss of function include reduced levels of, and responsiveness to tropic hormones, consequent decrease or imbalance in protein metabolism, neurodegeneration, muscle fibre atrophy, decreased functional capacity, and alteration in gene expression (Thomas, 2007). Lifestyle is the only thing that an individual has direct control over in the prevention of muscle loss; but still we are seeing one-

half of all baby boomers remain sedentary (Horton, 2010). A decreased functional capacity is related to decreases in maximal and submaximal aerobic capacity, cardiac contractility, maximal heart rate, stroke volume, and cardiac output (Fiatarone Singh). Participating in regular physical activity can modify the decrements in functional capacity and individuals can sustain higher submaximal workloads with less cardiorespiratory response and less overall musculoskeletal fatigue (Fiatarone Singh). It is also evident that older endurance trained athletes are able to maintain higher stroke volume, and cardiac output during peak exercise (Hagberg, 1998).

By not participating in physical activity, an individual increases his or her risk for disease and disability. Benefits of physical activity include reducing the risk of cardiovascular disease (CVD), diabetes, osteoporosis, osteoarthritis, and colon cancer, while improving neuropsychological health (Neid & Franklin, 2002). If functional loss becomes too great, an individual will not be able to perform activities of daily living. Moving from an inactive to active lifestyle later in life will set back the date of dependence by ten to twenty years depending on the individual and amount of activity (Shephard, 1993). The rate of functional loss remains constant in active and inactive individuals, however the inactive reach a threshold where support is needed at a younger age (Shephard, 1987). Combinations of lifestyle choices, recreational sport, unstructured play, and household and occupational tasks can contribute to a desirable exposure to physical activity that will be lifelong and robust enough to counteract age and disease related losses of bone. Canadian Physical activity guidelines suggest that an adult maintain an average of 150 minutes of physical activity per week. Activity can be performed in bouts of 10 minutes or more (CSEP, 2011). Participating in physical activity is not difficult or expensive. Finding the time throughout one's day is the hardest part for any individual.

Psychological Changes with Age

Participation in regular physical activity has health benefits including increased quality of life and prevention of chronic diseases (Rejeski & Mihalko, 2001). Mental illness is socially debilitating and associated with increased risk for suicide attempts, drug and alcohol use, and homelessness (Fox, 1999). There are cases of mental instability that go undiagnosed. These individuals suffer from low mental well-being characterized by emotional distress, low self-esteem, poor body image, sense of hopelessness, chronic stress, and anxiety (Fox). Given that these are not clinically diagnosed, major implications for other problems such as heavy drinking, family breakdown, physical violence and abuse, and overall quality of life occur. Depression is a widespread disorder affecting 5 to 10% of the population of most developed countries (Weissmann & Klerman, 1992). Biddle and Mutrie (2008) stated that physical activity is associated with a decreased risk of developing clinical depression and aerobic and resistance exercise is effective in treating depression. The effects of physical activity produce similar results to that of psychotherapeutic interventions. As well as reducing the effects of depression, physical activity provides moderate reductions in state and trait anxiety (Fox).

Rejeski, Brawley, and Shumaker (1996) explored the relationship between functional status and health-related quality of life (HRQL). They reported on a number of studies that found a direct relationship between HRQL and physical activity. When serious medical conditions arise, older adults who are physically active report that they enjoy better physical functioning, greater energy, less fatigue, less pain, improved psychosocial well being, and less distress than those reporting lower levels of physical activity (Rejeski, et al.). Furthermore, Morey et al. (2002) investigated older adults who participated in an ongoing supervised exercise program over a 10-

year period and determined that long-term participation in structured exercise programs protected against premature mortality and functional disability.

The Transtheoretical Model and the Stages of Change Model

The Transtheoretical Model (TTM) has been an important theoretical concept used for studying exercise behaviour (Prochaska & DiClemente, 1984; Prochaska & Velicer, 1997). The TTM integrates concepts from cognitive, affective, and behavioural processes and principles of change from leading theories of psychotherapy and health psychology (Jordan, Nigg, Norman, Rossi, & Benisovich 2001). It consists of four constructs including stages of change, processes of change, self-efficacy, and decisional balance. The model draws from other theories of intervention, hence the name transtheoretical (Prochaska & Velicer). It focuses on understanding when, how and why people change their health behaviours (Courneya & Bobick, 2000a).

The Stages of Change Model (SCM) is the first construct in the TTM and is used extensively in the health and behavioural field. Stages of change are used to distinguish when a meaningful change occurs. There are six stages of change including precontemplation (no intent to change behaviour), contemplation (want to change in the next six months), preparation (change in the next 30 days), action (made a change, but not longer than six months), maintenance (active and maintaining activity level longer than 6 months) and termination (Courneya & Bobick, 2000a; DiClemente et al., 1991; Prochaska et al., 1992). The termination stage has been proven irrelevant for the exercise domain (Courneya & Bobick, 2000b). Intention is the immediate determinant of exercise behaviour and can be seen as a precursor to the stages of change (Courneya, 1995).

The Theory of Planned Behaviour

The Theory of Planned Behaviour (TPB) is an extension of Ajzen and Fishbein's Theory of Reasoned Action (TRA; 1975). The TRA is based on the assumption that a person's intention to perform or not to perform a behaviour is the immediate determinant of that action (Ajzen, 1988). The TRA assumes that attitudes toward a behaviour and subjective norms predict intentions to perform a behaviour and these intentions in turn predict actual performance of the behaviour (Ajzen, 1991). The TRA did not account for behaviours over which people did not have complete volitional control (Ajzen, 1991), and overall, limited behaviours can be controlled completely (Ajzen 1985). Ajzen (1985) incorporated a third component to this theory: perceived behavioural control (PBC), creating the TPB. Figure 1 illustrates Ajzen's TPB.

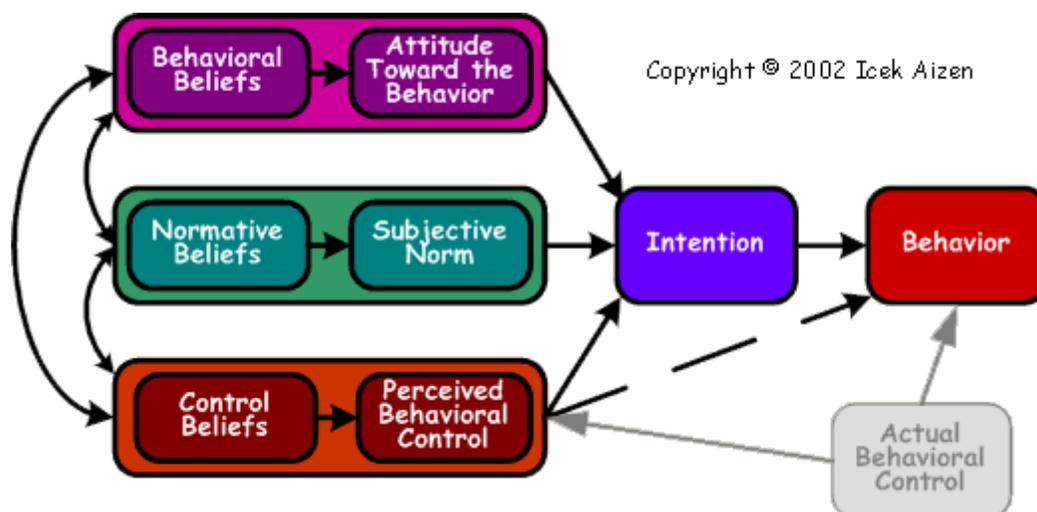


Figure 1. Theory of Planned Behaviour (Ajzen, 1988, p. 132)

The TPB is an attempt to provide a conceptual framework that addresses the issue of incomplete volitional control (Ajzen, 1985; Ajzen & Madden, 1986; Schifter & Ajzen, 1985). A central factor in the TPB is the individual's intention to perform a certain behaviour. Intentions reflect primarily an individual's willingness to engage in a given behaviour. Typically, the more favourable the attitude and subjective norm with respect to a behaviour, and the greater the PBC, the stronger an individual's intention to perform the behaviour (Ajzen, 1988). People who

believe they do not have access to the resources or opportunities to perform a certain behaviour are less likely to develop behavioural intentions even though they hold favourable attitudes toward the behaviour and they believe important others approve of the behaviour (Ajzen).

Intention is defined as the combination of the strength of effort and willingness to perform the behaviour (Carron, Hausenblas, & Estabrooks, 2003). Intention is the immediate antecedent of behaviour (Ajzen, 1991). The intention is based on attitude toward the behaviour, subjective norm, and perceived behavioural control. According to the theory, the stronger a person's intentions, the more likely he or she will be to engage in the behaviour (Ajzen, 1988). Attitude is defined as a person's positive or negative evaluation of performing a behaviour (Carron et al.; Courneya, 1995). Attitudes cannot be observed directly but have to be inferred from observed consistency in behaviour (Fishbein & Ajzen, 1975). Subjective norm is defined as the perceived social pressure and/or expectation of others that an individual should engage or not engage in a behaviour (Ajzen, 1991; Carron et al.).

PBC emphasizes how much control an individual believes he or she has over performance of a particular behaviour (Ajzen, 1991). PBC is defined as the perceived ease or difficulty of performing a behaviour (Carron et al., 2003). PBC may also be a direct determinant of behaviour if the behaviour is not completely volitional (Courneya, 1995). The direct effect of perceived behavioural control on behaviour accounts for barriers that affect behaviour despite an individual's best intentions (Brenes, Strube, & Storandt, 1998). Studies have shown that exercise behaviour, attitude, and perceived behavioural control are the strongest predictors of exercise intention, and perceived behavioural control and intention are the strongest predictors of behaviour (Brenes, Strube, & Storandt; Godin & Kok, 1996).

Belief Based Structure of the TPB. When using the TPB, establishing the cognitive foundation of a population's salient exercise beliefs will give the researcher a better understanding of the population itself (Downs & Hausenblas, 2005). The TPB can be used in many ways. If the goal is to predict behaviour, direct measure of intention will be the only relationship examined. If the objective is to predict intention as well as behaviour, then the measures of attitude, subjective norms and perceived behavioural control will be taken into consideration. However, if the aim is to understand intention and behaviour, researchers must examine the behavioural, normative and control beliefs (Downs & Hausenblas). In order to understand the psychological and cognitive determinants of people's physical activity, it is important to identify which beliefs most strongly determine their attitudes, subjective norms and perceived behavioural control.

The constructs of the TPB have a belief-based structure (Collette, Godin, Bradet, & Gionet, 1994; Conn, Tripp-Reimer, & Maas, 2003; Kerner & Grossman, 2000). The secondary constructs (behavioural, normative and control beliefs) lead into the main constructs (attitude, subjective norm and PBC) in predicting intention. Attitude toward the behaviour is based on behavioural beliefs that are weighted by evaluations of the importance of the beliefs (Ajzen & Driver, 1992). Behavioural beliefs are the perceived positive and negative consequences of performing the exercise behaviour (Conn, Tripp-Reimer, & Maas). Courneya (1995) demonstrates that behavioural beliefs have predicted stage of exercise adoption in older adults. Rowland, Dickinson, Newman, Ford, and Ebrahim (1994) studied retired women, and reported that behavioural beliefs predicted exercise behaviour in these women. In 1993, Wankel and Mummery reported on significant belief predictors in older adults' attitude toward physical activity. Their findings suggest that older adults believe physical activity improves overall level

of fitness and health, and allows them to be more comfortable with their appearance. However, there is a strong belief among older adults that physical activity could result in injury, therefore, the risks may outweigh the benefits for some individuals (Wankel & Mummery, 1993).

Subjective norms are based on normative beliefs. These beliefs are an individual's perceptions that those important to him or her approve or disapprove of the behaviour (Conn, Tripp-Reimer, & Maas, 2003). How much the person is motivated to comply with those referents will weight the belief (Ajzen & Driver, 1992). Significant others are person dependent, for one it could be a spouse, another, children or family doctor. Although the theory contends that children's beliefs concerning exercise might influence the older individual's behaviour it is not supported in the research regarding exercise behaviour (Courneya, & McAuley, 1995; Terry & O'Leary, 1995; Blue, Wilbur, & Marston-Scott, 2001). Some report normative beliefs predict exercise intention in older adults (Wankel & Mummery, 1993), while Theodorakis (1994) found that normative beliefs were unable to predict exercise intention or behaviour in older adults.

Perceived behavioural control is based on control beliefs. Control beliefs distinguish the perceptions about how easy or difficult it is to perform a behaviour (Conn, Tripp-Reimer, & Maas, 2003). PBC is a main predictor of exercise intention and behaviour, therefore control beliefs are important predictors of exercise intention and behaviour (Blue, Wilbur, & Marston-Scott, 2001).

The TPB proposes that people will intend to perform a behaviour when they view it to be a positive behaviour, believe that those important to them think they should perform it, and when they perceive it to be under their own control (Courneya, 1995). The stronger the individuals' intention to perform the behaviour, the more a person is expected to try, therefore the greater likelihood the behaviour will be performed (Dean et al., 2007). The model as a whole has proven

to be a useful predictive model as attitude towards the behaviour is a significant predictor of behavioural intention (Collete, Godin, Bradet, & Gionet, 1995; Courneya & McAuley, 1995; Dzewaltowski, Noble, & Shaw, 1995). However, a majority of studies have found a lack of association between subjective norms and the intention of participants to exercise (Courneya & McAuley; Terry & O'Leary, 1995). The subjective norms construct is seen as an attempt to account cognitively for social influence in exercise behaviour change (Courneya, Nigg, & Estabrook, 1998).

Application of the TPB. The TPB has been used extensively to predict intentions and behaviours in different areas of research including individual's participation in exercise. Armitage and Conner (2001) conducted a meta-analysis of 185 independent studies published until the end of 1997. Overall, the TPB accounted for 27% of the variance in behaviour and 39% of the variance in intention. The meta-analysis provides support for the efficacy of the TPB in predicting behaviour and intention.

Downs and Hausenblas (2005) reviewed TPB and exercise studies that conducted elicitation studies examining the behavioural, normative, and control beliefs. Overall, 47 studies met the criteria. Results indicated that the most important behavioural change seen throughout the studies was improved physical and psychological health. Another interpretation was that the most frequently reported normative influences were from family and friends. These results were consistent with previous research (Norman & Smith, 1995; Terry & O'Leary, 1995). However, some studies reported a personal physician being an important normative influence because people consider their physician to be an important authority regarding behaviour and promotion of physical activity. In these cases, physicians have the potential to play a valuable role in exercise intervention. Downs and Hausenblas found that behavioural beliefs explained 54% of

the variance in attitude, normative beliefs explained 56% of the variance in subjective norm and control beliefs explained 34% of the variance in perceived behavioural control. The overall predictive ability of the beliefs varied between studies. It was lower ($r = 0.37$) in a study of cancer patients (Courneya & Friedenreich, 1997) compared to a study of fitness participants ($r = 0.60$; Deyo, 1984). It is important to understand the predictability of the beliefs within different populations to demonstrate the variability in individual's beliefs toward exercise (Downs & Hausenblas).

When examining the most common control beliefs stated, Downs and Hausenblas (2005) discovered a variation from previous studies. Carron et al. (2003) found lack of time, energy and motivation to be the most common control beliefs. However, Downs and Hausenblas determined that health issues, inconvenience/lack of access to exercise facilities, lack of motivation and energy, and lack of social support were the most common. One reason for this discrepancy in findings relates to the current health status of the sample. Carron et al. based their findings on healthy populations, whereas Downs and Hausenblas reviewed 13 studies that included special populations where physical barriers to participation in physical activity would be more problematic.

Godin, Valois, and Lepage (1992) conducted an analysis of PBC and its influence on exercise behaviour and intention. They used two study groups: one consisting of 357 adults of the general population, and the second consisting of 136 pregnant women. Results indicated that in both studies perceived behavioural control contributed to the prediction of exercise intention. Study one, using the general population, reported that there was an indirect influence upon behaviour through intention. The relationship between intention and behaviour was not seen in study two. Researchers hypothesized that the lack of relationship between intention and

behaviour was because of the time lapse between the onset of the study (pregnancy) to the time of behavioural assessment (postnatal period). The time lapse between measurements of intention and behaviour was in agreement with Jaccard (1975) who stated that a major factor affecting the intention-behaviour relationship was the actual time interval between the measures of intention and behaviour. In this sense, intention could not predict future behaviour because the circumstances were completely different. In both studies, relationships were found between attitudes and intentions, however no relationship was observed between subjective norms and intentions.

Courneya, Nigg, and Estabrook (1998) explored the relationships among the TPB, SCM, and exercise behaviour in 131 older adults in a three-year period. The SCM is a construct of the Transtheoretical model, which reflects the temporal dimension of health behaviour change. The SCM highlights the dynamic nature of health behaviour change and demarcates when meaningful change has occurred (Courneya & Bobick, 2000). Baseline data were collected in 1993 and follow-up data in 1996. SCM was used to assess the participants' stage at the beginning of the study and at follow-up. Analysis showed that the TPB constructs were a significant predictor of exercise stage, intention mediated the effects of TPB constructs on exercise stage, and exercise behaviour was best predicted by intention rather than stage (Courneya, et al.). Together, the TPB and SCM predicted 29% of the variance in current exercise behaviour.

In 2007, Dean et al. conducted research using adults 55 and older who were classified as strength trainers, strength-aerobic trainers, aerobic trainers and non-trainers. Intention was able to explain 46% of the variance in behaviour, while perceived behavioural control and subjective norms were the strongest predictors of intention explaining 37% of strength training intention.

Significant differences were found between strength trainers (including strength-aerobic trainers) and aerobic and non-trainers with regards to perceived behavioural control. The participants with no previous experience in strength training perceived less control over their ability and perceived it to be more difficult compared to those who participated in strength training already.

Significant differences were apparent between non-trainers, strength, and strength aerobic trainers. Non-trainers had lower perceptions of social expectations and social support. The difference between social expectations and social support is supported by demographic inquiry regarding friends' participation in strength training. Non-trainers had fewer friends who participated in strength training compared to the two strength-training groups (Dean et al.).

Godin and Kok (1996) reviewed TPB studies in a meta-analysis in the behavioural health field to verify the efficiency of the theory to explain and predict health-related behaviours. They found that the overall correlation between intention and attitude, subjective norm and perceived behavioural control was .46, .34, and .46 respectively. With regard to exercising alone, the correlation between intention and attitude, subjective norm and perceived behavioural control was .51, .30, and .50 respectively (Godin & Kok). Intention had the strongest relationship to actual behaviour compared to perceived behavioural control with correlations of .52 for intention and .41 for PBC. The results of this study were collected solely from the health-related behaviour domain. Intention remained the most influential variable in the studies analyzed. Consequently, health-related behaviours remain within one's personal motivation (Godin & Kok). The researchers suggest that the TPB can include additional predictors if they are able to predict a significant proportion of the variance in intention on top of the theory's current predictors (Godin & Kok).

Using the TPB to understand why exercise stage change has occurred might be beneficial to integrate the concepts from TTM to understand how individuals change their exercise stage. The TPB is a practical framework for understanding the important cognitions related to stages of change (Courneya, 1995). No single theory can account for all of the complexities of behaviour change due to the focus on parsimony that negates human intricacies. Integrating constructs might lead to a more comprehensive model to predict exercise intention and behaviour. Using theories to determine the predictive characteristics of constructs gives way to intervention that can be participant oriented. Knowing what stage the participant is at, can lead to an intervention that will enhance self-control in the behavioural health field.

It seems that researchers are not clear on whether intention, stage, and behaviour need to be included in the same model, or if they are redundant (Courneya, Nigg, & Estabrooks, 1998). Some researchers believe that the stage of change model is a combination of intention and behaviour (Marcus et al., 1994). By this definition, the first two stages of change are defined by intention and the last three are related to behavioural change (Marcus et al.). Interpreting the SCM in this manner is in contrast to previous research in that the first two stages are defined and operationalized as “seriously considering” or “seriously thinking” as opposed to “intending” to change (DiClemente et al., 1991; Marcus & Owen, 1992; Marcus, Rakowski et al., 1992; Prochaska & DiClemente, 1983). Intending implies a different psychological construct when compared to seriously thinking or considering. Prochaska and Marcus (1994) noted that the only stage that includes intentional and behavioural criteria is the preparation stage. The last two stages of the SCM, action and maintenance, are distinguished by the time required to perform the behaviour at an appropriate level. Despite or perhaps because of these clarifications the incorporation of the SCM with the TPB may result in a clearer explanation of behaviour from

study results. Investigating the participant's stage would help explain if active individuals view their attitudes, subjective norms, and PBC differently than those who are not as physically active.

By continuing research focusing on the baby boom generation, specific interventions that are geared towards concerns of this specific cohort could be designed. Of those who join exercise programs, 50% are shown to drop out within the first year (Marshall & Biddle, 2001). A critical assumption of the TTM is that those who do not participate in physical activity will not begin to if served with a traditional action-oriented prevention program. Health promotion needs to shift from an action paradigm to a stage paradigm (Prochaska & Velicer, 1997). If baby boomers seem deterred from activity, attempting to move from contemplation to action might not produce significant results. Based on the results, this logic applies because individuals not thinking about participating in physical activity will not be influenced by an intervention developed for those who are already active. Better understanding of the depth of thinking that goes into this population's decisions about being active or not would be beneficial in developing exercise interventions.

Baby Boomers, Physical Activity, TPB, and the SCM

Overall, from reviewing the literature, it is evident that limited research has been conducted regarding baby boomers and their intentions and behaviours towards physical activity. The majority of TPB studies focus on university aged students, older adults, or the population as a whole. Incorporating the SCM will help determine baby boomers' perceived involvement in physical activity or stage of change while focusing on the TPB constructs.

The TPB is a comprehensive model that predicts exercise behaviour. It is expected that application of the model in this study will help explain the current exercise behaviour of baby

boomers and that the motivational stages identified may be applied in a subsequent intervention study to promote regular and frequent exercise by baby boomers.

Purpose

The main purpose of this study was to examine baby boomer's attitudes, subjective norms, perceived behavioural control, behavioural beliefs, normative beliefs, and control beliefs toward physical activity. By using the constructs and beliefs of the TPB, the researcher hoped to gain a better understanding of the baby boom generation's intentions to participate in physical activity. As well, this study examined the relationship between the TPB and exercise behaviour by comparing the METs participants reported based on frequency of moderate and vigorous physical activity to the TPB questionnaire results. The Stages of Change Model (SCM) was compared to exercise behaviour and the TPB constructs in order to see if a relationship existed between these models. Another purpose of this study was to understand if there were any differences between gender and the older and younger baby boomers with regard to intention and behaviour.

Hypotheses

It was hypothesized that:

- No differences would be seen between the younger and older baby boomers' participation in physical activity based on the SCM, nor would there be any difference between gender and stage of change.
- Those in action and maintenance would have higher scores on the independent variables (attitudes toward the behaviour, subjective norms and PBC constructs) compared to those in precontemplation, contemplation and preparation stages.

- Attitudes and PBC would be the stronger predictors of intention to be physically active in baby boomers compared to subjective norms.

Pilot Study

Hoegy and Taylor (2011) completed preliminary data analysis to determine if using a theoretical inquiry approach to assess the baby boom generation was appropriate. The results from the pilot led the researchers to believe that the TPB is an appropriate model for moderately predicting exercise intention in baby boomers focusing on attitude toward the behaviour and perceived behavioural control. Fifty-five baby boomers were recruited and participated in the study. Seventy percent of participants said they were in the maintenance stage compared to research stating only 50% of baby boomers are physically active (Statscan, 2011). Sixty-seven percent of participants were female. Sixty-nine percent of participants were either married or common law, 18% were separated or divorced, 7.3% were widow/widower and 5.5% were single. Seventy-six percent had achieved higher education through post-secondary education and 24% completed high school.

Correlations between intention and the TPB constructs, attitude, subjective norms and PBC were .53, .33, and .54 respectively. The correlation between behaviour and intention was .54. Using regression analysis to determine the predictability of the TPB constructs for intention, it was found that attitude was the strongest predictor followed by perceived behavioural control. The amount of variance predicted by the constructs on intention was 46.3%. Overall, behaviour was predicted by intention alone at 27.6% of the variance explained. Results suggest that wanting to participate in physical activity was under the participants' volitional control. The information presented here indicates that research and promotion of physical activity through interventions that focus on changing attitudes toward physical activity would be

the most beneficial. The TPB has proven to be moderately effective in predicting exercise behaviour throughout the life span. This study helps explain the predictive power of the TPB. No changes were made to the research protocol for the main study, therefore, the data collected in the Pilot analysis was incorporated in the final study. Figure 2 below illustrates the results of the predicted variance explained on intention and behaviour in baby boomers.

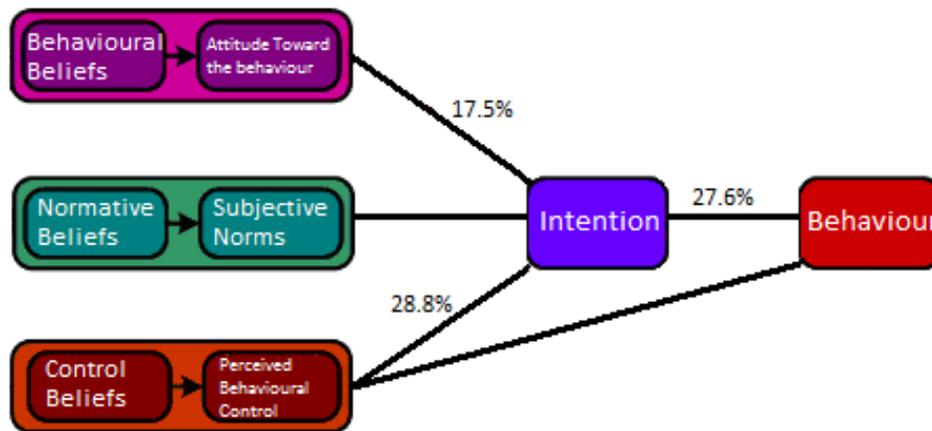


Figure 2. TPB Results of the Pilot Study
(Adapted from Ajzen, 2002)

Method

Participants and Procedures

Participant recruitment attempted to include 200 individuals born between 1946 and 1964. After recruitment, 170 baby boomers (including the 55 from the pilot study) agreed to participate in the study. The researcher contacted local businesses in Thunder Bay and Brussels, Ontario, gained consent to distribute information posters at the facilities and to set up an information session where customers completed questionnaires on site. Eligible participants included those who had no known health complications that would prevent them from participating in physical activity. All eligible participants were provided an information letter (Appendix A) and a consent form (Appendix B) before participating in the study. Once consent was obtained, the researcher distributed the questionnaires to participants. All participants were made aware through both the information letter and consent form that their data would be used for research purposes only, that they were volunteers and that at any time they had the option of refusing to answer any questions and of withdrawing from the study.

Once consent was obtained, participants completed three self-administered questionnaires in this order: Stages of Change (Appendix C; Prochaska & DiClemente, 1983), the TPB (Appendix D; Ajzen, 1985), and the Godin Leisure Time Exercise Questionnaire (GLTEQ; Appendix E; Godin & Shephard, 1997). If a participant did not have enough time to complete the questionnaire at the facility, the participant returned the questionnaires back to the researcher in an envelope that had prepaid postage. If the participant completed the questionnaires on site at the designated facility, he or she returned the questionnaires back to the researcher.

Instrumentation

Stages of change. The Stages of Change questionnaire was used to establish the stage of motivational readiness of the participants (Prochaska & DiClemente, 1983). The stages of change questionnaire defined what moderate physical activity and vigorous physical activity are and the participants selected one of the options that best described their level of physical activity. Stages ranged from pre-contemplation to maintenance. Courneya (1995) reported a two week test-retest correlation of $r= 0.79$ for this measure ($n=148$), and concurrent validity has been demonstrated with the Seven Day Physical Activity Recall Questionnaire (Marcus & Simkin, 1993). In this study, stage of change was used to assess exercise behaviour and provide insight into the question of the relationship between exercise intention and at what stage they classify themselves.

TPB questionnaire. Demographic information was collected using part A of the TPB questionnaire. The TPB questionnaire is adapted from previous research (Brenes et al., 1998; Courneya, 1995; Courneya, Nigg, & Estabrook, 1980; Godin & Kok, 1996; Rhodes, Courneya, & Hayduk, 2002, Dean et al., 2007), and is used to assess the intent and behavioural change of the baby boom generation. The focus of this specific inquiry is on the intentions of individuals to participate in regular physical activity based on Likert scale questions of the following constructs: attitude toward the behaviour, subjective norms, perceived behavioural control, behavioural beliefs, normative beliefs, and control beliefs.

Attitude toward the behaviour. Attitude was measured using a 7-point scale suggested by Ajzen and Fishbein (1980). Both instrumental (useless to useful, harmful to beneficial, foolish to wise, bad to good) and affective (unenjoyable to enjoyable, boring to interesting, unpleasant to pleasant, stressful to relaxing) components of attitude were assessed using adjectives commonly

used in the exercise domain (Courneya & Bobick, 2000; Courneya, Friedenreich, Arthur & Bobick, 1999). The statement that precedes the adjectives is “My participation in regular physical activity is/would be”.

Subjective norm. Subjective norm was measured by 3 items similar to those suggested by Ajzen and Fishbein (1980) and were used in previous research (Courneya & Bobick, 2000). Subjective norm was measured on a 7-point Likert scale that ranges from 1 (strongly disagree) to 7 (strongly agree). Questions included: “Most people who are important to me think I should engage in regular physical activity”, “Most people who are important to me would/do support my participation in regular physical activity”, and lastly, “Generally speaking, I want to do what most people who are important to me think I should do”.

Perceived behavioural control. Perceived behavioural control was measured using 3 items similar to those used by Ajzen and Madden (1986) and Courneya and Bobick (2000). Items included; “How much control do you have over whether or not you engage in regular physical activity?” (1=no control at all to 7=complete control), “Overall, for me to engage in regular physical activity would be...” (1=extremely difficult to 7=extremely easy), “If I chose, I could participate in regular physical activity any time I wanted to...” (1=Strongly disagree to 7=strongly agree).

Intention. Intention was measured using three items commonly used in the exercise domain (Courneya, 1994; Courneya & Bobick, 2000). “I intend to engage in physical activity with the following number of times in the next four weeks”. This question was based on a 7-point Likert scale from 1 (equal to 0 to 4 times) and 7 (equal to 25 times or more). The second question was “I intend to engage in physical activity with the following regularity over the next four weeks”, (1=not at all to 7=everyday). Lastly, intention was investigated using the question,

“I intend to engage in physical activity at least 12 times in the next four weeks”, (1=definitely not to 7=definitely).

Secondary beliefs. The TPB questionnaire included three secondary beliefs; behavioural, normative, and control. Similar to the main constructs, the questions are based on a 7-point Likert scale. Behavioural beliefs were measured using 19 questions focusing on physical activity helping the participants’ improve fitness, health, energy level, mood, weight, etc. Normative beliefs were measured with 8 questions focusing on the participant’s beliefs whether friends and family members’ personal input would affect his or her participation in physical activity. Control beliefs were measured by 30 scale questions focusing on the participant’s beliefs and his or her level of confidence in performing physical activity.

Exercise Behaviour. Exercise behaviour was assessed using the Godin Leisure Time Exercise Questionnaire (GLTEQ; Appendix E). The participant was asked to complete a self-explanatory, brief four-item query of usual leisure-time exercise habits (Godin & Shephard, 1997). The first question asked participants to state the number of times per week they participated in strenuous, moderate and mild physical activity for more than 15 minutes. The second question asked them how often they worked up a sweat in one week; often, sometimes, and never/rarely were the three choices. The GLTEQ has been previously validated as a leisure time physical activity questionnaire (Godin & Shephard, 1985).

Statistical Analyses

Data analysis was conducted using Statistical Package for Social Sciences (SPSS) 18.0. All tests conducted used statistical significance at $p < 0.05$ with a two-tailed significance. Descriptive statistics on measures including gender, age, marital status, and education were

recorded. Correlations between intention and the TPB constructs, as well as behaviour and intention, and exercise stage were investigated.

Statistical stepwise regression analysis was used to analyze the TPB model. Intention was regressed on the direct measures of attitudes, subjective norms, and perceived behavioural control. The second regression equation used the main and secondary constructs to predict intention. Intention and perceived behavioural control were used to predict exercise behaviour in the baby boomer generation.

Results

Sample Characteristics

The sample population consisted of 100 female and 70 male baby boomers ranging in age from 46 to 66 ($M = 55.63$; $SD 5.319$). The majority of participants were married/common law ($n=140$), while seven were single, five were widowed, and eighteen were separated or divorced. Education status illustrated that 62.7% of participants completed post-secondary education, 36.7% completed high school and one participant commented on not completing high school. Participants were selected from a rural location in Southwestern Ontario (Huron, Perth, and Bruce County) and a more urban area in Northwestern Ontario (Thunder Bay and surrounding area) with 92 and 78 participants respectively. With an 85% return rate, participants were very willing to participate in data collection.

The responses to the SCM are illustrated in Table 1. The majority of participants considered themselves to be in the maintenance stage (I participate in regular physical activity and have done so for more than six months; 62.9%), however 22.4% of the participants were in the preparation stage (I am physically active once in a while, but not regularly).

Table 1. Frequency of Participants Stage of Change

	Frequency	Percent
Pre-Contemplation	1	0.6
Contemplation	12	7.1
Preparation	38	22.4
Action	12	7.1
Maintenance	107	62.9
Total	170	100

Table 2 illustrates the grouping of the participants by age category. Equal variance was assumed across all age categories.

Table 2. Baby Boom Generation Age Grouping

	Frequency	Percent
46-50	32	18.8
51-55	57	33.8
56-60	40	23.5
61-66	41	24.1
Total	170	100.0

Homogeneity of Demographics in Relation to Intention and Behaviour

Testing for homogeneity of the sample, there were no significant differences seen between the younger (46-55 years old) and the older boomers (56-66 years old) with intention ($t_{(168)}=.013, p>0.05$) and behaviour ($t_{(168)}=-1.021, p>0.05$). When comparing rural and urban locations, no statistical differences were seen between participants' intentions using independent samples testing ($t_{(168)}= 0.013, p>0.05$). Comparison of behaviour using a non-parametric Mann-Whitney U test revealed there was no significant difference on physical activity behaviour between urban ($Md = 31.21, n = 78$) and rural locations ($Md = 31.13, n = 92, U = 3278, z = .972, p > 0.005, r = .07$).

When comparing the relationship between marital status and intention, there was no significant difference between married/common-law, separated/divorced, widow/widower, or single ($F_{(3,166)} = 0.053, p > 0.05$). Using the non-parametric independent samples Kruskal Wallis test due to lack of homogeneity on behavioural beliefs, results revealed no statistical difference between behaviour and marital status, ($X^2_{(3, n = 170)} = 4.747, p > 0.05$). No relationship was seen between the level of education and gender with regard to intention or behaviour to be physically active.

Participation in Physical Activity

Physical activity is based on mild, moderate, and strenuous levels. Mild physical activity included fishing, archery, bowling, horseshoes, golf, and other activities where an individual would exert a similar amount of effort. Moderate examples are, but not limited to, fast walking, baseball, tennis, volleyball, easy swimming, alpine skiing, and popular and folk dancing. Strenuous activities include, but are not limited to, running, jogging, hockey, football, soccer, squash, roller blading, vigorous swimming, and vigorous long distance biking. The mean rate of participation in mild (minimal effort) physical activity was 3.6 days/week (n = 170), where 19.4% stated they did not participate in mild activity at all. The mean rate of moderate (not exhausting) physical activity was 3.5 days/week (n = 170) and 21.2% stated they did not participate in moderate physical activity. The mean rate of strenuous (heart beats rapidly) physical activity was 1.52 days/week (n = 170) and 55.3% of baby boomers stated they did not participate in strenuous physical activity. Averages are based on days/week and the number of participants participating at that level. Figure 3 illustrates the number of participants participating in mild, moderate, and strenuous physical activity. Examples of each level of physical activity were given on the questionnaire.

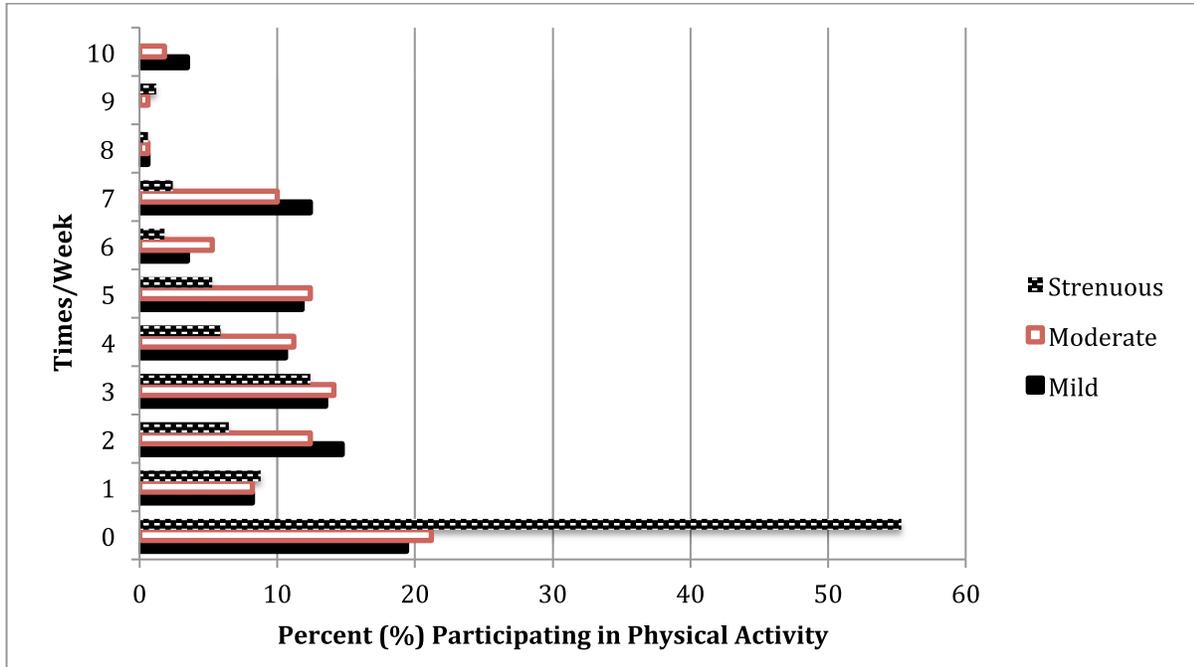


Figure 3. Percent Participating in Physical Activity Based on Number of Times/Week

The Godin Leisure Time Exercise Questionnaire (GLTEQ) uses the metabolic equivalent (METs) based on an individual's mild, moderate, and strenuous level of physical activity to give a representation of the participant's physical activity levels. Figure 4 illustrates the male and female activity levels based on their metabolic equivalent. The participants' weekly frequencies of mild, moderate, and strenuous activities were multiplied by the estimated value in METs (3, 5, and 9 respectively). Total weekly leisure time physical activity was calculated by adding the three components. García Bengoechea, Spence, and McGannon (2005) determined the cut-off values of active/inactive levels. They considered men to be sufficiently active if they expended 38 METs/week and females sufficiently active if they expended 35 METs/week.

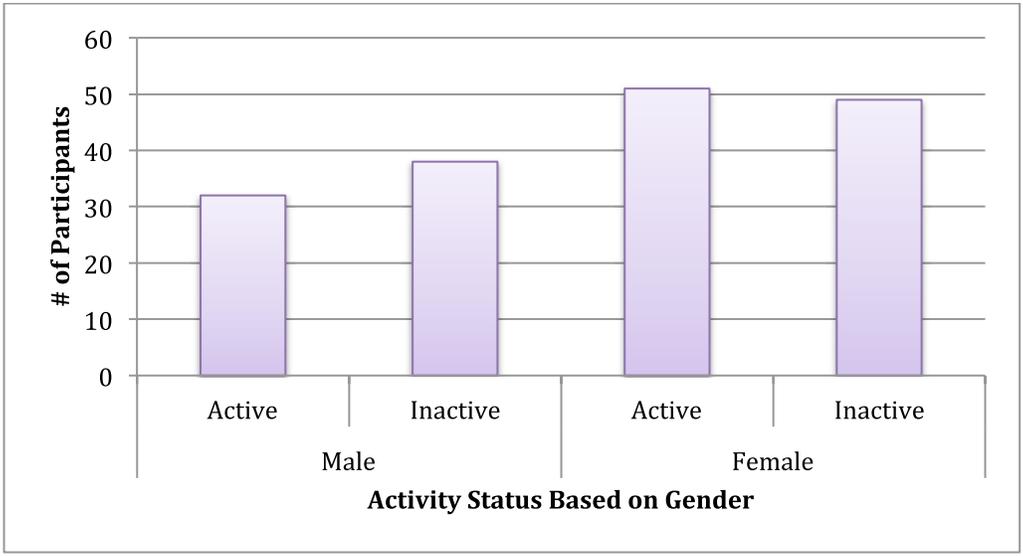


Figure 4. Activity Status of Male and Female Participants based on METs (Male: Active \geq 38 METs, Inactive 0 to 37 METs, Female: Active \geq 35 METs, Inactive 0 to 34 METs).

To understand the overall activity of individuals, a breakdown of participation in mild, moderate, strenuous, and combinations of the three levels of physical activity were investigated. Figure 5 illustrates if participants were active in one, two, or all types of physical activity. The majority either participated in all levels of physical activity (36%) or in mild and moderate physical activity (30%).

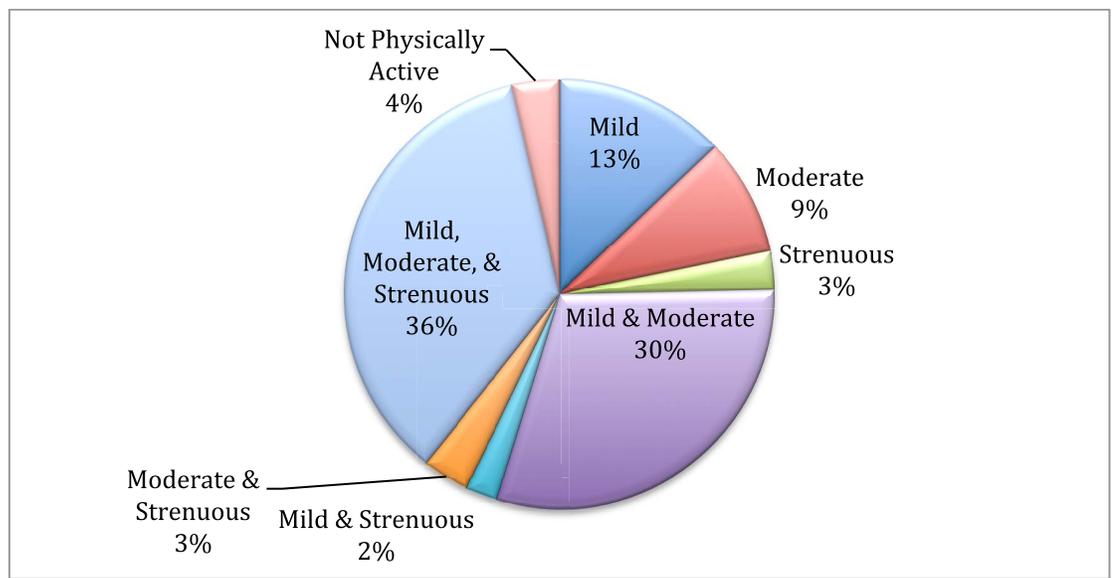


Figure 5. Participation in Type of Physical Activity Based on GLTEQ

When asked to think of a typical 7-day period and state how often one engages in any regular leisure time physical activity long enough to work up a sweat, 46% replied they sometimes work up a sweat. Figure 6 illustrates the responses of the participants.

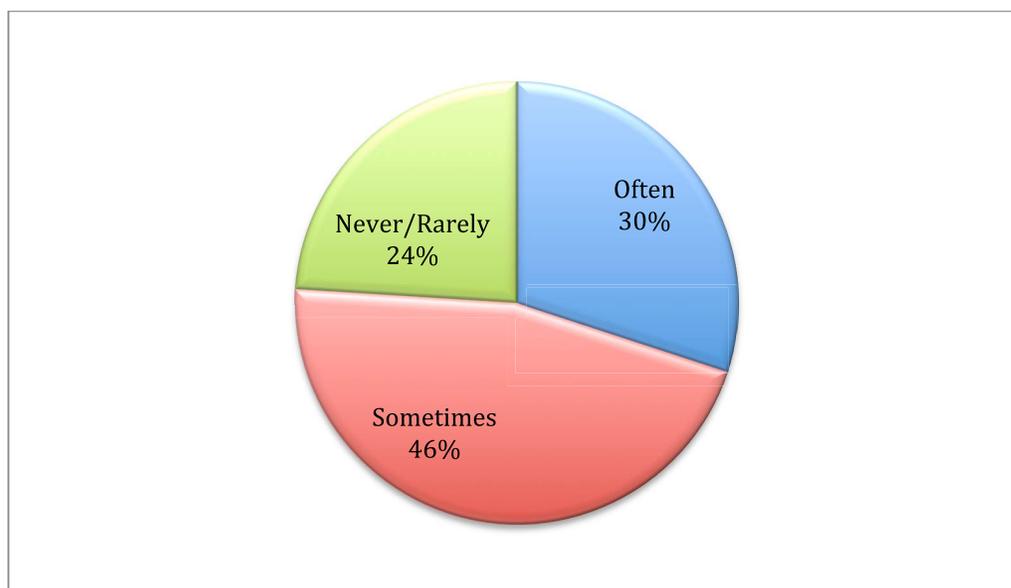


Figure 6. Response rate to GLTEQ “In one week, how often do you work up a sweat”

Independent samples *t*-test was used to determine if there was a significant difference between gender and exercise behaviour focusing on often, sometimes, and never/rarely from the GLTEQ. Results reveal that no differences were found between gender and physical activity response ($t_{(168)}=-1.035, p>0.05$). A one-way ANOVA was used to determine what relationship existed between the participants’ response regarding how often they sweat in one week and their stage of change. Excluding the single participant in pre-contemplation, analysis suggested that there was a significant difference between the stages and their response to how often they work up a sweat while participating in LTPA ($F_{(3,166)}= 22.175, p <0.001$). Using Scheffe Post Hoc analysis, the difference could be seen between maintenance and contemplation ($p < 0.001$) and preparation ($p < 0.001$) stage of change. Analysis revealed that the participants in the preparation and contemplation stage of change differentiated significantly from the participants in the

maintenance stage of change with regard to how many times in one week they work up a sweat. Participants in the maintenance stage sweat often or sometimes in a week compared to preparation ($p < 0.001$) and contemplation ($p < 0.001$) stage of change which were commonly seen in the ‘sometimes’ and ‘never/rarely’ working up a sweat category.

Differences Between Gender and Age on the SCM

An independent samples t-test was used to determine if there was a significant difference between gender on the SCM. No significant differences were found between the male and female participants based on what stage they considered themselves to be in ($t_{(168)} = -.043, p > 0.05$). A one-way ANOVA was used to determine if there were any differences between age and the SCM. No significant differences were found between the stage of change they considered themselves to be in and the age of the participants, ($F_{(3, 166)} = .683, p > 0.05$).

Differences Between Gender and Age on the Main Constructs of the TPB

Independent samples *t*-tests were conducted to assess if differences existed on gender and the main constructs of the TPB. No significant differences were found between the main constructs and gender. Independent samples *t* tests were conducted to assess if differences existed between age and the main constructs (attitudes, subjective norms, and PBC). When looking at older (55+) versus younger baby boomers, significant differences were found between age and subjective norm ($t_{(168)} = -2.856, p < 0.005$) and PBC ($t_{(168)} = -3.332, p < 0.001$). Breaking the age groupings down into 4 groups (Table 3), significant differences were seen using a one-way ANOVA between subjective norm ($F_{(3, 166)} = 3.616, p < 0.05$) and PBC ($F_{(3, 166)} = 4.323, p < 0.05$). Scheffe post hoc analysis revealed that participants aged 51 to 55 years differed from those 56 to 60 years old subjective norms ($p < 0.05$). Regarding PBC, participants aged 45 to 50

years differed from participants aged 56 to 60 years ($p < 0.05$). Table 3 illustrates the mean scores for the main TPB constructs based on age.

Table 3. Main TPB Construct Means Based on Age Group (Years)

Age Groups	Attitudes	Subjective Norm	PBC
46-50	6.3	5.6	5.3
51-55	6.0	5.5	5.5
56-60	6.3	6.1	6.1
61-66	6.3	5.8	5.8

Regarding subjective norm, the participants aged 51 to 55 years had the lowest scores compared to the other three age groups. A significant difference was seen between them and the participants aged 56 to 60, who had scored the highest on the subjective norm scale. The question on which the participants aged 56 to 60 had greater a social expectation was ‘Most people who are important to me would/do support my participation in regular physical activity. Regarding PBC, those aged 56 to 60 years demonstrated stronger perceived control with ‘If I chose to, I could participate in physical activity anytime I wanted to’ compared to those aged 46 to 50 years. The 56 to 60 year olds scored higher on their PBC scale compared to all the other groups, but significantly higher than the 45 to 50 years olds.

Differences Between Gender and Age on the Secondary Constructs of the TPB

Independent samples *t*-test were conducted to assess if differences existed between gender and the secondary constructs (behavioural, normative, and control beliefs) of the TPB. Significant differences were found between behavioural beliefs and gender. Behavioural beliefs violated assumptions of homogeneity of the sample and the non-parametric Mann-Whitney *U* test revealed a significant difference in the behavioural beliefs of males ($Md = 6.3158, n=70$) and females ($Md = 6.7368, n = 100, U = 4396.5, z = 2.861, p < 0.005, r = .22$).

Differences between SCM and TPB Constructs

Multiple tests were conducted to assess if there were differences between the SCM and the main constructs of the TPB. Table 4 states the means, standard deviations, ANOVA F statistic and effect size using Eta-squared.

Table 4. Mean, Standard Deviations, ANOVA Results, and Effect Sizes for TPB Constructs by Stage of Change

Constructs	Stage of Change				$F_{(3,166)}$	Eta-squared
	C <i>n</i> = 13	P <i>n</i> = 38	A <i>n</i> = 12	M <i>n</i> = 107		
Intention					52.71***	0.49
<i>M</i>	3.03	3.67	5.69	5.84		
<i>SD</i>	1.51	1.28	0.92	1.01		
Attitude					13.15***	0.19
<i>M</i>	5.22	5.80	6.54	6.42		
<i>SD</i>	1.01	1.11	0.54	0.64		
Perceived Behavioural Control					11.79***	0.18
<i>M</i>	4.62	5.17	5.78	6.00		
<i>SD</i>	1.18	1.13	1.02	0.86		
Subjective Norm					7.48***	0.12
<i>M</i>	4.95	5.34	5.83	6.01		
<i>SD</i>	1.78	1.13	1.03	0.85		
Behavioural Beliefs^b					13.03***	0.19
<i>M</i>	5.89	5.96	6.52	6.57		
<i>SD</i>	0.79	0.78	0.49	0.50		
Control Beliefs					15.90***	0.22
<i>M</i>	4.06	4.62	5.50	5.48		
<i>SD</i>	0.81	0.85	0.72	0.95		
Normative Beliefs					6.49***	0.10
<i>M</i>	4.91	5.00	5.21	5.65		
<i>SD</i>	0.99	0.82	1.13	0.91		

Note 1. All scales range from 1 to 7. ANOVA = analysis of variance; TPB = Theory of Planned Behaviour; C = contemplation; P = preparation; A = action; M = maintenance, *n* = number of participants

*** = $p < 0.001$.

^bBehavioural Beliefs Violated Assumptions of Homogeneity

Significant differences were found between the stage of change and the intention to be physically active. Assumption of homogeneity of variance was violated; using an independent samples Kruskal Wallis test revealed a statistically significant difference in intention and across the stage of change categories ($X^2_{(3, n=170)} = 76.051, p < 0.0001$). The action and maintenance

stages of change recorded higher median scores ($Md = 5.7$, $Md = 6.0$ respectively) than contemplation and preparation ($Md = 2.7$, $Md = 3.7$ respectively). The participants in the action or maintenance stage had more intention to be physically active than the participants in the contemplation and preparation stages. When observing the effect size (Cohen, 1969), a medium effect size was seen with intention, where almost 50% of the variance in participants' stage of change is due to their intention to perform physical activity. However, a small effect size was seen when comparing control beliefs to the SCM where control beliefs accounted for 22% of the variance between the stages, which is more than any of the other constructs.

Significant differences were found between the stages of change on attitude ($F_{(3, 166)} = 13.154$, $p < 0.0001$). Scheffe post hoc analysis indicated the differences were seen between contemplation and the two physically active stages of change, action ($p < 0.001$) and maintenance ($p < 0.0001$). Also, there was a statistical difference on attitude between the preparation and maintenance stage of change (0.001). Results indicate that participants who considered themselves in an active stage of change produced higher scores on the attitude scale than those who were not physically active (in the contemplation and preparation stage of change).

A significant difference was found on the TPB construct subjective norm between the stages of change ($F_{(3, 166)} = 7.477$, $p < 0.0001$). Scheffe post hoc analysis indicated that the differences were seen between both contemplation and preparation and the physical activity grouping variable, maintenance ($p < 0.005$ and $p < 0.006$ respectively). Results indicate that the participants in the contemplation and preparation stage perceived less social expectation to be physically active compared to the maintenance stage participants.

A significant difference was found on the TPB construct PBC and the stages of change ($F_{(3, 166)} = 11.788$, $p < 0.0001$). Scheffe post hoc analysis revealed that differences were seen

between contemplation and the action and maintenance stages ($p < 0.05$, $p < 0.0001$ respectively). Also, there was a significant difference between the preparation stage and the maintenance stage ($p < 0.0001$). Results indicate that those in the action and maintenance stage perceive greater control over their participation in physical activity.

No significant differences were seen between the action and maintenance stage on the main constructs and the contemplation and preparation stage based on the main constructs. The findings from this statistical analysis are consistent with the hypothesis that the less active groups (contemplation and preparation) would differ significantly from those who were active (action and maintenance) on the TPB constructs.

Reliability

Cronbach's alpha statistics were calculated to assess the internal reliability of the TPB scales used in this study. The scales for each construct were internally consistent with alphas ranging from 0.677 to 0.94. Consistency levels and descriptive statistics of the variables used in the study are reported in table 5.

Table 5. Reliability, Mean, and Standard Deviations of the TPB Constructs

	Cronbach's α	Mean	SD
Intention	0.866	5.13	1.54
Attitudes	0.906	6.20	0.88
Subjective Norms	0.682	5.77	1.05
Perceived Behavioural Control	0.677	5.66	0.66
Behavioural Beliefs	0.940	6.38	0.96
Normative Beliefs	0.824	5.42	1.06
Control Beliefs	0.934	5.20	1.02

Bivariate Correlations

Pearson Product-Moment Correlations between the variables of the TPB and exercise behaviour are presented in Table 6. The relationship between physical activity behaviour and intention was investigated. There was a strong, positive correlation between the two variables.

Intention had moderately positive correlations with the TPB main and secondary constructs excluding control beliefs. Control beliefs and intention had a strong, positive relationship. The main constructs of the TPB when compared to their secondary constructs had a moderately positive correlation. This is expected because the main constructs are based on the secondary constructs, therefore a stronger relationship should exist between the variables.

Table 6. Pearson Product-Moment Correlations Between Measures of the TPB Constructs

	1	2	3	4	5	6	7	8
1 Behaviour		.546**	.175*	.269**	.294**	.295**	.331**	.345**
2 Overall Intention		-	.440**	.361**	.454**	.426**	.373**	.505**
3 Attitude			-	.373**	.204**	.507**	.363**	.382**
4 Subjective Norms				-	.220**	.460**	.627**	.264**
5 Perceived Control					-	.271**	.232**	.484**
6 Behavioural Beliefs						-	.510**	.363**
7 Normative Beliefs							-	.217**
8 Control Beliefs								-

Note 1. * = $p < 0.05$, ** = $p < 0.01$

Regression Analysis

To understand the independent contribution of the TPB construct variables to the variance in intention and behaviour, a series of statistical stepwise regression analyses were completed. The first analysis was performed to determine if the TPB was a useful model for predicting exercise intention in the baby boom population. Using stepwise method regression, the three main constructs of the TPB were entered to explain the variance in intention. Results revealed that perceived behavioural control was the strongest predictor of intention (beta = .355), although attitude and subjective norm were also significant predictors (beta = .304 and .170 respectively). Total R^2 adjusted variance of intention that was explained was 35.6%, ($F_{(3,166)}=30.635, p < 0.0001$). The results of this regression analysis are consistent with the hypothesis that PBC and attitude would explain more variance when compared to subjective

norm. Figure 7 illustrates the amount of variance explained by the main constructs of the TPB on physical activity intentions.

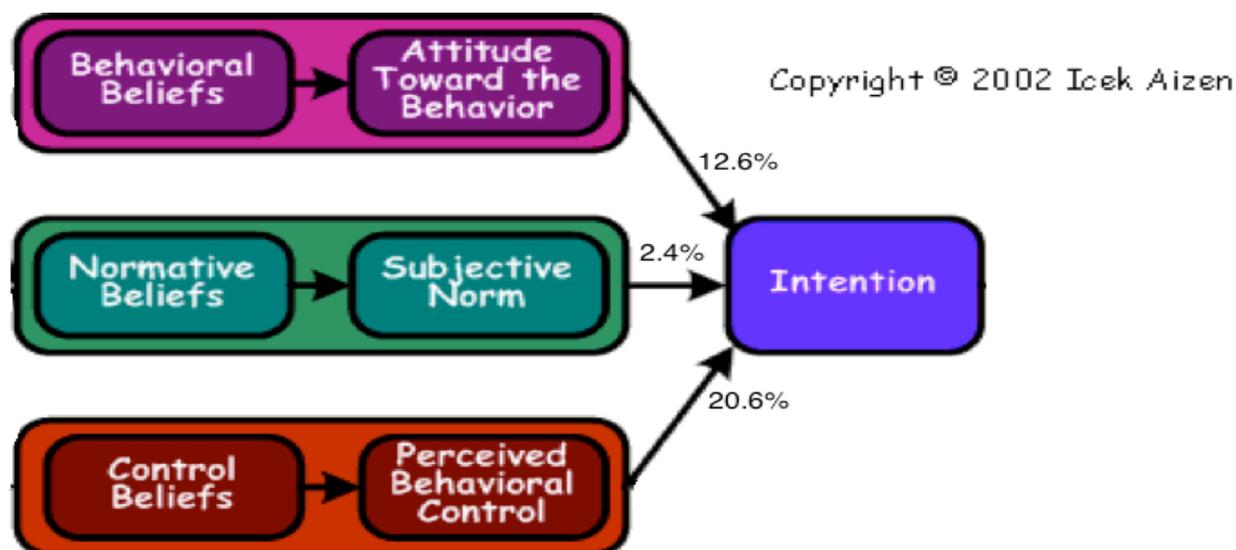


Figure 7. Amount of Variance Explained in Intention from TPB Main Constructs
Adapted from Ajzen (2002)

The second analysis included the secondary constructs and explained more overall variance of physical activity intention (Figure 8). TPB main constructs and secondary constructs (behavioural, normative, and control beliefs) were added using stepwise regression analysis. Subjective norm, and behavioural beliefs did not add significance to the equation and were removed. The adjusted R^2 was 39.8%, which explained 3% more variance when the secondary constructs were included, ($F_{(4,165)} = 28.987, p < 0.001$). Attitude, PBC, normative beliefs, and control beliefs were all significant predictors. Figure 8 illustrates the amount of variance explained by the main and secondary constructs of the TPB on physical activity intention.

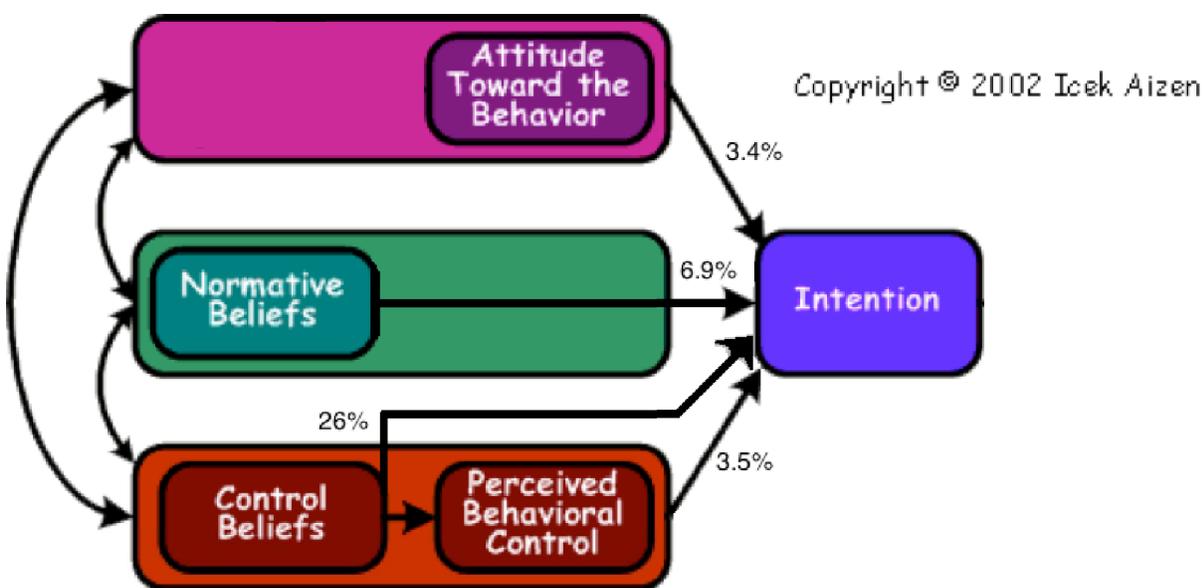


Figure 8. Amount of Variance Explained in Intention by TPB Main and Secondary Constructs Adapted from Ajzen (2002)

The third analysis included intention and perceived behavioural control, which were entered into stepwise regression in an attempt to explain the variance in exercise behaviour. Intention was the strongest predictor of behaviour, explaining 29.4% of variance, ($F_{(1,168)} = 71.413, p < 0.01$). Figure 9 illustrates the amount of variance that is explained by intention on physical activity behaviour.

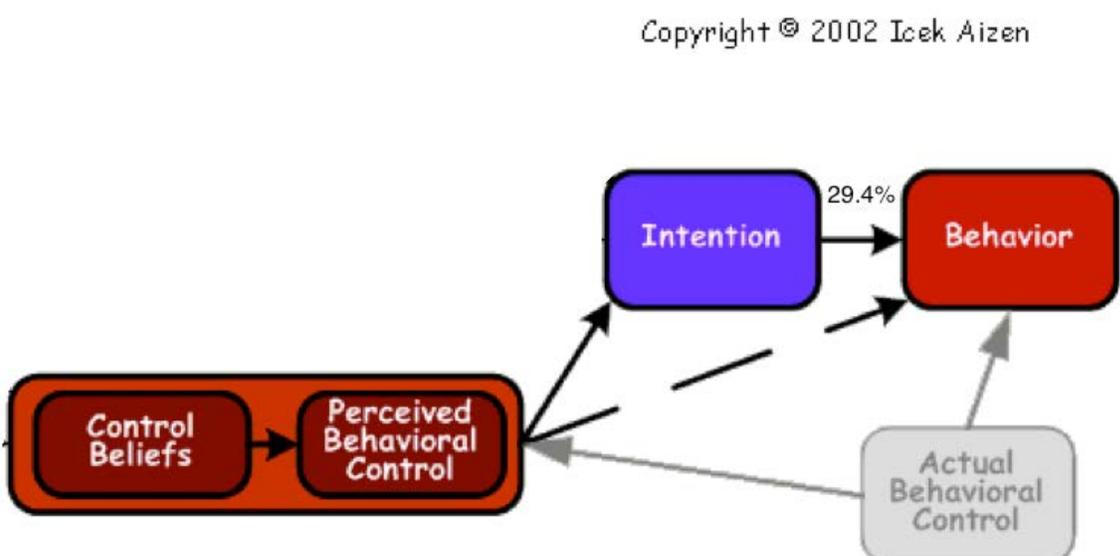


Figure 9. Theory of Planned Behaviour: Amount of Behavioural Variance Explained Adapted from Ajzen (2002)

Discussion

Physical Activity Participation Rates in the Baby Boom Generation

The primary goal of this study was to explore the relationship between the TPB, SCM, and the effects on exercise behaviour and intention. To understand the relationships, it is important to understand the population being investigated. First, the SCM illustrated the level of physical activity in the baby boom population. Over 62% of the baby boomers in the study reported being physically active for 6 months or longer, compared to Statistics Canada census data where less than 50% claimed to take part in leisure time physical activity (Statistics Canada, 2012). According to a meta-analytic review by Marshall and Biddle (2001), it is typical to see individuals 55 years of age or older in the maintenance stage. Compared to other countries, Canadian samples reported more cases in the maintenance stage (45%), whereas the USA reported the lowest number of cases (31%). In the current study, individuals between the ages of 45 and 55 reported similar results when compared to the 55 plus category.

The Canadian Physical Activity Guidelines (CPAG, 2011) state that individuals need to accumulate 150 minutes of moderate to vigorous physical activity per week in bouts of 10 minutes or more. The Godin Leisure Time Exercise Questionnaire (GLTEQ) focuses on strenuous, moderate, and mild physical activity levels across an average week. The majority of participants reported being in the maintenance stage with regard to the SCM. However, when looking at participation levels with the GLTEQ, 55% of participants reported they have never performed any form of strenuous physical activity in an average week, and approximately 83% reported participating in strenuous physical activity 3 days or less. When asked the frequency of how often they participated in moderate physical activity 55.9% stated 3 times or less during a typical week.

These results are troubling because it is known that moderate and strenuous levels of physical activity produce optimal healthy lifestyle results, including a reduced risk of cancer, heart disease, stroke, diabetes and other diseases and disabilities (CSEP, 2011). Previous findings revealed that while being categorized in the maintenance stage is favourable, the majority of participants were actually not as active as they claimed to be. The lack of participation in strenuous and moderate activity is only seen through the behavioural analysis (GLTEQ), using the SCM alone would not provide accurate results of participants' physical activity levels. Incorporating both the SCM and the GLTEQ helped the researchers understand the participants' perceived stage of change, and their corresponding actual mild, moderate, and strenuous physical activity. The SCM is used often in the behavioural health sciences field, commonly with the Canadian Society of Exercise Physiologists (CSEP).

The purpose of the GLTEQ was to further examine the level of physical activity participation in the baby boomer population based on their metabolic rates. The scale is based on the average metabolic equivalent of the task (METs). The examples for mild activity on the GLTEQ were not seen to offer substantial physical health benefits from earlier research by Godin and Shephard (1985), and therefore were removed from the METs equation. A cut point of 24 units was obtained using moderate and strenuous activity. Substantial benefits were seen with 24 units or higher, compared to individuals who had 23 units or less and were considered insufficiently active (Godin & Shephard). In the current study, with the level set at 24 units, approximately 45% of participants did not maintain the sufficient level and 15.8% of the total population did not engage in physical activity at the moderate or strenuous level at all. By encouraging baby boomers to maintain optimal levels of moderate and strenuous physical

activity, it could help reduce health care costs in the future (Katzmarzyk, Gledhill, & Shephard, 2000).

Research conducted by Garcia Bengoechea, Spence, and McGannon (2005) offered a more comprehensive model that included the mild physical activity variable. A cut off was established where a total value of 35 units for women and 38 units for men was considered substantially active when including the mild activity level (Jacobs, Ainsworth, Hartman, and Leon, 1993). Jacobs et al. concluded that the values of 35 and 38 were equivalent to 300-400 MET-minute per day, which is equivalent to a weekly expenditure of 2000 kcals. This value is associated with common health benefits such as a decrease in risk of heart disease, stroke and diabetes. The results of the current study found that 46% of males and 51% of females had reached the substantially active phase at 38 and 35 METs respectively. This information relates back to census research stating that approximately 50% of baby boomers are currently physically active (StatsCan, 2011). Participants would be able to expend more calories based on the amount of physical activity they are doing and by increasing their intensity. Strenuous and moderate physical activities expend more calories than mild activity. If this knowledge barrier were made more obvious to the aging population (baby boomers), perhaps they would be more inclined to participate in physical activity.

Gender, Age, and the SCM

A study investigating participants' stage of change was completed by 15 member states of the European Union in 1997. Results revealed that younger participants (15-24 year olds) were more likely to be in the maintenance stage compared to their older adult counterparts (65 years or older) (Kearney, de Graaf, Damkjaer, & Magnus Engstrom, 1999). Focusing on the baby boomers, the current study found no differences between age and gender based on the SCM,

which is consistent with the hypothesis. Older and younger boomers can be classified in the same group when comparing their stage of change. Also, when comparing men and women, similar findings were reported regarding the stage they consider themselves to be in. No significant difference was seen between the male and female participants. Booth et al. (1990) found no significant difference when investigating gender differences and their stage of change.

Gender, Age, and the TPB Constructs

Past research using the TPB found no statistical significance between gender and the main constructs of the TPB (Nigg, Lippke, & Maddock, 2009; Rhodes, Blanchard, & Blacklock, 2008; Rhodes, MacDonald, & McKay, 2006), and similar findings occurred in the present study. However, the current study found significant differences between males and females on the secondary construct of behavioural beliefs. Females scored higher on the overall behavioural belief scores. Between 64 to 80% of females strongly agreed with the behavioural beliefs, whereas only 30% to 70% of males strongly agreed with the behavioural beliefs. Women felt that improving their health, fitness, mood, energy level, and preventing the risk of falls was more important to them than their male counterparts. If women were more influenced by internal factors of physical activity (improving health, fitness, energy level) then gearing an intervention specific to their needs would be beneficial.

Differences between the age groups on the TPB main constructs were seen between the younger baby boomers, 51 to 55 years old and the older boomers, 56 to 60 years old on subjective norm. Comparing younger participants to older participants, younger people have a lower association to subjective norm. Motivational factors for younger people evolve around factors such as enjoyment (Salmon, Owen, Crawford, Bauman, & Sallis, 2003). The impact of enjoyment could apply to this age grouping as well, since walking is an affordable, social, and

preferred activity among older adults (Paterson & Warburton, 2010). Statistical differences were seen between the young boomers (45 to 50 years age-category) and the older boomers (56 to 60 years age-category) on PBC. The older baby boomer group perceived more control over their physical activity intentions than their younger counterparts. The older adults might feel they have more time, therefore control, over when they can be physically active.

The Baby Boom Generation, the SCM, and the Main Constructs of the TPB

Statistical differences were found in intention to be physically active between the contemplation and preparation stage and the action and maintenance stages of change. These results are consistent with the hypothesis stating those in the action and maintenance stage of change participants would differ from the precontemplation, contemplation and preparation stages of change participants on the main constructs of the TPB. The two groups who were already active (action and maintenance) had higher intentions to perform physical activity compared to the contemplation and preparation stages. These results suggest that those who are already active intend to participate in physical activity more than individuals who do not participate on a regular basis. This finding is important when related to boomers' own ideas about aging and physical activity. Helping those who are inactive become more physically active will help reduce their risks for disease and disability in the future.

Investigating the effect a participant's stage of change had on attitude resulted in significant findings. Statistical differences were seen between contemplation and the action and maintenance stages of change. Those who are already participating in physical activity are more likely to have positive attitudes towards the behaviour. Individuals in the action and maintenance stages view activity to be positive, harmless, beneficial, wise, enjoyable, pleasant, good, relaxing,

interesting, and useful compared to those in contemplation who do not share the same beliefs that physical activity is more enjoyable than harmful.

Significant differences were found on the TPB construct subjective norm and the stages of change. Differences were between maintenance and the two less active groups, contemplation and preparation. Participants in the contemplation and preparation stage had lower perceptions of social expectation compared to the maintenance stage. Maintenance stage participants feel they have more support from friends and family to be physically active compared to their contemplator and preparer counterparts.

Consistent with the hypothesis stating that individuals in the less active stages, precontemplation, contemplation, and preparation would have lower scores on the TPB constructs, the contemplators and preparers were significantly different than the active groups in the SCM (action and maintenance stages), on PBC. Individuals in the action and maintenance stage felt they had more control over their physical activity actions compared to contemplators. Action and maintenance groups felt they could participate in physical activity when they wanted to but contemplators and preparers did not see it so much as their own choice. These findings comparing the constructs of the TPB to SCM are similar to Courneya (1995), who found that contemplators differentiated from actors and maintainers. However, he found a difference between contemplators and preparers, which in this study did not exist. The small sample size and the size difference between the two groups could have affected the significance in this study. Contemplators and preparers in this group seemed to have similar perceptions to physical activity and the scores for the TPB main and secondary constructs were similar.

Predicting Baby Boomer Physical Activity Intentions

Study results support applying the TPB to physical activity interventions in the baby boom generation. Statistical stepwise regression analysis was used to assess the relationship among variables (Tabachnick & Fidell, 2001). Findings were consistent with studies of younger and older adults that predicted behaviour using the TPB (Dean, Farrell, Kelley, Taylor, & Rhodes, 2007; Godin & Kok, 1996). Similar to Godin and Kok's meta-analytic review of TPB studies, correlations of physical activity intention and the TPB yielded similar results (.51, .30, and .50 for attitudes, subjective norm and PBC respectively) when compared to the findings of this research study. Attitude and PBC were closely correlated to intention while subjective norms had a smaller correlation.

The meta-analysis conducted by McEachan, Conner, Taylor, and Lawton (2011) suggested that physical activity is better predicted by the TPB compared to other health behaviours (23.9% exercise behaviour variance explained compared to safer sex and abstinence between 13.8% and 15.3%). Regression analysis revealed that attitudes, subjective norm, and PBC were significant predictors of intention, accounting for 35.6% variance. These results are unique to this study, since no other TPB research has focused on this population alone. Having attitudes, subjective norm, and PBC as significant predictors of intention is not common within the behavioural health field. Subjective norm is not usually seen as a significant predictor of intention, or when it does contribute, its weight is lower than attitude and PBC (Godin & Kok, 1996). Armitage and Conner (2001) suggest that this weakness is due to single measure analysis of the construct. When multiple-item measures are used instead, subjective norm increases in its predictability. Similar results were found in Dean et al., (2007), where subjective norm was a significant predictor of strength training intention in the older adult population.

Focusing on subjective norms in the older adult population might be beneficial because during this stage of life, more emphasis is put on social engagement and the importance of peer support.

Interventions directed at the secondary constructs might in turn produce corresponding changes to the main TPB constructs and these changes may influence intention in the desired direction (Ajzen, 2006). These changes in intention however, might not produce positive interventions if an individual is incapable of carrying out these intentions. Implementing intentions (forming a specific plan detailing when, where, and how physical activity will be performed) can help bridge the gap between intention and behaviour and help individuals carry out their intended action.

Predicting Baby Boomer Physical Activity Behaviour

In the present study, intention was the main predictor of physical activity behaviour, and was significantly correlated to behaviour at .546, whereas the correlation between PBC and behaviour was only .294. Similar to Godin and Kok (1996), the averaged correlations for exercise studies were .50 for intention, however PBC correlated more in the meta-analysis than in the current study ($r = .41$). To our knowledge, this is the first study that has focused on the baby boom population alone, therefore findings may be unique and further research would be required to confirm them.

Regression analysis revealed that intention was the strongest and only predictor of physical activity behaviour, accounting for 29.4% of the variance. The results of this study are similar to that of Godin and Kok (1996), who found in their meta-analysis that intention accounted for 36% of variance in exercise behaviour. As well, Armitage and Conner (2001) meta-analysis focusing on 185 TPB studies up to the end of 1997 found that intention and PBC were able to explain 27% of overall behaviour. Out of the 11 exercise behaviour studies included

in Godin and Kok's meta-analysis, 6 studies did not find PBC to be a significant predictor of behaviour, and those that did found PBC to add on average 8% of the explained exercise behaviour variance. In the current study PBC was not found to be a significant predictor of physical activity behaviour (Beta .058, $p > 0.05$). Possible explanations include two proposed conditions (Ajzen & Timko, 1986; Bozionelos & Bennett, 1999). First, the participants could relate past physical activity behaviour that has already been accomplished to self-reporting activity. Second, the participants might not have taken into consideration future activities where they might not have control over their own physical activity behaviour. That is, their successful past performance could give them a sense of control when performing future behaviours (Ajzen, 1988; Kashima, Gallois, & McCamish, 1993). Changing physical activity behaviour needs to take into consideration factors beyond an individual's control, and their PBC must be realistic if intervention strategies targeting baby boomers are to be effective.

Conclusion

The results from this study suggest that the TPB is a viable framework for understanding a baby boomer's intention and willingness to perform physical activity. The results based on age, gender, and the SCM are consistent with the hypothesis in that no difference was seen on the SCM when compared to gender or age. Results support the hypothesis that the participants in the action and maintenance phase scored higher on the TPB constructs compared to the participants in the contemplation and preparation stage. Action and maintenance participants had stronger attitudes, subjective norms, and PBC values compared to the contemplators and preparers. The TPB regression analysis results were similar to the hypothesis in that attitudes and PBC were the strongest predictors compared to subjective norm. However subjective norm formed a significant relationship with intention, which is not always seen regarding physical activity.

In conclusion, this research study can aid future researchers in understanding and promoting physical activity initiatives in the baby boom population by implementing interventions based on the significant predictors of intention. With the SCM categorizing the participants into a stage based on physical activity participation, intervention studies can be designed to specifically focus on the stage and the TPB constructs that predicted intention. Contemplators are considering a behavioural change, but have yet to implement one on their own. Interventions targeting contemplators could focus on control and efficacy related beliefs (Courneya, 1995). Participants in the preparation stage need to incorporate regular physical activity in their lives on a regular basis. They understand the importance and have positive feelings towards activity, yet are unable to develop a system where physical activity becomes part of daily life. Interventions can focus on the differences between preparers and the action and maintenance stages (Courneya). Focusing on the difference, and becoming aware of the changes that need to occur, studies can be based on these results.

With approximately one-half of baby boomers physically inactive, the need for healthcare initiatives to increase physical activity levels is pertinent. With the baby boom population on the cusp of older adulthood, creating healthy habits now will help them enjoy their older adulthood experience. The regression analysis results revealed that PBC was the main predictor of intention when using the main constructs alone. Motivating baby boomers to gain control over their physical activity behaviour and decrease the lack of control they feel by promoting the benefits of activity is key in intervention strategies. Focusing intervention strategies on the secondary construct of control beliefs to help alleviate barriers that baby boomers face and when participating in physical activity is a similar route. Guiding them in overcoming the barriers they perceive by breaking activity into smaller intervals, or providing time management sessions

which focus on making physical activity part of everyday living are two possible strategies. Canadian physical activity guidelines suggest being active for 150 minutes per week to reap the health benefits (CSEP, 2011). This can be completed in bouts of 10 minutes or more. Educating precontemplators and contemplators on the ease of performing 10 minutes of physical activity (taking the stairs, walking the dog, going for a walk during a lunch break) might encourage them to become more active. Baby boomers' have already redefined the aging process. Continuing pro-active participation in physical activity while transitioning into older adulthood is the next step.

Future Considerations

Although there are theoretically meaningful findings in the present study, some changes can be made for future designs. In addition to using the SCM, the incorporation of a complete physical activity diary might help differentiate activity/stages in a more comprehensive way. Intensity of physical activity behaviour was addressed in this study (mild, moderate, and strenuous levels), however duration was not specifically looked at. All activities were based on 15-minute intervals, and not what the participant would normally perform. Inclusion of a questionnaire reporting on intensity and duration of every activity would help researchers determine the actual amount of time participants were active. The sample in this study could be considered more active than the average baby boomer population. Additional studies should attempt to tap into the inactive group more, as well as those already participating in physical activity.

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Appendix A – Information Letter

Motivating the Baby Boom Generation: An Application of the Theory of Planned Behaviour

Dear Potential Participant,

I would appreciate your participation in the above research study. My name is Laurin Hoegy and I am a graduate student in Kinesiology at Lakehead University. The purpose of this research is to investigate your intention to engage in physical activity and your actual engagement in physical activity. The number of individuals greater than 65 years of age in 2031 will increase from 14% to 23% of the population. You as a baby boomer are a part of this growing population. Physical activity is a natural way to maintain a healthy lifestyle, yet researchers have found that more than one-half of boomers are sedentary. Limited research has been done on either intentions of this group to exercise or its actual involvement in physical activity. Not only is it important to implement physical activity programs, but also to understand what kinds of problems would motivate you and your generation to be physically active.

If you were born between 1946 and 1964, are able to participate in physical activity, and are interested in helping understand the behaviours and intentions of baby boomers and physical activity you are eligible to take part in this study. You must be willing to complete a Stages of Change Questionnaire assessing your motivational readiness to participate in physical activity. You will also be asked to complete a questionnaire based on the Theory of Planned Behaviour assessing your physical activity intentions and behaviours. Lastly, a Godin Leisure Time Exercise Questionnaire will be provided assessing your past physical activity behaviour. Overall, this study will take 15-20 minutes of your time.

Once the data has been collected, the researcher may wish to contact you for further information regarding your reflection on the questionnaires and the ease of answering the questions.

Your participation in this study is voluntary and you may refuse to participate in any part of the study, decline to answer questions, or withdraw from the study at any time. All information provided will remain confidential. Your name will not be published in any documentation. Data will be coded and no names will appear in any reporting of results.

This research has been approved by the Lakehead University Research Ethics Board. If you have any questions or concerns regarding the ethics of this project, please contact the Board at (807)-343-8283 or research@lakeheadu.ca.

Thank you for your time and cooperation,
Sincerely,

Laurin Hoegy
Phone (807)-344-4254
E-mail – lmhoegy@lakeheadu.ca

Dr. Jane Taylor
Phone - (807)-343-8572
E-mail – jtaylor@lakeheadu.ca

Appendix B – Consent Form

Motivating the Baby Boom Generation: An Application of the Theory of Planned Behaviour

I _____ have read and understand the information letter and agree to participate in this study that will help explore the regular physical activity intentions and behaviours of the baby boomers. This study is being conducted by Laurin Hoegy, a Masters Student in the School of Kinesiology at Lakehead University under the supervision of Dr. Jane Taylor.

I understand there is limited risk to this study, and that this information will be used to further a study in the area of baby boomers and their intentions and behaviours to exercise.

I understand I will be asked to complete three questionnaires including a stages of change, theory of planned behaviour and a past physical activity questionnaire. I may also provide further consent to be contacted once I have completed the questionnaires to answer questions regarding how long it took me to complete, the ease of answering questions and if I returned the questionnaires via mail, it was a suitable option.

I fully understand that my participation in this study is completely voluntary, that I may refuse to answer any questions that I do not wish to answer and that I may withdraw from the study at any time. I understand that the information I provide will be confidential and the results will be stored at Lakehead University for 5 years with Dr. Jane Taylor. I understand the research findings can be made available to me upon request, and I, as an individual, will remain anonymous in any publication/presentation of the research findings.

Signature of Participant

Date

Signature of Witness

Date

I am willing to be contacted after returning the questionnaires to provide further information regarding the questionnaires, including how I felt it reflected physical activity behaviour of the baby boom generation.

YES

NO

Phone # _____

E-mail _____

Appendix C - SCM

QUESTIONNAIRE #1
STAGES OF CHANGE MODEL

Physical activity can include such activities as walking, cycling, swimming, climbing the stairs, dancing, active gardening, walking to work, aerobics, sports, etc. Regular physical activity is 30 minutes of moderate activity accumulated over the day, almost every day, OR ... vigorous activity done at least three times per week for 20 minutes each time.

1. Here are a number of statements describing various levels of physical activity. Please select the one which most closely describes your own level

(Please tick

one)

I am not physically active and I do not plan on becoming so in the next six months

I am not physically active, but I have been thinking about becoming so in the next six months

I am physically active once in a while, but not regularly

I am currently physically active, but have only begun doing so with in the last six months

I participate in regular physical activity and have done so for more than six months

2. (Answer if not currently active)

I was physically active in the past, but not now YES NO

Appendix D – Demographics and TPB

QUESTIONNAIRE #2
Physical Activity Questionnaire

Thank you for your participation in this study. All information presented in this questionnaire is extremely valuable. Questions asked will involve those related to your attitudes and beliefs toward regular physical activity

Physical Activity defined by The World Health Organization

Physical activity is any bodily movement requiring the use of energy. Engaging in 30 minutes of moderate physical activity everyday (walking, cycling, dancing)

Please refer to this definition when responding to the following questions.

For each question, please circle the appropriate word or number as it applies to you.

Please feel free to add additional comments you feel are appropriate

Physical Activity Questionnaire**Part A: Demographics**

Please check the appropriate answer.

1. Gender

Male Female

2. Age _____

3. Marital Status

Currently Married/Common Law Single
 Widow or widower Separated or divorced

4. Education

Completed secondary
(high school)
 Post Secondary Education

Occupation: _____

Part B: Attitudes and Beliefs toward Physical Activity

Please circle the most appropriate response for each statement

5. My participation in regular physical activity is/would be

Useless	1	2	3	4	5	6	7	Useful
Harmful	1	2	3	4	5	6	7	Beneficial
Foolish	1	2	3	4	5	6	7	Wise
Bad	1	2	3	4	5	6	7	Good
Unenjoyable	1	2	3	4	5	6	7	Enjoyable
Boring	1	2	3	4	5	6	7	Interesting
Unpleasant	1	2	3	4	5	6	7	Pleasant
Stressful	1	2	3	4	5	6	7	Relaxing

6. Most people who are important to me think I should engage in physical activity

Strongly Disagree	1	2	3	4	5	6	7	Strongly Agree
-------------------	---	---	---	---	---	---	---	----------------

7. Most people who are important to me would/do support my participation in regular physical activity

Strongly Disagree	1	2	3	4	5	6	7	Strongly Agree
-------------------	---	---	---	---	---	---	---	----------------

8. Generally speaking, I want to do what most people who are important to me think I should do

Strongly Disagree	1	2	3	4	5	6	7	Strongly Agree
-------------------	---	---	---	---	---	---	---	----------------

9. How much control do you have over whether or not you engage in regular physical activity?

No control at all	1	2	3	4	5	6	7	Complete control
-------------------	---	---	---	---	---	---	---	------------------

10. Overall, for me to engage in regular physical activity would be:

Extremely Difficult	1	2	3	4	5	6	7	Extremely Easy
------------------------	---	---	---	---	---	---	---	-------------------

11. If I chose to, I could participate in regular physical activity any time I wanted to

Strongly Disagree	1	2	3	4	5	6	7	Strongly Agree
----------------------	---	---	---	---	---	---	---	-------------------

12. I intend to engage in physical activity at least _____ times in the next four weeks

13. I intend to engage in physical activity the following number of times in the next four weeks
(please circle one)

0-4	5-8	9-12	13-16	17-20	21-24	25+
-----	-----	------	-------	-------	-------	-----

14. I intend to engage in physical activity with the following regularity in the next four weeks

Not at All	1	2	3	4	5	6	7	Everyday
------------	---	---	---	---	---	---	---	----------

15. I intend to engage in physical activity at least 12 times in the next four weeks

Definitely Not	1	2	3	4	5	6	7	Definitely
-------------------	---	---	---	---	---	---	---	------------

I believe regular physical activity can/could help me to:

16. Improve my health

Strongly Disagree	1	2	3	4	5	6	7	Strongly Agree
----------------------	---	---	---	---	---	---	---	-------------------

17. Improve my fitness

Strongly Disagree	1	2	3	4	5	6	7	Strongly Agree
----------------------	---	---	---	---	---	---	---	-------------------

18. Increase my energy level

Strongly Disagree	1	2	3	4	5	6	7	Strongly Agree
----------------------	---	---	---	---	---	---	---	-------------------

19. Improve my mood

Strongly Disagree	1	2	3	4	5	6	7	Strongly Agree
----------------------	---	---	---	---	---	---	---	-------------------

20. Lose/control my weight
Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree
21. Improve/maintain my ability to perform daily tasks
Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree
22. Improve/maintain my confidence to do daily tasks
Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree
23. Prevent falls or decrease the severity of falls
Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree
24. Relieve stress/tension
Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree
25. Other: _____
26. Improving my health is important to me
Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree
27. Improving my fitness is important to me
Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree
28. Increasing my energy level is important to me
Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree
29. Improving my mood is important to me
Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree
30. Improving my muscle strength and tone is important to me
Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree
31. Losing/controlling my weight is important to me
Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

32. Maintaining my ability to perform daily tasks is important to me
Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree
33. Increasing/maintaining my confidence to do daily tasks is important to me
Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree
34. Preventing falls or decreasing the severity of falls is important to me
Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree
35. Relieving stress/tension is important to me
Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree
36. Generally speaking, I want to do what my spouse/partner thinks I should do
Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree
37. Generally speaking, I want to do what my children think I should do
Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree
38. Generally speaking, I want to do what my friends think I should do
Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree
39. Generally speaking, I want to do what my doctor thinks I should do
Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree
40. My spouse/partner/other would/does support my participation in regular physical activity
Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree
41. My children/family would/do support my participation in regular physical activity
Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree
42. My friends would/do support my participation in regular physical activity
Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree

43. My doctor thinks I should participate in regular physical activity

Strongly Disagree	1	2	3	4	5	6	7	Strongly Agree
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For me, factors that make participation in regular physical activity difficult include:

44. Transportation to facilities

Strongly Disagree	1	2	3	4	5	6	7	Strongly Agree
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45. Getting equipment

Strongly Disagree	1	2	3	4	5	6	7	Strongly Agree
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46. Health problems/fitness

Strongly Disagree	1	2	3	4	5	6	7	Strongly Agree
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47. Lack of motivation

Strongly Disagree	1	2	3	4	5	6	7	Strongly Agree
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48. Too busy/other things to do

Strongly Disagree	1	2	3	4	5	6	7	Strongly Agree
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49. Too expensive

Strongly Disagree	1	2	3	4	5	6	7	Strongly Agree
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50. Don't know what exercises to do

Strongly Disagree	1	2	3	4	5	6	7	Strongly Agree
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51. Afraid of injury or over-exertion

Strongly Disagree	1	2	3	4	5	6	7	Strongly Agree
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52. Lack of interest

Strongly Disagree	1	2	3	4	5	6	7	Strongly Agree
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53. Little support from friends and/or family

Strongly Disagree	1	2	3	4	5	6	7	Strongly Agree
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54. Too old								
Strongly Disagree	1	2	3	4	5	6	7	Strongly Agree
55. Fatigue/lack of energy								
Strongly Disagree	1	2	3	4	5	6	7	Strongly Agree
56. Weather								
Strongly Disagree	1	2	3	4	5	6	7	Strongly Agree
57. Care giving responsibilities								
Strongly Disagree	1	2	3	4	5	6	7	Strongly Agree
58. Depression								
Strongly Disagree	1	2	3	4	5	6	7	Strongly Agree
59. Other _____								

I am confident that I could do regular physical activity even if:

60. I couldn't get to a facility								
Not very Confident	1	2	3	4	5	6	7	Very Confident
61. I didn't have any equipment								
Not very Confident	1	2	3	4	5	6	7	Very Confident
62. I had health problems or became ill								
Not very Confident	1	2	3	4	5	6	7	Very Confident
63. I felt unmotivated								
Not very Confident	1	2	3	4	5	6	7	Very Confident
64. I was busy and had other things to do								
Not very Confident	1	2	3	4	5	6	7	Very Confident
65. I didn't have enough money								
Not very Confident	1	2	3	4	5	6	7	Very Confident

Appendix E – GLTEQ

QUESTIONNAIRE #3
Godin Leisure-Time Exercise Questionnaire

1. During a typical **7-Day period** (a week), how many times on average do you do the following kinds of exercise for **more than 15 minutes** during your free time (write on each line the appropriate number).

Times per Week

a) STRENUOUS EXERCISE
(HEART BEATS RAPIDLY)

(e.g., running, jogging, hockey, football, soccer, squash, basketball, cross country skiing, judo, roller skating, vigorous swimming, vigorous long distance bicycling)

b) MODERATE EXERCISE
(NOT EXHAUSTING)

(e.g., fast walking, baseball, tennis, easy bicycling, volleyball, badminton, easy swimming, alpine skiing, popular and folk dancing)

c) MILD EXERCISE
(MINIMAL EFFORT)

(e.g., yoga, archery, fishing from river bank, bowling, horseshoes, golf, snow-mobiling, easy walking)

2. During a typical **7-Day period** (a week), in your leisure time, how often do you engage in any regular activity **long enough to work up a sweat** (heart beats rapidly)? (Please circle appropriate one)

OFTEN

SOMETIMES

NEVER/RARELY