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**APPLICATION OF TRANSTHEORETICAL MODEL TO EXERCISE IN
SLOVAK POPULATION: A CROSS-CULTURAL COMPARISON**

**BY
GABRIELA DYE**

**A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS FOR THE DEGREE OF
MASTER OF ARTS
IN PSYCHOLOGY**

UNIVERSITY OF RHODE ISLAND

2006

Abstract

The current study validated the translation of TTM measures for physical activity in a Slovakian sample, and compared the TTM constructs to an existing U.S. sample. A majority of the Slovak and the U.S. participants were in Precontemplation, Contemplation, and Preparation Stages. The distribution of Slovaks across Contemplation and Preparation Stages was significantly different compared to the U.S. distribution. The distribution of Slovaks and the U.S. participants across Precontemplation and Action/Maintenance Stages was the same. The basic structure of the translated TTM measures (Stages of change, Decisional Balance, and Situational Self-efficacy) held for the Slovak sample and replicated the existing structure of the TTM constructs. The measurement models were invariant across the USA and Slovak samples. The relationship between the Stages, the Pros and Cons scales, Self-efficacy, and Family Support replicated the pattern observed across multiple samples and behaviors. The Cons of exercising exceeded the Pros in Precontemplation and Contemplation Stages, while the Pros exceeded the Cons of exercising in Action/Maintenance. Self-efficacy increased across stages in a non-linear pattern. Family support increased linearly across stages. Relationship between physical activity and the Stages of change also replicated the pattern previously observed for exercise. Strenuous and moderate physical activities differentiated between the Stages in both samples in that individuals in pre-Action Stages engaged significantly less in moderate and strenuous physical activities. The amount of strenuous and moderate physical activity increased from Precontemplation to Action/Maintenance with a small increase from Contemplation to Preparation followed by large increases from Preparation to Action/Maintenance. Slovak sample was assessed on activities of daily living using IPAQ. The results indicated that individuals in early Stages engage significantly more in activities of daily living compared to individuals in later Stages, while individuals in later Stages engage more in structured types of activities.

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Chapter 1

Study Overview

Study Introduction

The amount and types of physical activities practiced by individuals vary across, as well as within, a culture. These variations are often a function of gender, age race, ethnicity, education, economic status, geographic region, or residence. Cross-cultural comparisons could provide important, more generalizable, and more culture specific information on factors that influence exercise participation, which is of crucial importance when promoting physical activity among culturally and ethnically diverse populations. More studies are needed in order to determine with greater consistency patterns of physical activity and exercise across diverse cultures. In view of that, the purpose of this study was to compare exercise participation across two different cultures.

This study had two Aims: (1) to develop and validate three core measures from the Transtheoretical Model (TTM) for exercise in a Slovak sample and (2) to compare the results of that study to the results of a United States study. To achieve the first aim, three key measures from the Transtheoretical Model were translated, culturally adapted, and administered to a Slovak sample: the Exercise Stages of change, the Exercise Decisional Balance Inventory, and the Exercise Situational Self-efficacy Inventory. In addition, Family Influence measure was translated, culturally adapted, and administered to a Slovak sample in order to examine the Family Support for

exercise. Initial validity was established by examining the relation between the Stages of change and the Pros and Cons scales from the Decisional Balance Inventory, the Situational Temptations Inventory, Family Influence scale, and exercise behavior. The second aim was achieved by comparing the results of the Slovak sample to the results of the U.S. sample. The analysis compared the internal or factorial validity of the measures, the exercise Stages of change distribution, and the four key relationships investigated above (stage and Decisional Balance; stage and Situational Temptations; stage and Family Influences, and stage and exercise behavior). Exercise behavior was assessed by Godin Leisure Time Activity Questionnaire in both Slovak and the U.S. samples, and by the International Physical Activity Questionnaire in a Slovak sample. Both scales were translated and culturally adapted.

Physical Activity

Prevalence Rates

Physical activity has been defined in the literature (Caspersen, Powell, & Christenson, 1985) as “any bodily movement produced by skeletal muscles resulting in energy expenditure.” Exercise is “a subcategory of physical activity defined as planned, structured movement undertaken to improve or maintain one or more aspects of physical fitness” (Caspersen et al., 1985). Steptoe, Wardle, Cui, Bellisle, Zotti, Baranyai, and Sanderman (2002) identified a large cross-cultural variation in the levels of exercise among University students between 1990 and 2000 across 13 European countries. In 1990, the prevalence

of physical exercise ranged from 52.6% in Portugal to 87.6% in Hungary for males, and from 29.4% in Greece to 95% in Hungary for females. In 2000, the prevalence of the physical activity defined as any exercise in the past two weeks ranged from 60.4% in Portugal to 87.8% in Poland for males and from 36.7% in Portugal to 87.4% in Hungary for females.

Haase, Steptoe, Sallis, and Wardle (2004) assessed physical inactivity among university students in 23 countries (Belgium, Bulgaria, Colombia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, South Korea, the Netherlands, Poland, Portugal, Romania, Slovakia, South Africa, Spain, Thailand, United Kingdom, United States, and Venezuela). Researchers clustered the countries using cultural, geographical, and political criteria, resulting in following groupings: (1) North-Western Europe and the United States, (2) the former socialist states of Central and Eastern Europe (including Slovakia), (3) Mediterranean countries, (4) Pacific-Asian countries, and (5) developing countries. Haase et al. (2004) examined physical activity across clusters and found that physical inactivity was lowest in group of North-Western countries and the United States (21%), and highest in developing countries (35%). Physical inactivity in countries of Central and Eastern Europe was 25%, and in Mediterranean countries 30%. Haase et al. (2004) also examined physical activity rates across each individual country. Looking at the two countries of our interest, physical inactivity prevalence rates were slightly higher in Slovakia (about 19% for males, and 28% for females) compared to the U.S.

(about 12% for males, and 15% for females). In this study, the rates of physical inactivity among university students are rather low and do not reflect the rates of physical inactivity reported by studies that examined physical inactivity among adults. Different rates may also reflect cultural differences in educational structure. University curricula in the U.S. is different compared to some other countries, and allows for greater exercise and physical activity participation.

Above mentioned studies indicate a large variability in exercise participation across different countries and cultures. This suggests that exercise behavior needs to be studied within a specific cultural context. Schoenborn, Adams, Barnes, Vickerie, and Schiller (2004) demonstrated that even within the U.S. exercise participation varies across geographical regions, and cultural and ethnic groups. They reported that approximately 61% of general US population (64% males, 59% females) engaged in some physical activity between 1999 and 2001. Coups, Gaba, and Orleans (2004) reported only about 54% screening prevalence rate for physical activity from a survey representative of U.S. adults. Only 30.5% of individuals self-reported being physically active. However, these rates vary even across geographical locations within the United States. According to Schoenborn et al. (2004) 65.3% of adults living in the West engage in leisure-time physical activity compared to 56.4% of adults living in the South. Adults living in the West (27.3%) are more likely to engage in light-moderate physical activity compared to adults living in the South (22.2%). Adults living in the West (13.8%) are also more likely to engage in vigorous

types of physical activities compared to adults living in the Northeast (12.7%), Midwest (11.9%), or the South (11.7%). Overall, adults living in the West (35%) are most likely to engage in any regular physical activity while adults living in the South are least likely to do so (28.4%). Different physical activity rates indicate that variability of engaging in regular physical activity is influenced by geographic regions, and provide compelling reasons for conducting a cross-cultural exercise research.

Physical Activity and Health Benefits

Physical activity has been shown to be associated with long-term health improvements (Saelens, Sallis, & Frank, 2003). Traditionally, researchers focused on more structured and more vigorous forms of exercise. A large amount of literature suggests that moderate exercise provides health benefits comparable to those obtained by vigorous exercising, and these indications have led more recently towards studying the effects of moderate intensity exercise (Pikora, Corti, Bull, Jamrozik, and Donovan, 2003). Regular exercise reduces (1) the risk of dying from coronary heart disease, (2) reduces the risk of developing high blood pressure, colon cancer, and diabetes, (3) reduces blood pressure in some people with hypertension, (4) helps maintain healthy bones, muscles, and joints, (5) reduces symptoms of anxiety and depression, and fosters improvements in mood and feelings of well-being, and (6) helps control weight, develop lean muscle, and reduce body fat (Centers for Disease Control and Prevention, 1996).

Haase et al. (2004) assessed beliefs about the importance of physical activity on health, and knowledge about the effects of physical activity on health in university students across 23 countries. Researchers did not find any differences between countries on beliefs about the importance of physical activity on health. Examination of knowledge about the association between heart disease and physical activity varied across clusters of countries. Students in North-Western countries and the U.S. were most knowledgeable about the association between heart disease and exercise, followed by Central and Eastern European countries, Mediterranean, Asian-Pacific, and developing countries. Comparison of individual countries indicated that knowledge about the association between heart disorders and physical activity was highest in Slovakia (about 76% of men and 73% of females), and lowest in South Africa (slightly above 10% for both males and females). In the U.S., about 47% of females and 46% of males knew about the effects of physical activity on heart disease.

Physical Inactivity as a Risk Factor

At least 50% of premature mortality is due to health behaviors in general (Velicer, & Prochaska, 1999). Physical activity is an important behavior for the prevention of chronic diseases, and accounts for about 14% of premature mortality (National Center for Chronic Disease Prevention and Health, 2004). Tobacco use is the only behavior that accounts for a greater proportion (19%) of premature mortality than exercise (National Center for Chronic Disease

Prevention and Health, 2004). Physical inactivity is often associated with overweight and obesity. The two factors represent a global health problem and are associated with chronic conditions such as hypertension, Type II diabetes, and elevated cholesterol. Cardiovascular disease is the leading cause of mortality in the United States (Plotnikoff, Hotz, Birkett, & Courneya, 2001), followed by cancers, stroke, chronic obstructive pulmonary disease, unintentional injuries, diabetes, and other acute and chronic disorders that account for less than 6% of total mortality (National Center for Chronic Disease Prevention and Health, 2004). Physical inactivity is a leading risk factor for development of these diseases. Lack of exercise is also associated with increased risks for psychological dysfunctions such as depression, or anxiety. Fine, Philogene, Gramling, Coups, and Sinha (2004) reported that the four most common behavioral health risk factors (smoking, physical inactivity, diet, and alcohol use) accounted for 39% of total deaths in 2000. Using the data from 2001 National survey study, the researchers demonstrated that physical inactivity is the strongest and the most common risk factor. Sixty six percent of participants in their study were inactive, and 41% did not engage in regular physical activity. When looking at the interaction of any two risk factors, Fine et al. (2004) found that the combination of obesity and inactivity was by far the strongest predictor for developing a chronic disorder. Fang, Rosett, Cohen, Kaplan, and Alderman (2003) reported that physical inactivity and increased BMI are two factors most commonly associated with cardiovascular disease. In

this longitudinal study, Fang et al. (2003) found that those in the least active group had the highest mortality rates across all BMI categories. About 46% of their sample reported a limited amount of physical activity. One interesting finding showed that those who exercised most, and had normal weight had the lowest mortality rate but also the highest calorie intake while those who were obese and reported least physical activity had the lowest calorie intake and the highest mortality rates. This finding suggests that exercise rather than dietary intake is a major predictor of mortality since mortality increased as a function of exercise, regardless of caloric intake. Dietary intake was a non-significant factor contributing to cardiovascular mortality after accounting for the effects of exercise.

Physical Activity and Adherence

Despite the fact that regular exercise is known to be beneficial to overall health, reduces obesity, reduces risk of cardiovascular episodes, and relieves stress, tension, and anxiety, adherence to exercise seems to be very low (Nigg & Courneya, 1998). According to Dishman (1988), 50% of individuals who engage in exercise end up dropping out after three to six months. Effective intervention programs are necessary to increase the adherence to exercise.

According to Velicer, Prochaska, Fava, Rossi, Redding, Laforge, and Robbins (2000), the most effective interventions should produce the desired changes in behavior, while targeting a greater proportion of the population at a higher risk. The researchers suggest that the impact of an intervention depends

on efficacy and participation rates in that a greater impact is achieved by increased participation, and increased efficacy of an intervention (success rates). Traditional behavioral interventions are clinical in nature, and they have not been successful in promoting long-term physical activity participation because they target mostly individuals who actively seek help and are ready to change (Velicer, 2003 Greifswald). Clinical interventions employ reactive recruitment. This kind of recruitment, because it is based on volunteerism, often results in lower participation rates. TTM successfully maximizes participation and efficacy rates using proactive recruitment of participants by contacting individuals and offering services (Velicer et al., 2000). TTM allows researchers to assess each individual's readiness to change. Based on this assessment, it is possible to create tailored, fully individualized interventions. Acquisition of exercise is a crucial factor for reducing overweight and obesity, and for reducing the risk of developing chronic conditions. Exercise acquisition is a process and requires changes in ones' behavior and lifestyle. As a process, it would require that individuals acquire exercise habits in stages. Exercise stage distributions and stage transitions using the constructs of TTM have been addressed by several studies (Laforge, Velicer, Richmond, & Owen, 1999; Nigg & Courneya, 1998; Plotnikof, Hotz et al., 2001; Prochaska, 1994; Prochaska, Velicer, Rossi, Goldstein, Marcus, Rakowski, Fiore, Harlow, Redding, Rosenbloom, & Rossi, 1994; Prochaska & Velicer, 1997; Sarkin, Johnson, Prochaska, & Prochaska, 2001; Velicer & Prochaska, 1999). In this study, the physical activity status of

Slovaks in the cycle of behavioral change was also assessed using TTM.

Transtheoretical Model

Brief Overview

TTM has been used to assess the transition of people through Stages in their attempts to acquire or cease a variety of behaviors (i.e., smoking, diet, exercise, alcohol, and substance abuse) (Prochaska, 1994; Prochaska, et al., 1994). The TTM provides an integrative and comprehensive overview of intentional behavior change (Sarkin et al., 2001). Importantly, it recognizes that people differ in their readiness to adopt new behaviors (Plotnikof, Hotz et al., 2001). TTM consists of three major dimensions: Temporal ordering dimension, Dependent or Outcome measures, and Independent measures. The temporal ordering dimension contains five stage variables (Stages of change) that assess readiness to change, and a status of an individual in the cycle of change (Prochaska & Norcross, 1994). This study was limited to the temporal ordering dimension, and the dependent measures (the Pros and the Cons of continuing or adopting a behavior, temptation to relapse into a negative behavior, and exercise behavior). The weighing of the Pros and the Cons by an individual varies across Stages (Prochaska et al., 1994). Individuals' perceptions of tempting situations change across Stages as well as their self-efficacy (Prochaska & Norcross, 1994). Ten process-oriented variables (processes of change) are independent measures assessing different activities that individuals use to change their behaviors (Sarkin et al., 2001). Stages and processes of

change are integrated in that different processes of change are emphasized during different Stages of change (Prochaska, & Norcross, 1994). The processes were not assessed in this study.

Stages of Change

TTM views changes in behaviors as processes that involve progression through five Stages named Precontemplation, Contemplation, Preparation, Action, and Maintenance (Velicer et al., 2000). (1) *Precontemplation* is the stage in which individuals have no intention to change within the next six months. These individuals are often unmotivated to change, or they resist change. (2) *Contemplation* is the stage in which individuals have intentions to change within the next six months. These individuals often experience a balance between the Pros and the Cons of changing behavior. Some individuals tend to be stuck in this stage for long periods, and are often characterized as chronic contemplators. (3) *Preparation* is the stage in which individuals have intentions to change in the immediate future, often within a month. Individuals in Preparation stage have taken some significant action towards behavior change in the past year, and they often have some plans to change their behavior. (4) *Action* is the stage in which individuals have already made specific modifications in their lifestyles within the past six months. These modifications are observable; however, complete behavior change is not yet accomplished. (5) *Maintenance* is the stage in which individuals work on consolidating the gains they achieved in Action in order to prevent relapse.

Individuals progress through these Stages in a spiral pattern, often relapsing into earlier Stages (Prochaska, DiClemente, & Norcross, 1992).

Progression, or stage transitions, involves movements from Precontemplation to Contemplation, Contemplation to Preparation, Preparation to Action, and Action to Maintenance (Prochaska & Velicer, 1997). It is also possible for individuals to make direct transitions from Precontemplation to Preparation, Contemplation to Action, or Preparation to Maintenance. Relapse from Action or Maintenance Stages is also common. However, the spiral model also suggests that relapsers do not move endlessly in circles, and do not regress all the way back to the first Stages (Prochaska et al., 1992). Individuals often regress to either Contemplation or Preparation (Velicer et al., 2000).

Decisional Balance

Decisional balance reflects individuals' assessment and balancing of the Pros (advantages) and the Cons (disadvantages) that are associated with target behavior (Velicer et al., 2000). The Pros and the Cons vary across the Stages of change. The relationship between the Stages, the Pros, and the Cons is slightly different for cessation of an unhealthy behavior, and for acquisition of a healthy behavior. Using the standardized T-scores, the Cons far outweigh the Pros for healthy and unhealthy behaviors in Precontemplation. In Contemplation, the Cons and the Pros are at about equal level for both, cessation of an unhealthy behavior, or acquisition of a healthy behavior. In Preparation, the Pros of ceasing unhealthy or acquiring healthy behaviors outweigh the Cons. In Action

and Maintenance, the Pros and the Cons show different pattern depending on type of behavior. For unhealthy behaviors, the Pros outweigh the Cons in Action and Maintenance; however, there is a gradual decrease in both. For healthy behaviors, the Pros also outweigh the Cons in Action and Maintenance; however, the Pros remain high, while the Cons decrease gradually.

Self-efficacy

Self-efficacy is a measure of individuals' confidence in being able to cope with high-risks situations without relapsing to earlier Stages (Velicer et al., 2000). In exercise domain, self-efficacy assesses the confidence of individuals to exercise in different situations. Self-efficacy typically increases linearly across the five Stages, while temptation decreases.

Stages of Change and Exercise

The TTM has been used to assess exercise behaviors across various age groups, worksites, communities, cultures and countries, mostly by using cross-sectional research methods (Plotnikof, Hotz et al., 2001). Prochaska and Velicer (1997) examined exercise stage distributions in the U.S., Europe, and Australia. The results indicated that a majority of population was distributed in the first three Stages: Precontemplation, Contemplation, and Preparation. Cross-cultural comparison of stage distribution for exercise indicated that in the U.S. sample, about 37% of people were in Precontemplation, 27% of people were in Contemplation, and 36% were in Preparation (Prochaska, & Velicer, 1997). In the European sample, rates of distribution across the three Stages of

Precontemplation, Contemplation, and Preparation were 33%, 19%, and 48%, and in the Australian sample, the rates were 30%, 19%, and 51% respectively (Prochaska, & Velicer, 1997).

Laforge et al. (1999) reported the stage distribution for regular exercise finding that about half of the population was in Precontemplation, Contemplation or Preparation, while the other half was in Maintenance and Action. Distribution across the Stages was similar for two U.S. samples, and three Australian samples. Slightly greater percentages of U.S. respondents were in early Stages compared to the percentages of Australian respondents. Boudreaux, Francis, Taylor, Scarinci, and Brantley (2003) also reported that 50% of individuals were in Precontemplation, Contemplation, and Preparation stages for exercise, and 50 % were in Action and Maintenance. Prochaska et al. (1994) assessed the stage distribution of exercise acquisition of employees from different work sites. Out of 717 participants, 477 (66.53%) were in Precontemplation, Contemplation, and Preparation, while 240 (33.47%) participants were in Action and Maintenance Stages. The exercise stage distribution pattern was further examined by Sarkin et al. (2001) who found that the total number of individuals in Precontemplation, Contemplation, and Preparation was greater than the total number of individuals in later Stages. Using a meta-anlaysis procedure, Marshall and Biddle (2001) examined exercise stage distribution across 80 studies. Researchers concluded that across a total sample of 68,580 participants, 14% of individuals were in Precontemplation, 16% in

Contemplation, 23% in Preparation, 11% in Action, and 36% in Maintenance. Looking at cross-cultural differences, proportion of individuals in Precontemplation was highest in Australian samples and lowest in the UK samples (Marshall & Biddle, 2001). Proportion of individuals in Maintenance was highest in Canadian samples and lowest in the U.S. samples (Marshall & Biddle, 2001). In summary, numerous studies show that at least 50% of individuals are in Pre-Action Stages.

The stage distribution patterns are not always consistent, often depending on the population studied. Nigg and Courneya (1998) examined exercise habits of adolescents. The stage distribution of adolescents was reversed compared to that of adults in that more than half of the participants were in Action and Maintenance Stages. This supports the findings of Haase et al. (2004) who reported rather low rates of physical inactivity in University students across 23 countries. University students are an older group compared to adolescents studied by Nigg and Coutneya, but they still have more opportunities to exercise in college compared to the general adult population. It appears that there are differences between adults and adolescents on exercise behavior. These discrepancies may be associated with the fact that adolescents participate in exercise during physical education courses. Adolescents also tend to be more concerned with their appearance than adults. Adolescent girls are often concerned with losing weight, while boys are more concerned with increasing their muscle mass.

TTM Constructs and Exercise

Plotnikof, Hotz et al. (2001) designed a longitudinal study assessing exercise stage transitions over two consecutive six months periods by examining the constructs of TTM (i.e., self-efficacy, the Pros, the Cons, and the processes of change) in a Canadian population. According to TTM, self-efficacy should be increasing across Stages. Plotnikof, Hotz et al. (2001) found partial support in that self-efficacy, the Pros, and the Cons predicted movement out of Precontemplation; however, only at the second six-month period. Self-efficacy and the Pros, but not the Cons predicted movement out of Contemplation at both time periods. Self-efficacy, but not the Pros or the Cons, further predicted progression out of Preparation, but only at the second six-month period, and out of Action and Maintenance at both time periods. In general, the Pros of engaging in exercise outweighed the Cons in Action and Maintenance; however, researchers also reported that the Pros of engaging in exercise were higher than the Cons for those in Precontemplation. This result is inconsistent with the concept of TTM, which postulates that the Cons outweigh the Pros during early Stages. This inconsistency may have resulted from using raw scores rather than standardized scores to assess the pattern of the Pros and the Cons across the Stages of Change.

However, most individuals recognize benefits of regular exercise even if they do not intend to exercise. Dannecker, Hausenblas, Connaughton, and Lovins (2003) found significant differences between the Pros and the Cons

across stages. Follow up analysis indicated that only the Pros differentiated the early stages from the Action and Maintenance. The Cons did not differentiate between the Stages. More research is needed to establish the relationship between Stages and Decisional Balance measures for exercise.

Cross-sectional studies of Nigg and Courneya (1998), Prochaska (1994), Prochaska et al. (1994), and Sarkin et al. (2001) reflected the concept of the TTM by providing evidence that the Pros of exercise tend to increase across Stages, while the Cons tend to decrease. Nigg and Courneya (1998), Prochaska (1994), and Prochaska et al. (1994) reported that the Pros increased across Stages, while the Cons decreased. Sarkin et al. (2001) showed that the Cons outweighed the Pros in Precontemplation, the transition from Precontemplation to Contemplation was marked by a rapid increase in the Pros, followed by a decrease in the Cons. Nigg and Courneya (1998) also examined the pattern of self-efficacy and demonstrated its increase across Stages.

Dannecker et al. (2003) assessed the relationship between a 12-item barrier self-efficacy scale and stages. Significant differences between self-efficacy across stages were found. Discriminant function analysis indicated that self-efficacy differentiated the early stages from the Action and Maintenance.

Research on exercise and TTM shows a consistent pattern of relationships between the Pros, self-efficacy, and Stages. The relationship between the Cons and Stages is not well established, and more research in this area is required. This study will examine relationships between stages, the

Pros, the Cons, self-efficacy, and exercise behavior across two economically different cultures. Differences between two countries on physical activity participation will be examined. To understand the rationale behind selecting and comparing Slovakia and the U.S., it is necessary to present an overview of Slovakia, and to examine cultural, economical, and health differences.

Cross-Cultural Comparison Overview

Slovakia

Slovakia is a central European country that separated Eastern and Western Europe (Carpenter, 1997). The Slovak Republic covers 49,035 km² (18,930 miles²) and borders with Czech, Poland, Ukraine, Hungary, and Austria (Hlavačka, Wágner, & Riesberg, 2004). The population was 5.4 million in 2001 (Hlavačka et al., 2004). The Slovaks account for 85.8%, Hungarians 9.7%, Roma 1.7%, Czechs 0.8, and Others 2% (Hlavačka et al., 2004).

Throughout much of its history, Slovakia was an economically underdeveloped country (Carpenter, 1997). Since the collapse of socialism, the Slovak market is trying to catch up with the western world; however, the total income is far below the average of the western world. The average monthly income is currently about 390 dollars ("Indicators on Economic," 2003), and the minimum monthly wage is about 203 dollars (Hlavačka et al., 2004). Therefore, financial barriers to purchase fitness memberships, exercise equipment, or to engage in exercise are very limited. On the other hand, public transportation and walking are still considered major modes of transportation, which allows

people to remain physically active.

Health and Exercise Disparities and Commonalities across Cultures

Comparing Slovak and the U.S. population will provide us with information on how individuals in two economically and culturally divergent countries perceive exercise, engage in exercise, and change exercise behavior. Currently there is very limited information available about exercise habits, or types of physical activities of Slovak population. Cardiovascular diseases and stroke are the major causes of death in both Slovakia and the U.S., accounting for about 54.5% of all deaths in Slovakia (Hlavačka et al., 2004) and about 40% of all deaths in the U.S. (National Center for Chronic Disease Prevention and Health Promotion, 2004). Cancer is the second major cause of death accounting for about 22% of all deaths in Slovakia (Hlavačka et al., 2004) compared to 23% in the U.S. (National Center for Chronic Disease Prevention and Health Promotion, 2004). Smoking rates are higher in Slovakia, where 42.3% of males and 28% of females 18 years and older smoke, while in the U.S. 27.8% of males, and 22.3% of females 18 years and older smoke (Mackay & Mensah, 2004). The world data table published by the World Health Organization indicates that in Slovakia smoking is banned in government buildings, while in the U.S. it is only restricted (Mackay & Mensah, 2004). The irony is that despite the smoking regulations smoking rates are higher in Slovakia (Mackay & Mensah, 2004). Studies on smoking and exercise show that smokers are also more likely to be sedentary. This would suggest that

Slovaks would be less active than Americans. Other factors need to be considered as well. Physical inactivity is strongly linked to diabetes. Percentage of adults (20 years and older) with diabetes in Slovakia is lower (3.9%) compared to the U.S. (8.8%) (Mackay & Mensah, 2004). A better management of diabetes may indicate that Slovaks tend to be more active; although, different diet is certainly a big factor that influences the prevalence rates of diabetes. Among other factors, environment and urban structure have enormous influence on the levels of physical activities practiced by individuals.

Environmental Diversity and Walking Behaviors

Slovakia, unlike the U.S, contains historically older towns and cities that are designed to facilitate walking. These types of towns and cities are characterized by a high walkability. According to Sallis, Kraft, and Linton (2002), only few studies within the health field in recent years focused on the impact of environmental correlates on physical activity. These few studies show consistent associations between environmental variables and physical activity by providing some evidence that people walk and cycle more for transportation when they live in traditional communities where they can walk to shops compared to more "modern" auto-dependent communities (Sallis et al., 2002). Owen, Humpel, Leslie, Bauman, and Sallis, (2004) reviewed studies on objective and perceived environmental attributes and walking. Environmental attributes such as aesthetic nature of the local environment, the convenience of facilities for walking (footpaths, trails), accessibility of places to walk to (shops,

beach), level of traffic on roads, and their composites were strongly associated with walking for specific purposes (Owen et al., 2004).

Saelens et al. (2003) found that highly walkable neighborhoods (distance between two points influenced by density, and by intermingling of residential and commercial facilities; connectivity, or easiness to move between destinations) influence walking behavior in that residents of high-walkable neighborhoods reported approximately two times more walking trips than residents of non-walkable or low-walkable neighborhoods. These factors characterize more historically older cities such as those located on the European continent. Slovakia seems to match the walk-friendly environment that is described by the above-mentioned studies to a greater degree than the U.S.; therefore, we were expecting to find the differences in the amount of lifestyle physical activities across these two cultures. Many researchers suggest that environment plays an important role in walking behavior of individuals. The next section summarizes selected studies that explored the environmental determinants of exercise and specifically walking. Although this study will not address the environmental influences on physical activity, cultures selected for this study are environmentally different. Therefore, it would be useful to briefly examine the effects of environment on exercise.

Pikora et al. (2003) described the Social Ecological Model of influences on physical activity developed by Corti in 1998. In this model, numerous individual factors (perceived behavioral control, attitude toward process, and

behavioral skills) and social environmental factors (club membership, dog ownership, knowing regular exercisers, exercise partners) influence walking behavior through a mediator of behavioral intention. According to this model, physical environmental factors (e.g., access to public open space, shops, and footpath) and exercise habits (frequency of trying) directly influence walking.

Pikora et al. (2003) identified four major types of environments influencing walking that are often studied by researchers: functional (walking surface, streets, traffic, permeability), safety (personal, traffic), aesthetic (streetscape, views), and destination (facilities).

Kirtland, Porter, Addy, and Neet (2003) suggest that the actual and perceived environment need to be assessed for more accurate representation of what is involved in choosing the living environment and deciding on walking. For example they noted that individuals who walk in a park as a part of their daily physical activity report parks as safe environments for walking, while individuals who do not walk in parks report parks as unsafe. Therefore, walking behavior may also be related to the perceived environmental safety, regardless of the objective assessment of safe environment. Troped, Saunders, Pate, Reininger, and Addy (2003) also showed that environment has a major impact on individuals' decision to walk. Their study of environmental factors as they relate to transportation and recreational activities showed that streetlights, enjoyable scenery, sidewalks present, and distance to rail-trail were significantly related to transportation (lifestyle) physical activity. The amount of walking is

greatly influence by the structure of the environment. It is important to study environmental influences on walking behavior because studies on walking suggest that health benefits from walking are comparable to benefits obtained from more structured types of activities. Selected studies in the next section provide evidence describing health benefits of walking.

Walking and Health

Walking is an important activity that can substantially lower the blood pressure. Iwane, Arita, Tomimoto, Satani, Matsumoto, Miyashita, and Nishio (2000) showed that walking 10,000 steps/day, assessed objectively by pedometry, effectively lowered elevated blood pressure, and decreased the activity of the sympathetic nerve activity, which is responsible for the development of hypertension. In addition, increases in oxygen intake were also noted. Swartz, Strath, Bassett, Moore, Redwine, Groër, and Thompson (2003) found that women at high risk for diabetes had an 11% decline in their plasma glucose levels after only 8-weeks of intervention, which consisted of accumulating the recommended 10,000 steps/day. The intervention was successful in lowering blood pressure in overweight, inactive women (4.7% decrease in systolic, and 6.7% decrease in diastolic blood pressure). A twelve-week walking intervention was also effective in lowering systolic and arterial blood pressure among women with borderline stage 1 hypertension (Moreau, Degarmo, Langley, McMahon, Howley, Bassett, & Thompson, 2001). These reductions were unrelated to changes in BMI, adiposity, diet, or insulin levels. In

the study by Tudor-Locke, Ainsworth, Whitt, Thompson, Addy, and Jones (2001), steps/day were inversely related to BMI and percent body fat. In another study, Tudor-Locke, Bell, Myers, Harris, Lauzon, and Rodger (2002) strengthened the previous results and reported yet again a consistent inverse relationship between steps/day and body mass index. Yanagimoto, Oshida, and Sato (2000) found a strong positive relationship between walking and bone quality in that the more a person walks on a daily basis, the greater the bone quality. Houghton, Harrison, Cowley, and Hampton (2002) reported a significant positive correlation between the scores on the quality of life questionnaire and steps/day. In general, walking seems to have a positive impact on overall quality of life.

According to many studies (Iwane et al., 2000; Swartz et al., 2003; Tudor-Locke et al., 2001; Yanagimoto et al., 2000; Houghton et al., 2002) walking is sufficient to decrease risks of developing a chronic disease. Walking is the most common type of physical activity, and if performed on a regular basis it has been identified as having a protective influence on health regardless of other types of vigorous activities performed by an individual (Saelens et al., 2003). Walking is an important activity practiced by people in Slovakia on regular bases due to economical, social, and environmental factors that differ from those in the U.S. Therefore, we may find differences in the amount of physical activity practiced within these two cultures. For that reason, it is important to acknowledge the benefits of walking and the environmental

influences on exercise; although, these variables are not addressed by this study.

Cultural, environmental, and health disparities, as well as commonalities exist across our selected cultures (Slovakia and the U.S.). Some of the disparities would suggest that leisure-time activities (such as walking) would be more common among Slovaks, while structured exercise would be more common among Americans.

Hypotheses

The current study tested two sets of hypotheses, each reflecting the major aims. The first aim was to validate the translation of TTM measures for physical activity in a Slovakian sample selected from the general population. The second aim was to assess and to compare TTM constructs to an existing U.S. sample, and to compare physical activity participation across the U.S. and the Slovak samples.

Aim 1. Hypothesis 1. Measurement Model (Internal Validity). The TTM model has been used as an assessment tool in different cultures and across different behaviors. Therefore; it was expected that the basic structure of the translated TTM measures (Stages of change, Decisional Balance, and Situational Self-efficacy) would hold for the Slovakian sample and would replicate the existing structure of the TTM constructs.

Aim 1. Hypothesis 2. (External Validity). It was expected that the relationship between the Pros and Cons scales from the Decisional Balance

Inventory would replicate the pattern observed across multiple samples and behaviors (Prochaska, et al., 1994; Prochaska, 1994).

Aim 1. Hypothesis 3. (External Validity). It was further expected that the relation between the Stages of change and Self-efficacy inventory would replicate the pattern observed across different behavior and samples, i.e., there would only be small differences between the first three Stages followed a large increase in Action and a further large increase in Maintenance.

Aim 1. Hypothesis 4. It was further expected the amount of physical activity would increase from Precontemplation to Maintenance with a small increase from Contemplation to Preparation followed by large increases from Preparation to Action and again from Action to Maintenance.

Aim 2. Hypothesis 1. Measurement Hypothesis. It was hypothesized that the measurement models previously reported for the Transtheoretical Model variables (Stages of change, Decisional Balance, and Situational Self-efficacy) would be replicated and would be invariant across the USA and Slovak samples.

Aim 2. Hypothesis 2. External Validity. It was expected that the relationship between the Pros and the Cons scales from the Decisional Balance Inventory and the Stages of change would replicate the pattern previously observed for exercise in that the Cons of exercising would exceed the Pros in Precontemplation and Contemplation Stages, while the Pros would exceed the Cons of exercising in Action and Maintenance. It was further hypothesized that

the pattern would be replicated across the USA and Slovak samples.

Aim 2. Hypothesis 3. External Validity. It was expected that the relationship between the Situational Self-efficacy Inventory and the Stages of change would replicate the pattern previously observed for exercise in that Self-efficacy would rapidly increase in the Action and Maintenance Stages. It was further hypothesized that the pattern would be replicated across the USA and Slovak samples.

Aim 2. Hypothesis 4. External Validity. It was expected that the relationship between physical activity and the Stages of change would replicate the pattern previously observed for exercise, in that the amount of physical activity reported by participants would increase across Stages. It was further hypothesized that the pattern would be replicated across the USA and Slovak samples.

Aim 2. Hypothesis 5. It was hypothesized that a majority of participants in Slovakia would be in Precontemplation, Contemplation, and Preparation Stages, with less than a half of participants in Action or Maintenance. The pattern of stage distributions would therefore be similar across the two countries; although, the types of physical activities that individuals engage in may differ across two cultures.

Aim 2. Hypothesis 6. Differences in Exercise Behavior. Slovak people have fewer opportunities, and may experience greater barriers to engage in structured exercise programs; therefore, it was hypothesized that the

engagement of Slovak people in active or structured exercise programs would be limited, while the engagement of Americans in active or structured exercise programs would be more common. On the contrary, it is expected that lifestyle activities (walking) would be more common among Slovaks, and more limited among Americans.

Family influences on exercise were also assessed, but no predictions are made a-priori.

Description of Measures

The assessment was text-based, primarily because no direct contact between the source and the receiver was necessary (Velicer & Prochaska, 1999). A text-based assessment is also easily implemented. In this case, “snowballing” can reach more people compared to computer-based approach. Computers are used much less in Slovakia than in the United States.

Informed Consent. The informed consent form explained the purpose of the study to the participants. It explained risks and benefits, new information, confidentiality, withdrawal privileges, and compensations in case of illness or injury that may pertain to this study. Participants were asked to sign and to date the informed consent form if they agree with all the terms and conditions, and wish to participate. Appendix A contains the English version of the Informed Consent, and Appendix B contains the translated version.

Instruction Sheet. The instruction sheet provided information that was necessary for completion of the survey. It provided information about survey

distribution and collection, and the time range within which surveys needed to be returned. English version of instruction sheet can be found in Appendix C, and the translated version in Appendix D.

Demographic Questionnaire. The demographic questionnaire included questions about participant's age, gender, nationality, overall health status, and marital status. Items assessing smoking habits of participants were also included. Slovakia differs from the U.S. in that individuals are not differentiated based on their ethnic status, but rather based on their nationality (Slovak, Hungarian, Roma, Czech, Ruthenian, Ukrainian, German, Polish, and Other). Participants were asked to report their school and/or work commitments (part-time, full time, or no commitments).

Godin Leisure-Time Exercise Questionnaire (Godin, & Shepard, 1985) was used to assess levels of physical activity of individuals in our study. Participants were asked to complete a self-explanatory four-item survey assessing their usual leisure-time exercise habits during the 7-day period. Individuals were asked to report how many times on an average they perform strenuous, moderate, and mild exercise for more than 15 minutes during their free time. Strenuous exercise is defined as one during which heartbeats rapidly. Several activities (e.g., running, jogging, hockey, basketball) are listed for easier identification of what constitutes a strenuous exercise. Moderate exercise is defined as not exhaustive. Several activities (e.g., fast walking, tennis, dancing, baseball) are listed for easier identification of what constitutes a moderate

exercise. Mild exercise is defined as one that requires minimal effort. Several activities (e.g., yoga, fishing, golf, bowling) are listed for easier identification of what constitutes a mild exercise. An additional question assesses the frequency (often, sometimes, never) with which individuals engage in any activity long enough to work up a sweat (heart beats rapidly). Lastly, participants were asked to add the time that they spend in physical activity each day, and to report the number of days that they participated in strenuous or moderate activities for at least 30 minutes per day during the past seven days. In Shepard and Vuillemin (2003), the reliability of a simple activity rating was .93. Two-week test-retest reliability had a correlation coefficient of .94 for the strenuous, .46 for the moderate, and .48 for the light activity. Godin Leisure-Time Exercise Questionnaire contains unique items measuring different levels of physical activity; therefore, psychometric properties of this measure have not been established.

International Physical Activity Questionnaire. IPAQ (Craig, Marshall, Sjöström, Bauman, Booth, Ainsworth, Pratt, Ekelund, Yngve, Sallis, & Oja, 2003) was used to assess the types and levels of PA of individuals in our study. Two versions of IPAQ are available: a long version assessing five activity domains, and a short version assessing four generic items. The long version was used in this study. The five domains in the long version are: (1) job-related PA measured by 7 items, (2) the transportation PA measured by 6 items, (3) housework, house maintenance, and caring for family measured by 6 items, (4)

recreation, sport and leisure time PA measured by 6 items, and (5) time spent sitting measured by 2 items. The questions are aimed at assessing the amount of PA performed during the past seven days. The long version contains items such as; "During the last 7 days, on how many days did you do vigorous physical activities like heavy lifting, digging, heavy construction, or climbing up stairs as part of your work? Think about only those physical activities that you did for at least 10 minutes at a time (Job-related PA)," "During the last 7 days, on how many days did you travel in a motor vehicle like a train, bus, car, or tram? (Transportation PA)," "How much time did you usually spend on one of those days doing vigorous physical activities in the garden or yard? (House work, house maintenance, and caring for family)," "How much time did you usually spend on one of those days walking in your leisure time? (Recreation, sport and leisure time PA)," and "During the last 7 days, how much time did you usually spend sitting on a weekday? (Time spent sitting)."

To establish the test-retest reliability of the IPAQ, Craig et al. (2003) administered different forms of IPAQ at two different time points. The version containing the items assessing the physical activity in the form of "during the last seven days" was administered no more than 8 days apart, and the version assessing the physical activity in the form of "during usual week" was administered no more than 10 days apart. The test-retest reliability for long version across 12 countries ranged from .46 (Rural South Africa) to .96 (South Carolina, USA). The remaining reliabilities were around .80. The pooled data

had a reliability coefficient of $\rho = .81$. The various other long forms that were tested showed reliabilities of .76 to .83. IPAQ contains unique items measuring different levels and types of physical activity; therefore, psychometric properties of this measure have not been established.

Stages of Change Algorithm (Schumann, Nigg, Rossi, Jordan, Norman, Garber, Riebe, & Benisovich, 2002). The short form of the Stages of change was used to assess a status of an individual in a cycle of change. Survey describes regular exercise as any planned physical activity (i.e., brisk walking, jogging, bicycling) performed to increase fitness. It also clarifies that these activities should be performed at least 4 or more times per week, with duration of 30 or more minutes per occasion. The questionnaire further explains that exercise does not have to be painful; rather, it should be performed at a level that would increase breathing rate and cause sweating. The questionnaire consists of five questions that are designed to evaluate individuals' readiness to change in order to place individuals into different Stages of change (Precontemplation, Contemplation, Preparation, Action, and Maintenance). Individuals in Precontemplation stage do not exercise, and have no intention to exercise in the future. The Contemplation item is defined as having intention to begin regular exercise within next 6 months. Preparation item is defined as having intention to begin regular exercise within 30 days. Action item is defined as participating in a regular exercise for less than 6 months. Maintenance item is defined as exercising regularly for more than 6 months. Individuals will be

placed into a stage for which they obtained the highest score. This algorithm differs from the algorithm proposed by Marcus, Rakowski, & Rossi (1992) in how the Preparation stage is defined. The Marcus version did not have behavioral intention as part of definition of Preparation; therefore, was inconsistent with the TTM (Reed, Velicer, Prochaska, Rossi, & Marcus, 1997).

Questionnaire was translated into Slovak, and reliability and validity of the translated questionnaire was examined. The reliability is difficult to accomplish and is generally not reported by other studies because the scale assesses behavioral changes, and we expect that assessment of Stages of change across time will not be the same. However, Schumann et al. (2002) provide some support that for the construct validity of the Stages of change algorithm for strenuous and moderate, but not mild, activities across different age groups. The values of the sensitivity (proportion of participants exercising 3 or more times per week) and specificity (proportion of participants exercising less than 3 times per week) indexes for strenuous and moderate exercise ranged from .50 to .94.

Decisional Balance (Nigg, Rossi, Norman, & Benisovich, 1998).

Decisional balance questionnaire assesses advantages (the Pros) and disadvantages (the Cons) of engaging in a regular exercise. It consists of ten questions, five questions assessing the Pros of exercising, and five questions assessing the Cons of exercising. Individuals are asked to report on the five point scale (5 = Not Important, 4 = A little bit Important, 3 = Somewhat

important, 2 = Quite important, and 1 = Extremely important) how important would the provided statements be in their decision to exercise or not to exercise. Among the items representing the Pros are: "I would have more energy for my family and friends if I exercised regularly," or "I would feel less stressed if I exercised regularly." Among the items representing the Cons of exercise are: "I would feel embarrassed if people saw me exercising," or "Exercise prevents me from spending time with my friends." This questionnaire was also translated into Slovak, and its' reliability and validity was established. Lower scores on the Pros and higher scores on the Cons items indicate that an individual views exercise as being advantageous, while higher scores on the Pros and lower scores on the Cons indicate that an individual perceives exercise as disadvantageous. Plotnikoff, Blanchard, Hotz, and Rhodes (2001) reported good internal consistency for five-item Pros (.82, .83, .77) and five-item Cons (.72, .69, and .69) scales at three time-points. In Sarkin et al. (2001), the reliabilities were .87 for four-item Pros scale and .71 for four-item Con scale.

Self-efficacy (Benisovich, Rossi, Norman, & Nigg, 1998). The scale looks at the confidence of individuals to exercise when other things get in the way. The scale consists of six questions assessing the confidence to exercise under variety of circumstances (e.g., "I am under a lot of stress," "I feel I don't have time," "It's raining or snowing"). Participants are asked to rate these items on a scale from 1 to 5 (1= Not at all confident, 2= Somewhat confident, 3= Moderately confident, 4= Very confident, 5= Completely confident). Higher

scores indicate higher level of confidence that individuals have to exercise when different things get in their way. The reliabilities (Cronbach's alphas) ranged from .77 to .87. This questionnaire was also translated into Slovak, and its' reliability and validity was established.

Family Influence Questionnaire (Redding, Rossi, Pallonen, Prochaska, Abrams, Velicer, Plummer, Meier, Greene, & Rossi, 1999). The scale consists of four items assessing the influence of families on health behavior change of parents or adults. Participants are asked how often in the past 30 days has their family done the following: "Encourage each other to exercise regularly," "Discuss how being inactive is unhealthy," "Remind each other to exercise regularly," and "Share ideas on how to be physically active on most days." Participants are asked to rate each of these items on a scale of 1 to 5 (1 = Never, 2 = Rarely, 3 = Sometimes, 4 = Often, 5 = Almost Always). In the study by Redding et al. (1999), reliabilities for the following health behaviors were established: sun protection (alpha = .92), low fat eating (alpha = .91), and nonsmoking (alpha = .89). Reliability of the scale assessing family influence on exercise has not yet been established. Copies of all the questionnaires in English can be found in Appendix E of this document. The translated Slovak questionnaires are included in Appendix F.

Chapter Contents: An Overview

The purpose of this study is to examine: (1) the psychometric properties of the TTM measures, (2) the invariance of these measures cross-culturally, and

(3) physical activity participation within and between the U.S. and Slovakia.

Chapter 2 of this manuscript will focus on the validation and reliability of the TTM measures in the U.S. sample of parents. Participation of the Americans in structured strenuous, mild, and moderate physical activities will also be examined.

Chapter 3 of this manuscript will focus on the validation and reliability of the TTM measures in the Slovak sample. Participation of Slovaks in structured strenuous, mild, and moderate physical activities will also be examined. In addition, participation of Slovaks in leisure-time activities such as walking will be assessed.

Chapter 4 will focus on cross-cultural invariance of the TTM measures. The U.S. and the Slovak participants will be compared on demographic and Stage distribution, and on structured physical activity participation.

References

- Benisovich, S. V., Rossi, J. S., Norman, G. J., & Nigg, C. R. (1998).
Development of a multidimensional measure of exercise self-efficacy.
Annals of Behavioral Medicine, 20, S190 (Abstract).
- Boudreaux, E. D., Francis, J. L., Taylor, C. L. C., Scarinci, I. C., & Brantley, P. J.
(2003). Changing multiple health behaviors: Smoking and exercise.
Preventive Medicine, 36, 471-478.
- Carpenter, M. (1997). Slovakia and the triumph of nationalist populism.
Communist and Post-Communist Studies, 30, 205-220.
- Caspersen, C. J., Powell, K. E., & Christenson, G. M. (1985). Physical
activity, exercise, and physical fitness: Definitions, and distinctions for
health-related research. *Public Health Report*, 100, 126-130.
- Centers for Disease Control and Prevention. (1996). *Physical activity and health
in Adults. A report of the surgeon general*. Atlanta, GA: Author.
- Coups, E. J., Gaba, A., & Orleans, C. T. (2004). Physician screening for multiple
behavioral health risk factors. *American Journal of Preventive Medicine*,
27, 34-41.
- Craig, C. L., Marshall, A. L., Sjöström, M., Bauman, A. E., Booth, M. L.,
Ainsworth, B. E., Pratt, M., Ekelund, U., Yngve, A., Sallis, J. F., & Oja, P.
(2003). International Physical Activity Questionnaire: 12-country reliability
and validity. *Medicine and Science in Sports and Exercise*, 35, 1381-
1395.

- Dannecker, E. A., Hausenblas, H. A., Connaughton, D. P., & Lovins, T. R. (2003). Validation of a stages of exercise change questionnaire. *Research Quarterly for Exercise and Sport*, 74, 236-247.
- Dishman, R. K. (1988). Exercise adherence research: Future directions. *American Journal of Health Promotion*, 3, 52-56.
- Fang, J., Wylie-Rosett, J., Cohen, H. W., Kaplan, R. C., & Alderman, M. H. (2003). Exercise, body mass index, caloric intake, and cardiovascular mortality. *American Journal of Preventive Medicine*, 25, 283-289.
- Fine, L. J., Philogene, G. S., Gramling, R., Coups, E. J., & Sinha, S. (2004). Prevalence of multiple chronic disease risk factors: 2001 National health interview survey. *American Journal of Preventive Medicine*, 27, 18-24.
- Godin, G., & Shepard, R.J. (1985). A simple method to assess exercise behavior in the community. *Canadian Journal of Applied Sport Sciences*, 10, 141-146.
- Haase, A., Steptoe, A., Sallis, J. F., & Wardle, J. (2004). Leisure-time physical activity in university students from 23 countries: Associations with health-beliefs, risk awareness, and national economic development. *Preventive Medicine*, 39, 182-190.
- Hlavačka, S., Wágner, R., & Riesberg, A. (2004). *Health Care Systems in Transition: Slovakia*. Copenhagen: WHO Regional Office for Europe on behalf of the European Observatory on Health Systems and Policies.

- Houghton, A. R., Harrison, M., Cowley, A. J., & Hampton, J. R. (2002). Assessing exercise capacity, quality of life and haemodynamics in heart failure: Do the tests tell us the same thing? *The European Journal of Heart Failure*, 4, 289-295.
- Indicators on economic development (2003). *Statistical Office of the Slovak Republic*. Retrieved December 2, 2003, from http://www.statistics.sk/webdata/english/index2_a.htm
- Iwane, M., Arita, M., Tomimoto, S., Satani, O., Matsumoto, M., Miyashita, K., & Nishio, I. (2000). Walking 10,000 steps/day or more reduces blood pressure and sympathetic nerve activity in mild essential hypertension. *Hypertension Research*, 23, 573-580.
- Kirtland, K.A., Porter, D.E., Addy, C.L., Neet, M.J., Williams, J.E., Sharpe, P.A., Neff, L.J., Kimsey, C.D., & Ainsworth, B.E. (2003). Environmental measures of physical activity supports: Perception versus reality. *American Journal of Preventive Medicine*, 24, 323-331.
- Laforge, R.G., Velicer, W.F., Richmond, R.L., & Owen, N. (1999). Stage distributions for five health behaviors in the United States and Australia. *Preventive Medicine*, 28, 61-74.
- Mackay, J., & Mensah, G. (2004). *The Atlas of Heart Disease and Stroke*. Geneva: WHO Marketing and Dissemination and CDC monserial publication.

- Marcus, B. H., Rakowski, W. & Rossi, J. S. (1992). Assessing motivational readiness and decision-making for exercise. *Health Psychology*, 11, 257-261.
- Marshall, S. J., & Biddle, J. H. (2001). The transtheoretical model of behavior change: A meta-analysis of applications to physical activity and exercise. *Annals of Behavioral Medicine*, 23, 229-246.
- Moreau, K. L., Degarmo, R., Langley, J., McMahon, C., Howley, E. T., Bassett, D. R., & Thompson, D. L. (2001). Increasing daily walking lowers blood pressure in postmenopausal women. *Medicine and Science in Sports and Exercise*, 33, 1825-1831.
- National Center for Chronic Disease Prevention and Health Promotion. (2004). *Chronic Disease Prevention: Overview*. Atlanta, GA: Author.
- Nigg, C.R., & Courneya, K.S. (1998). Transtheoretical model: Examining adolescent exercise behavior. *Journal of Adolescent Health*, 22, 214-224.
- Nigg, C.R., Rossi, J.S., Norman, G.J., & Benisovich, S.V. (1998). Structure of decisional balance for exercise adoption. *Annals of Behavioral Medicine*, 20, S211.
- Owen, N., Humpel, N., Leslie, A., Bauman, A., & Sallis, J. F. (2004). Understanding environmental influences on walking: Review and research agenda. *American Journal of Preventive Medicine*, 27, 67-76.

Pikora, T., Corti, B. G., Bull, F., Jamrozik, K., & Donovan, R. (2003).

Developing a framework for assessment of the environmental determinants of walking and cycling. *Social Science and Medicine*, 56, 1693-1703.

Plotnikoff, R.C., Blanchard, C., Hotz, S. B., & Rhodes, R. (2001). Validation of the decisional balance scales in the exercise domain from the transtheoretical model: A longitudinal test. *Measurement in Physical Education and Exercise Science*, 5, 191-206.

Plotnikoff, R.C., Hotz, S.B., Birkett, N.J., & Coumeya, K.S. (2001). Exercise and the transtheoretical model: A longitudinal test of a population sample. *Preventive Medicine*, 33, 441-452.

Prochaska, J.O., DiClemente, C.C., & Norcross, J.C. (1992). In search of how people change: Application to addictive behaviors. *American Psychologist*, 47, 1102-1114.

Prochaska, J.O. (1994). Strong and weak principles for progressing from precontemplation to action on the basis of twelve problem behaviors. *Health Psychology*, 13, 47-51.

Prochaska, J.O., & Norcross, J.C. (1994). Comparative conclusions: Toward a transtheoretical therapy. In J.O. Prochaska, & J.C. Norcross (Eds.), *Systems of Psychotherapy: A Transtheoretical Analysis* (pp.453-492). Pacific Grove, CA: Brooks/Cole Publishing Company.

- Prochaska, J.O., Velicer, W.F., Rossi, J.S., Goldstein, M.G., Marcus, B.H., Rakowski, W., Fiore, C., Harlow, L.L., Redding, C.A., Rosenbloom, D., & Rossi, S.R. (1994). Stages of change and decisional balance for 12 problem behaviors. *Health Psychology, 13*, 39-46.
- Prochaska, J.O., & Velicer, W.F. (1997). Stages of change: The temporal dimension of the transtheoretical model. *American Journal of Health Promotion, 12*, 38-48.
- Reed, G. R., Velicer, W. F., Prochaska, J. O., Rossi, J. S. & Marcus, B. H. (1997). What makes a good staging algorithm: Examples from regular exercise. *American Journal of Health Promotion, 12*, 57-67.
- Redding, C.A., Rossi, J.S, Pallonen, U.E., Prochaska, J.O., Abrams, D.B., Velicer, W.F., Plummer, B., Meier, K., Greene, G.W., & Rossi, S.R. (1999). Measures of family influence on healthy behavior changes in parents of adolescents. *Annals of Behavioral Medicine, 21*, S174 (Abstract).
- Saelens, B. E., Sallis, J. F., & Frank, L. D. (2003). Environmental correlates of walking and cycling: Findings from the transportation, urban design, and planning literature. *Annals of Behavioral Medicine, 25*, 80-91.
- Sallis, J. F., Kraft, K., & Linton, L. S. (2002). How the environment shapes physical activity: A transdisciplinary research agenda. *American Journal of Preventive Medicine, 22*, 208.

- Sarkin, J.A., Johnson, S.S., Prochaska, J.O., & Prochaska, J.M. (2001). Applying transtheoretical model to regular moderate exercise in an overweight population: Validation of a stages of change measure. *Preventive Medicine*, 33, 462-469.
- Schoenborn, C. A., Adams, P. F., Barnes, P. M., Vickerie, J. L., & Schiller, J. S. (2004). Health behaviors of adults: United States, 1999-2001. National Center for Health Statistics. *Vital Health Statistics*, 10, 1-79.
- Schumann, A., Nigg, C. R., Rossi, J. S., Jordan, P. J., Norman, G. J., Garber, C. E., Riebe, D., & Benisovich, S. V. (2002). Construct validity of the stages of change of exercise adoption for different intensities of physical activity in four samples of differing age groups. *American Journal of Health Promotion*, 16, 280-287.
- Shepard, R. J., & Vuillemin, A. (2003). Limits to the measurement of habitual physical activity by questionnaires. *British Journal of Sports Medicine*, 37, 197-206.
- Steptoe, A., Wardle, J., Cui, W., Bellisle, F., Zotti, A. M., Baranyai, R., & Sanderman, R. (2002). Trends in smoking, diet, physical exercise, and attitudes toward health in European university students from 13 countries, 1990-2000. *Preventive Medicine*, 35, 97-104.
- Swartz, A. M., Strath, S. J., Bassett, D. R., Moore J. B., Redwine, B. A., Groër, M., & Thompson, D. L. (2003). Increasing daily walking improves glucose tolerance in overweight women. *Preventive Medicine*, 37, 356-362.

- Troped, P. J., Saunders, R. P., Pate, R. R., Reininger, B., & Addy, C. A. (2003). Correlates of recreational and transportation physical activity among adults in a New England community. *Preventive Medicine, 37*, 304-310.
- Tudor-Locke, C., Ainsworth, B. E., Whitt, M. C., Thompson, R. W., Addy, C. L., & Jones, D. A. (2001). The relationship between pedometer-determined ambulatory activity and body composition variables. *International Journal of Obesity, 25*, 1571-1578.
- Tudor-Locke, C. E., Bell, R. C., Myers A. M., Harris, S. B., Lauzon, N., & Rodger, N. W. (2002). Pedometer-determined ambulatory activity in individuals with type 2 diabetes. *Diabetes Research and Clinical Practice, 55*, 191-199.
- Velicer, W. F., & Prochaska, J. O. (1999). An expert system intervention for smoking cessation. *Patient Education and Counseling, 36*, 119-129.
- Velicer, W. F., Prochaska, J. O., Fava, J. L., Rossi, J. S., Redding, C. A., Laforge, R. G., & Robbins, M. L. (2000). Using the transtheoretical model for population-based approaches to health promotion and disease prevention. *Homeostasis in Health and Disease, 40*, 174-195.
- Velicer, W. F. (2003, September). *Behavioral Interventions for Disease Prevention in General Populations*. Paper presented at the meeting of German Society of Social Medicine and Prevention, Greifswald, Germany.

Yanagimoto, Y., Oshida, Y., & Sato, Y. (2000). Effects of walking on bone quality as determined by ultrasound in the elderly. *Scandinavian Journal of Medicine and Science in Sports*, 10, 103-108.

Chapter 2

Validation and Reliability of the Decisional Balance, Self-efficacy, Family Support and Godin Exercise Measures in a Sample of Parents

Introduction

Physical activity has been shown to be associated with long-term health improvements (Saelens, Sallis, & Frank, 2003). Regular exercise reduces (1) the risk of dying from coronary heart disease, (2) reduces the risk of developing high blood pressure, colon cancer, and diabetes, (3) reduces blood pressure in some people with hypertension, (4) helps maintain healthy bones, muscles, and joints, (5) reduces symptoms of anxiety and depression, and fosters improvements in mood and feelings of well-being, and (6) helps control weight, develop lean muscle, and reduce body fat (Centers for Disease Control and Prevention, 1996). At least 50% of premature mortality is due to health behaviors in general (Velicer, & Prochaska, 1999). Physical activity is an important behavior for the prevention of chronic diseases, and accounts for about 14% of premature mortality (National Center for Chronic Disease Prevention and Health, 2004). Lack of exercise is also associated with increased risks for psychological dysfunctions such as depression or anxiety. Fine, Philogene, Gramling, Coups, and Sinha (2004) reported that the four most common behavioral health risk factors (smoking, physical inactivity, diet, and alcohol use) accounted for 39% of total deaths in 2000.

Despite the fact that regular exercise is known to be beneficial to overall health, reduces obesity, reduces risk of cardiovascular episodes, and relieves stress, tension, and anxiety, adherence to exercise seems to be very low (Nigg & Courneya, 1998). According to Dishman (1988), 50% of individuals who engage in exercise end up dropping out after three to six months. Effective intervention programs are necessary to increase the adherence to exercise.

The Transtheoretical Model (TTM) has served as the basis for successful interventions to increase exercise adherence (Bock, Marcus, Pinto, & Forsyth, 2001; Emmons, Marcus, Linnan, Rossi, & Abrams, 1994; Linnan, Taylor, Bock, Roberts, Rossi, & Abrams, 1998; Marshall, Bauman, Owen, Booth, Crawford, & Marcus, 2003). TTM-based interventions can be combined with proactive recruitment of participants, i.e., contacting individuals and offering services, to maximize impact (participation x efficacy) rates (Velicer, Prochaska, Fava, Rossi, Redding, Laforge, & Robbins, 2000). TTM allows researchers to assess each individual's readiness to change. Based on this assessment, it is possible to create tailored, fully individualized interventions. However, developing TTM-based interventions requires the development of quality measures. The goal of this study was to examine the psychometric properties of TTM measures and to validate these measures across Stages of Change.

Transtheoretical Model

This study will focus on three key constructs of the Transtheoretical Model: Stage of Change, Decisional Balance and Situational Temptations. In

addition, it will investigate a new measure of Family Support and relate the Stages of Change to exercise behavior.

Stages of Change. The TTM (Velicer et al., 2000) views change in behaviors as a process that involves progression through five Stages: (1) *Precontemplation* is the stage in which individuals have no intention to change within the next six months. These individuals are often unmotivated to change, or they resist change. (2) *Contemplation* is the stage in which individuals have intentions to change within the next six months. These individuals often experience a balance between the Pros and the Cons of changing behavior. Some individuals tend to be stuck in this stage for long periods, and are often characterized as chronic contemplators. (3) *Preparation* is the stage in which individuals have intentions to change in the immediate future, often within a month. Individuals in Preparation stage have taken some significant action towards behavior change in the past year, and they often have some plans to change their behavior. (4) *Action* is the stage in which individuals have already made specific modifications in their lifestyles within the past six months. These modifications are observable; however, complete behavior change is not yet accomplished. (5) *Maintenance* is the stage in which individuals work on consolidating the gains they achieved in Action in order to prevent relapse.

Decisional Balance. Decisional balance reflects individuals' assessment and balancing of the Pros (advantages) and the Cons (disadvantages) that are associated with target behavior (Velicer, DiClemente, Prochaska, &

Brandenberg, 1985; Velicer et al., 2000). Decisional Balance was developed on the basis of Decisional Balance Sheet developed by Janis and Mann (1977) who described decision making process as weighing potential gains and losses. The model represents both cognitive and motivational aspects of decision making process.

Situational Self-efficacy. Self-efficacy is a measure of individuals' confidence in being able to cope with high-risks situations without relapsing to earlier Stages (Velicer, DiClemente, Rossi, & Prochaska, 1990). Bandura (1977) conceptualized self-efficacy as a confidence in ability to successfully perform a behavior in order to obtain a desirable outcome. Multiple Self-efficacy constructs have been examined and used in the past to assess high and low risk relapse situations and a broad classification of (a) positive/social, (b) negative/affective, and (c) habit/addictive has been developed (Velicer, DiClemente, Rossi, & Prochaska, 1990). In exercise domain, Self-efficacy assesses the confidence of individuals to exercise in different situations.

Transtheoretical Model Applied to Exercise.

Exercise stage distributions and stage transitions using the constructs of TTM have been addressed by several studies (Laforge, Velicer, Richmond, & Owen, 1999; Nigg & Courneya, 1998; Plotnikoff, Hotz, Birkett, & Courneya, 2001; Prochaska, 1994; Prochaska, Velicer, Rossi, Goldstein, Marcus, Rakowski, Fiore, Harlow, Redding, Rosenbloom, & Rossi, 1994; Prochaska & Velicer, 1997; Sarkin, Johnson, Prochaska, & Prochaska, 2001; Velicer &

Prochaska, 1999). According to these studies, a majority of adult population is distributed in the first three Stages (Precontemplation, Contemplation, Preparation). Marshal and Biddle (2001) examined exercise stage distribution across 80 studies and showed that stage distribution across various countries is quite stable with most individuals distributed in the first three stages.

Cross-sectional studies of Nigg and Courneya (1998), Prochaska (1994), and Prochaska et al. (1994) reported that the Pros increased across Stages, while the Cons decreased. Sarkin et al. (2001) also showed that the Cons outweighed the Pros in Precontemplation, the transition from Precontemplation to Contemplation was marked by a rapid increase in the Pros, followed by a decrease in the Cons. In addition, Nigg and Courneya (1998) examined pattern of Self-efficacy and demonstrated its' increase across Stages.

Dannecker, Hausenblas, Connaughton, and Lovins (2003) assessed the relationship between a 12-item barrier Self-efficacy scale and stages. Significant differences between Self-efficacy across stages were found. Discriminant function analysis indicated that Self-efficacy differentiated the early stages from the Action and Maintenance. Limited amount of research on exercise and TTM shows a consistent pattern of relationships between the Pros, Self-efficacy, and Stages. The relationship between the Cons and Stages is not well established, and more research in this area is required.

Current Study

The goal of the current study is to: (a) evaluate the psychometric

properties (internal validity) of three Transtheoretical measures (Decisional Balance Inventory, Situational Self-efficacy Inventory, and Family Support Inventory). The relationship between the Stages of Change and four measures (Decisional Balance Inventory, Situational Self-efficacy Inventory, Family Support Inventory, and exercise behavior as measured by the Godin Leisure Time Exercise Inventory) will then be investigated to establish the external validity.

Method

Participants.

Participants were parents of 9th-grade students across Rhode Island. The U.S. sample from the Parent study at the University of Rhode Island consisted of 347 participants. A majority of participants were females (64%). Ethnicity of participants was representative of Rhode Island population with a majority being White (93.7%). Most were married (74.8%), and employed for wages (74.8%). Thirty-eight percent of participants indicated that they were in a good health, 12.2% indicating an excellent health, and only .6% indicating poor health. Table 2.1 summarizes the characteristics of participants. Mean age was 47, ranging from 33 to 81. The average annual income was between 40,000 and 59,000. Distribution of individuals across Stages indicated that 94 (27.1%) participants were in Precontemplation, 66 (19%) in Contemplation, 147 (42.4%) in Preparation, 40 (11.5%) in Action.

Procedure

The results presented here are based on secondary data analyses of a sample obtained from a principal investigator at the University of Rhode Island, Cancer Prevention Research Center. Appropriate permission for the use of these data was obtained from the principal investigator. Procedures of the Institutional Review Board (IRB), College of Sciences Human Participation Committee, and guidelines of APA ethical standards for research were followed. Participation was voluntary, and anonymity of all participants was assured. No names were attached to any of the surveys. There were no prior analyses performed on this set of data, and the results are not published elsewhere.

Measures.

A demographic questionnaire, the Stages of Change Algorithm for Exercise, Decisional Balance Inventory, Situational Self-efficacy measures were used in this study, and are described below.

Demographic Questionnaire. Demographic questionnaire included questions about participant's age, gender, ethnicity, overall health status, and marital status. Items assessing smoking habits of participants were also included. Participants were asked to report their school and/or work commitments (part-time, full time, or no commitments), height, weight, and number of children in household.

Stages of Change Algorithm. The short form of the Stages of Change (Schumann, Nigg, Rossi, Jordan, Norman, Garber, Riebe, & Benisovich, 2002)

was used to assess a status of an individual in a cycle of change. Survey describes regular exercise as any planned physical activity (i.e., brisk walking, jogging, bicycling) performed to increase fitness, performed at least 4 or more times per week with duration of 30 or more minutes per occasion, and performed at a level that would increase breathing rate and cause sweating. The Precontemplation item is defined as not exercising, and having no intention to exercise in the future. The Contemplation item is defined as having intention to begin regular exercise within next 6 months. Preparation item is defined as having intention to begin regular exercise within 30 days. Action item is defined as participating in a regular exercise for less than 6 months. Maintenance item is defined as exercising regularly for more than 6 months. Individuals will be placed into a stage for which they obtained the highest score. This algorithm differs from the algorithm proposed by Marcus, Rakowski, & Rossi (1992) in how the Preparation stage is defined. The Marcus version did not have behavioral intention as part of definition of Preparation; therefore, was inconsistent with the TTM (Reed, Velicer, Prochaska, Rossi, & Marcus, 1997).

Decisional Balance Inventory. Decisional Balance Inventory (Nigg, Rossi, Norman, & Benisovich, 1998; Velicer, DiClemente, Prochaska, & Brandenburg, 1985) assesses advantages (the Pros) and disadvantages (the Cons) of engaging in a regular exercise. It consists of five questions assessing the Pros of exercising, and five questions assessing the Cons of exercising. Individuals are asked to report on the five point scale (5 = Not Important, 4 = A

little bit Important, 3 = Somewhat important, 2 = Quite important, and 1 = Extremely important) how important would the provided statements be in their decision to exercise or not to exercise. Lower scores on the Pros and higher scores on the Cons items indicate that an individual views exercise as being advantageous, while higher scores on the Pros and lower scores on the Cons indicate that an individual perceives exercise as disadvantageous.

Situational Self-efficacy Inventory. The Situational Self-efficacy Inventory (Benisovich, Rossi, Norman, & Nigg, 1998; Velicer, DiClemente, Rossi, & Prochaska, 1990) looks at the confidence of individuals to exercise when other things get in the way. The scale consists of six questions assessing the confidence to exercise under variety of circumstances. Participants are asked to rate items on a scale from 1 to 5 (1= Not at all confident, 2= Somewhat confident, 3= Moderately confident, 4= Very confident, 5= Completely confident). Higher scores indicate higher level of confidence that individuals have to exercise when different things get in their way.

Family Support Inventory. The Family Support Inventory (Redding, Rossi, Pallonen, Prochaska, Abrams, Velicer, Plummer, Meier, Greene, & Rossi, 1999) consists of four items assessing the influence of families on health behavior change of parents or adults. Participants are asked how often in the past 30 days has their family encouraged, discussed, reminded, and shared ideas about physical activity. Participants are asked to rate each item on a scale of 1 to 5 (1 = Never, 2 = Rarely, 3 = Sometimes, 4 = Often, 5 = Almost Always).

Copies of all questionnaires in English can be found in Appendix E of this document.

Godin Leisure-Time Exercise Questionnaire. This measure (Godin, & Shepard, 1985) was used to assess levels of physical activity of individuals in our study. Participants were asked to complete a self-explanatory four-item survey assessing their usual leisure-time exercise habits during the 7-day period. Individuals were asked to report how many times on an average they perform Strenuous (heartbeats rapidly, e.g., running, jogging, hockey, basketball), Moderate (not exhaustive, e.g., fast walking, tennis, dancing, baseball), and Mild (requires minimal effort, e.g., yoga, fishing, golf, bowling) exercise for more than 15 minutes during their free time. Additional question assessed the frequency (often, sometimes, never) with which individuals engage in any activity long enough to work up a sweat (heart beats rapidly). Lastly, participants were asked to add the time that they spend in physical activity each day, and to report the number of days that they participated in strenuous or moderate activities for at least 30 minutes per day during the past seven days. Godin Leisure-Time Exercise Questionnaire contains unique items measuring different levels of physical activity; therefore, psychometric properties of this measure have not been established.

Results

The results are presented in two parts. Part 1 will focus on internal validity and reliability for the three measures: Decisional Balance Inventory,

Self-efficacy Inventory and Family Support Inventory. Part 2 will focus on validation of the Godin Leisure Time Activities across the Stages of Change.

Measurement Models

Decisional Balance Inventory.

Structural modeling was used to test the fit of four competing measurement models. A null model was used as a comparison model. A one-factor model was tested with the expectation that it would not fit well. The next model tested was a correlated two-factor model consisting of five items for Pros and five items for Cons with the expectation that this model would fit the best. Finally, the last model tested was an uncorrelated two-factor model.

As expected, the one factor model did not fit well, $\chi^2(35) = 269.83$, $p < .001$, CFI = .688, RMSEA = .139. The two-factor correlated, $\chi^2(34) = 89.11$, $p < .001$, CFI = .927, RMSEA = .068, and uncorrelated, $\chi^2(35) = 95.44$, $p < .001$, CFI = .920, RMSEA = .071, models both fit reasonably well.

However, the item-factor loadings indicated that one item loaded low on Pros (.49) and one item loaded low on Cons (.46) scales. These items were removed from the model, and the two-factor correlated and uncorrelated models consisting on four items for Pros and four items for Cons were tested again. A correlated two-factor eight item model resulted in a better fit, $\chi^2(19) = 61.81$, $p < .001$, CFI = .933, RMSEA = .081, compared to models that used five items per scale. The reliability of Pro scale (.85) remained unchanged. The reliability of Con scale decreased from .69 for the five-item scale to .64 for the four item

scale. Low correlation ($r = .19$) between the latent factors suggests that these two latent factors need to be presented separately. The two-factor correlated model is presented in Figure 2.1. The unadjusted means and standard deviations are presented in Table 2.2 Part I.

Situational Self-efficacy Inventory.

Two measurement models were compared for the six-item exercise confidence measure. A null model was used as a comparison model. A traditional one-factor model was tested with the expectation that it would fit well.

A one-factor model fit well as expected, $\chi^2(9) = 19.10$, $p = .02$, CFI = .97, RMSEA = .06. The Coefficient Alpha for this scale was .65. This model is presented in Figure 2.2. The unadjusted means and standard deviations are presented in Table 2.2 Part II.

Family Support Inventory.

Two measurement models were compared for the four-item exercise Family Support Inventory. A null model was used as a comparison model. A traditional one-factor model was tested with the expectation that it would fit well.

A one-factor model fit as expected, $\chi^2(2) = 3.92$, $p = .14$, CFI = .998, RMSEA = .05. The Coefficient Alpha for this scale was .89. This model is presented in Figure 2.3. The unadjusted means and standard deviations are presented in Table 2.2 Part III.

Relationship between Measures and Stage of Change

Decisional Balance Inventory. A multiple analysis of variance showed

that decisional balance scales were significantly different across the Stages of Change, $F(6, 684) = 12.41$, $\lambda = .81$, $p < .001$, $1 - \lambda = .19$, $\eta^2 = .10$.

A follow-up one-way ANOVA showed that the Pros scale was significantly different across the Stages of Change, $F(3, 343) = 24.45$, $p < .001$, $\eta^2 = .18$. Post hoc tests showed that the Pros for Precontemplators were significantly lower than for participants in all other stages. Individuals in Contemplation had lower Pros compared to those in individuals in Preparation. The Cons scale did not differentiate between stages (Table 2.2 Part I). The standardized Pros and Cons by stage for exercise are illustrated in Figure 2.4.

Self-efficacy Inventory. A one-way ANOVA showed that exercise Self-efficacy was significantly different across stages, $F(3, 337) = 3.87$, $p = .01$, $\eta^2 = .03$. Tukey post hoc test showed that exercise Self-efficacy was significantly higher for individuals in Action compared to individuals in Precontemplation. Individuals in other stages did not differ significantly on exercise confidence (Table 2.2 Part I). The standardized confidence by stage for exercise is illustrated in Figure 2.5.

Family Support Inventory. A one-way ANOVA showed that exercise Self-efficacy was significantly different across stages, $F(3, 343) = 9.48$, $p < .01$, $\eta^2 = .08$. Tukey post hoc test showed that Family Support for exercise was significantly higher for individuals in Preparation and Action compared to individuals in Precontemplation. Individuals in Contemplation also scored lower on Family Support than individuals in Action (Table 2.2 Part III). The

standardized confidence by stage for exercise is illustrated in Figure 2.5.

Godin Leisure-Time Exercise Inventory. A MANOVA showed that different types of physical activity were significantly different across stages, $F(9, 828) = 7.20$, $\lambda = .83$, $p < .001$, $1 - \lambda = .17$, $\eta^2 = .06$. Breakdown by intensity indicated that participation in Strenuous Physical Activities, $F(3, 342) = 13.69$, $p < .001$, $\eta^2 = .11$, and Moderate Physical Activities, $F(3, 342) = 10.72$, $p < .001$, $\eta^2 = .09$, was significantly different across stages. Mild Physical Activities did not differentiate between Stages. Post-hoc analyses showed that individuals in Precontemplation, Contemplation, and Preparation engaged significantly less in strenuous and moderate physical activities compared to individuals in Action (Table 2.2 Part IV). The standardized exercise behavior scores by stage for exercise are illustrated in Figure 2.6.

An ANOVA also showed that engagement in any activity long enough to work up a sweat or hard breathing varies across stages, $F(3, 343) = 5.97$, $p < .01$, $\eta^2 = .05$. Post-hoc analyses showed that individuals in Precontemplation ($M = 1.97$, $SD = .75$) and Contemplation ($M = 1.94$, $SD = .63$) engaged significantly less in any activity long enough to work up a sweat or breath hard compared to individuals in Action ($M = 2.45$, $SD = .68$).

An ANOVA also showed that number of days during which individuals participate in strenuous/moderate activities for at least 30 minutes during the past 7 days is not different across stages.

Discussion

The Stage of Change for exercise distribution replicates the distribution of adults across stages reported by previous studies (Prochaska & Velicer, 1997, Prochaska et al., 1994, Sarkin et al., 2001) in that most individuals were staged into Precontemplation and Preparation stages, with a majority of population distributed across the first three stages. It also reflects the stage distribution reported by Marshall and Biddle (2001) on the basis of meta-analytic evidence summarizing 80 studies on Stages of Change for exercise.

The results of this study support cross-sectional studies of the Decisional Balance Inventory of Nigg and Courneya (1998), Prochaska (1994), Prochaska et al. (1994), and Sarkin et al. (2001) and provide additional evidence that the Pros of exercise increase across Stages, while the Cons decrease. The results also support the evidence that Cons outweigh the Pros in Precontemplation, and that the transition from Precontemplation to Contemplation is marked by a rapid increase in the Pros, followed by a decrease in the Cons. This study has shown that the Pros, but not the Cons, are important in differentiating between the Stages and moving individuals across Stages. Marshall and Biddle (2001) reported similar results after conducting the meta-analysis of 80 studies; however, they did find weak evidence supporting the relationship between the stages and the Cons.

The Self-efficacy Inventory also increased across Stages supporting the study of Nigg and Courneya (1998). The increase appears to be non-linear as

reported by Marshall and Biddle who found only small to moderate effects sizes for the relationship between Self-efficacy and stages. This construct was also important in differentiating between the Stages; however, with a small effect size. Self-efficacy in this study differentiated between those on Precontemplation and those in Action providing a partial support of Dannecker et al. (2003) who reported that Self-efficacy differentiated the early stages from the Action and Maintenance.

The Family Support Inventory is a new concept in the domain of exercise behavior suggesting that family members have a significant influence on individual exercise behavior. Individuals across different age groups may receive a support for exercise from different sources. Adolescents or young adults may receive family support mainly from parents, siblings, and peers or other family members whom regard as important, while adults may receive support from their significant others, or those that they hold in high regard. This study provides strong evidence suggesting that this construct may be a very important one in relation to Stages. These results support the psychometric strength and construct validity of these measures as one basis for tailored interventions to increase exercise behavior in adults.

Overall, this study supports previous findings that reported a consistent pattern of relationships between the Pros, Self-efficacy, and Stages. The relationship between the Cons and Stages remains unclear, and more research in this area is required. The relationship between Family Support Inventory and

Stages was also confirmed. Validation of these constructs against Stages of Change provides a strong support for the model of behavior change.

Limitations. This data were obtained from an intervention study that intervened with individuals in pre-action stages. One limitation is that individuals in Maintenance were excluded from the study, and only small number of individuals were in Action stage (N = 40). Therefore, the relationships between the TTM constructs and later stages should be interpreted with caution. Secondly, Cons of exercising cannot be used at this time to evaluate movement of individuals across the Stages of Change. The Cons items did not load well on their underlined factor, and had no relation to the Stages of Change.

Future Directions. Future studies should validate the relationship between Family Support and Stages. Family Support is a promising concept and could be valuable part of interventions to change exercise behavior. Secondly, future studies need to further evaluate the Cons of exercise. The Cons items may need to be revised, modified, or changed.

References

- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, 84, 191-215.
- Benisovich, S. V., Rossi, J. S., Norman, G. J., & Nigg, C. R. (1998). Development of a multidimensional measure of exercise self-efficacy. *Annals of Behavioral Medicine*, 20, S190 (Abstract).
- Bock, B. C., Marcus, B. H., Pinto, B. M., & Forsyth, L. A. H. (2001). Maintenance of physical activity following an Individualized motivationally tailored intervention. *Annals of Behavioral Medicine*, 23, 79-87.
- Centers for Disease Control and Prevention. (1996). *Physical activity and health in Adults. A report of the surgeon general*. Atlanta, GA: Author.
- Dannecker, E. A., Hausenblas, H. A., Connaughton, D. P., & Lovins, T. R. (2003). Validation of a stages of exercise change questionnaire. *Research Quarterly for Exercise and Sport*, 74, 236-247.
- Dishman, R. K. (1988). Exercise adherence research: Future directions. *American Journal of Health Promotion*, 3, 52-56.
- Emmons K. M., Marcus B. H., Linnan L., Rossi J. S. & Abrams D. B (1994). Mechanisms in multiple risk factor interventions: Smoking, physical activity, and dietary fat intake among manufacturing workers. *Preventive Medicine*, 23, 481-489.

- Fine, L. J., Philogene, G. S., Gramling, R., Coups, E. J., & Sinha, S. (2004). Prevalence of multiple chronic disease risk factors: 2001 National health interview survey. *American Journal of Preventive Medicine*, 27, 18-24.
- Godin, G., & Shepard, R.J. (1985). A simple method to assess exercise behavior in the community. *Canadian Journal of Applied Sport Sciences*, 10, 141-146.
- Janis, I. L., & Mann, L. (1977). Decision making: A psychological analysis of conflict, choice and commitment. New York: Free Press.
- Laforge, R.G., Velicer, W.F., Richmond, R.L., & Owen, N. (1999). Stage distributions for five health behaviors in the United States and Australia. *Preventive Medicine*, 28, 61-74.
- Linnan, L. A., Taylor, E. R., Bock, B. C., Roberts, M. B., Rossi, J. S., & Abrams, D. B. (1998). Evaluation of motivationally tailored vs. standard self-help physical activity interventions at the workplace. *American Journal of Health Promotion*, 12, 246-253.
- Marcus, B. H., Rakowski, W. & Rossi, J. S. (1992). Assessing motivational readiness and decision-making for exercise. *Health Psychology*, 11, 257-261.
- Marshall, A. L., Bauman, A. E., Owen, N., Booth, M. L., Crawford, D., Marcus, B. H. (2003). Population-based randomized controlled trial of a stage-targeted physical activity intervention. *Annals of Behavioral Medicine*, 25, 194-202.

- Marshall, S. J., & Biddle, J. H. (2001). The transtheoretical model of behavior change: A meta-analysis of applications to physical activity and exercise. *Annals of Behavioral Medicine*, 23, 229-246.
- National Center for Chronic Disease Prevention and Health Promotion. (2004). *Chronic Disease Prevention: Overview*. Atlanta, GA: Author.
- Nigg, C.R., & Courneya, K.S. (1998). Transtheoretical model: Examining adolescent exercise behavior. *Journal of Adolescent Health*, 22, 214-224.
- Nigg, C.R., Rossi, J.S., Norman, G.J., & Benisovich, S.V. (1998). Structure of decisional balance for exercise adoption. *Annals of Behavioral Medicine*, 20, S211.
- Plotnikoff, R.C., Hotz, S.B., Birkett, N.J., & Courneya, K.S. (2001). Exercise and the transtheoretical model: A longitudinal test of a population sample. *Preventive Medicine*, 33, 441-452.
- Prochaska, J.O. (1994). Strong and weak principles for progressing from precontemplation to action on the basis of twelve problem behaviors. *Health Psychology*, 13, 47-51.
- Prochaska, J.O., Velicer, W.F., Rossi, J.S., Goldstein, M.G., Marcus, B.H., Rakowski, W., Fiore, C., Harlow, L.L., Redding, C.A., Rosenbloom, D., & Rossi, S.R. (1994). Stages of change and decisional balance for 12 problem behaviors. *Health Psychology*, 13, 39-46.

- Prochaska, J.O., & Velicer, W.F. (1997). Stages of change: The temporal dimension of the transtheoretical model. *American Journal of Health Promotion, 12*, 38-48.
- Redding, C.A., Rossi, J.S, Pallonen, U.E., Prochaska, J.O., Abrams, D.B., Velicer, W.F., Plummer, B., Meier, K., Greene, G.W., & Rossi, S.R. (1999). Measures of family influence on healthy behavior changes in parents of adolescents. *Annals of Behavioral Medicine, 21*, S174 (Abstract).
- Reed, G. R., Velicer, W. F., Prochaska, J. O., Rossi, J. S. & Marcus, B. H. (1997). What makes a good staging algorithm: Examples from regular exercise. *American Journal of Health Promotion, 12*, 57-67.
- Saelens, B. E., Sallis, J. F., & Frank, L. D. (2003). Environmental correlates of walking and cycling: Findings from the transportation, urban design, and planning literature. *Annals of Behavioral Medicine, 25*, 80-91.
- Sarkin, J.A., Johnson, S.S., Prochaska, J.O., & Prochaska, J.M. (2001). Applying transtheoretical model to regular moderate exercise in an overweight population: Validation of a stages of change measure. *Preventive Medicine, 33*, 462-469.

- Schumann, A., Nigg, C. R., Rossi, J. S., Jordan, P. J., Norman, G. J., Garber, C. E., Riebe, D., & Benisovich, S. V. (2002). Construct validity of the stages of change of exercise adoption for different intensities of physical activity in four samples of differing age groups. *American Journal of Health Promotion, 16*, 280-287.
- Velicer, W.F., DiClemente, C.C., Prochaska, J.O., & Brandenburg, N. (1985). A decisional balance model for assessing and predicting smoking status. *Journal of Personality and Social Psychology, 48*, 1279–1289.
- Velicer, W.F., DiClemente, C.C., Rossi, J.S., & Prochaska, J.O. (1990). Relapse situations and self-efficacy: An integrative model. *Addictive Behaviors, 15*, 271-283.
- Velicer, W.F., & Prochaska, J.O. (1999). An expert system intervention for smoking cessation. *Patient Education and Counseling, 36*, 119-129.
- Velicer, W.F., Prochaska, J.O., Fava, J.L., Rossi, J.S., Redding, C.A., Laforge, R.G., & Robbins, M.L. (2000). Using the transtheoretical model for population-based approaches to health promotion and disease prevention. *Homeostasis in Health and Disease, 40*, 174-195.

Table 2.1. *Demographic Characteristics of the U.S. Sample*

	<i>N</i>	%
<i>Gender (N = 347)</i>		
Male	125	36
Female	222	64
<i>Ethnicity (N = 319)</i>		
White	299	93.7
American Indian or Alaskan Native	16	5.0
Hispanic or Latino	12	3.8
Black or African American	8	2.5
Asian	2	.6
Native Hawaiian/Pacific Islander	2	.6
<i>Marital status (N = 318)</i>		
Married	238	74.8
Not married, living with a partner	18	5.7
Not married	4	1.3
Separated	7	2.2
Divorced	47	14.8
Widowed	4	1.3
<i>Employment status (N = 318)</i>		
Employed for wages (Hourly)	238	74.8

Self employed	27	8.5
Out of work for more than 1 year	9	2.8
Out of work for less than 1 year	11	3.5
Student	3	.9
Retired	6	1.9

Health in general (N = 319)

Poor	2	.6
Fair	42	13.2
Good	121	37.9
Very Good	115	36.1
Excellent	39	12.2

	<i>Mean</i>	<i>SD</i>
Number of children per Household (N = 347)	2.3	1.14
Age (N = 343)	46.83	6.35
Height (inches) (N = 319)	66.11	4.13
Weight (lb)(N = 307)	171.52	44.09
Annual income (\$) (N = 293)	4.2	1.48

* 1 = Under 15,000; 2 =15,000-29,999; 3 = 30,000-39,999; 4 = 40,000-59,999; 5 = 60,000-79,999; 6 = 80,000 and over

Table 2.2. *Decisional Balance, Self-efficacy, Family Support, and Godin across Stages: Means, Standard Deviations, and T-scores*

	Stage	N	Mean	SD	T-Score
<i>Part I. Decisional Balance</i>					
Pros	Precontemplation	94	11.73	4.49	43.67
	Contemplation	66	13.91	3.40	49.12
	Preparation	147	15.67	3.25	53.53
	Action	40	15.60	3.15	53.35
Cons	Precontemplation	94	5.89	2.72	49.42
	Contemplation	66	6.55	3.31	51.82
	Preparation	147	6.13	2.58	50.29
	Action	40	5.33	1.83	47.32
<i>Part II. Self-efficacy</i>					
	Precontemplation	92	15.64	5.33	47.41
	Contemplation	65	17.26	4.75	50.71
	Preparation	145	17.11	4.56	50.40
	Action	39	18.59	4.76	53.43
<i>Part III. Family Support</i>					
	Precontemplation	94	11.54	3.76	46.61
	Contemplation	66	12.21	3.26	48.42
	Preparation	147	13.34	3.45	51.46
	Action	40	14.73	4.03	55.21

Part IV. Godin Leisure Time Inventory

Strenuous PA Behavior

Precontemplation	94	6.03	10.75	47.28
Contemplation	66	7.09	10.77	48.02
Preparation	147	10.47	12.86	50.37
Action	40	21.83	23.14	58.30

Moderate PA Behavior

Precontemplation	94	8.72	9.45	47.44
Contemplation	66	9.39	7.97	47.94
Preparation	147	12.96	10.01	50.61
Action	40	21.75	27.54	57.17

Mild PA Behavior

Precontemplation	93	15.19	10.43	50.42
Contemplation	66	13.82	8.87	48.93
Preparation	147	14.63	9.28	49.81
Action	40	16.20	6.54	51.50

Engagement in any activity long enough to work up a sweat/hard breathing

Precontemplation	93	1.97	0.75	48.23
Contemplation	66	1.94	0.63	47.83
Preparation	147	2.14	0.67	50.72
Action	40	2.45	0.68	55.09

Total PA

Precontemplation	94	29.78	18.30	47.01
Contemplation	66	30.30	18.70	47.23
Preparation	147	38.06	20.99	50.51
Action	40	59.78	34.18	59.72

Figure 2.1. Structural model of decisional balance measure for parent exercisers.

Figure 2.2. Structural model of Self-efficacy measure for parent exercisers.

Figure 2.3. Structural model of Family Support measure for parent exercisers.

Figure 2.4. Pattern of the Pros and the Cons across Stages.

Figure 2.5. Pattern of Self-efficacy and Family Support across Stages.

Figure 2.6. Pattern of Physical Activity Behavior across Stages.

Chapter 3

Validation and Reliability of the Decisional Balance, Self-efficacy, Family Support, and Exercise Behavior Measures in a Slovak Sample

Introduction

Physical activity has been shown to be associated with long-term health improvements (Saelens, Sallis, & Frank, 2003). Regular exercise reduces (1) the risk of dying from coronary heart disease, (2) the risk of developing high blood pressure, colon cancer, and diabetes, (3) blood pressure in some people with hypertension, (4) symptoms of anxiety and depression, and fosters improvements in mood and feelings of well-being, and helps (5) maintain healthy bones, muscles, and joints and (6) control weight, develop lean muscle, and reduce body fat (Centers for Disease Control and Prevention, 1996).

Despite the fact that regular exercise is known to be beneficial to overall health, reduces obesity, reduces risk of cardiovascular episodes, and relieves stress, tension, and anxiety, adherence to exercise seems to be very low (Nigg & Courneya, 1998). According to Dishman (1988), 50% of individuals who engage in exercise end up dropping out after three to six months. Effective intervention programs are necessary to increase the adherence to exercise.

Interventions based on the Transtheoretical Model (TTM) seem to produce a significant impact on a positive behavior change and long-term adherence to a desired behavior. TTM successfully maximizes participation and

efficacy rates using proactive recruitment of participants by contacting individuals and offering services (Velicer, Prochaska, Fava, Rossi, Redding, Laforge, & Robbins, 2000). TTM allows researchers to assess each individual's readiness to change. Based on this assessment, it is possible to create tailored, fully individualized interventions. Developing interventions to increase exercise participation and long-term exercise adherence requires the development of quality measures.

This study was aimed at developing and validating three core measures from the TTM for exercise in a Slovak sample. Three key measures from the Transtheoretical Model were translated, culturally adapted, and administered to a Slovak sample: the Exercise Stages of Change, the Exercise Decisional Balance Inventory, and the Exercise Situational Self-efficacy Inventory. In addition, Family Support Inventory was translated, culturally adapted, and administered to a Slovak sample in order to examine the Family Support for exercise. Initial validity was established by examining the relation between the Stages of Change and the Pros and Cons scales from the Decisional Balance Inventory, the Situational Temptations Inventory, and Family Support Inventory.

Exercise Behavior in Slovakia

Examining exercise behavior of Slovak population would provide information on how individuals perceive exercise, engage in exercise, and change exercise behavior in a country that is economically and culturally different from the U.S. The knowledge attained from examining exercise

behavior within this culture could provide insights on how to interact with populations living in the U.S. but being culturally and ethnically more similar to collectivist and former socialist cultures such as Slovakia. Currently there is very limited information available about exercise habits, or types of physical activities of Slovak population.

Slovakia is a central European country that separated Eastern and Western Europe (Carpenter, 1997). The Slovak Republic is covering 49.035 km² (18.930 miles²) and borders with Czech, Poland, Ukraine, Hungary, and Austria (Hlavačka, Wágner, & Riesberg, 2004). The population was 5.4 million in 2001 (Hlavačka et al., 2004). The Slovaks account for 85.8%, Hungarians 9.7%, Roma 1.7%, Czechs 0.8, and Others 2% (Hlavačka et al., 2004).

Cardiovascular diseases and stroke are the major causes of death in Slovakia accounting for about 54.5% of all deaths (Hlavačka et al., 2004). Cancer is the second major cause of death accounting for about 22% of all deaths in Slovakia (Hlavačka et al., 2004). Smoking rates in Slovakia are about 42.3% of males and 28% of females 18 years and older. Percentage of adults (20 years and older) with diabetes in Slovakia is about 3.9% (Mackay & Mensah, 2004).

Haase, Steptoe, Sallis, and Wardle (2004) assessed leisure-time physical activity among university students in 23 countries (Belgium, Bulgaria, Colombia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, South Korea, the Netherlands, Poland, Portugal, Romania, Slovakia, South

Africa, Spain, Thailand, United Kingdom, United States, and Venezuela).

Slovakia is a central European country. Haase et al. (2004) reported 25% physical inactivity in countries of Central and Eastern Europe. Haase et al. (2004) also examined physical activity rates across each individual country.

Physical inactivity prevalence rates in Slovakia were about 19% for males, and 28% for females. Only about 23% of males and 18% of females in Slovakia meet the recommended guidelines for exercise, which is a very low participation rate. Physical activity is an important behavior for the prevention of chronic diseases, and accounts for about 14% of premature mortality (National Center for Chronic Disease Prevention and Health, 2004). At least 50% of premature mortality is due to health behaviors in general (Velicer, & Prochaska, 1999).

Lack of exercise is also associated with increased risks for psychological dysfunctions such as depression, or anxiety. Fine, Philogene, Gramling, Coups, and Sinha (2004) reported that the four most common behavioral health risk factors (smoking, physical inactivity, diet, and alcohol use) accounted for 39% of total deaths in 2000.

Transtheoretical Model of Behavior Change

The Transtheoretical Model of Behavior Change has been demonstrated to be an effective basis for developing interventions. Stages of Change and other TTM measures seem to be effective in assessing individual readiness to change behavior, and in evaluating the actions that individuals take to change a behavior. The following TTM constructs will be the focus of this paper.

Stages of Change. Behavior change is viewed as involving progression through five Stages of Change (Velicer et al., 2000). (1) Precontemplation is the stage in which individuals have no intention to change within the next six months. These individuals are often unmotivated to change, or they resist change. (2) Contemplation is the stage in which individuals have intentions to change within the next six months. These individuals often experience a balance between the Pros and the Cons of changing behavior. Some individuals tend to be stuck in this stage for long periods, and are often characterized as chronic contemplators. (3) Preparation is the stage in which individuals have intentions to change in the immediate future, often within a month. Individuals in Preparation stage have taken some significant action towards behavior change in the past year, and they often have some plans to change their behavior. (4) Action is the stage in which individuals have already made specific modifications in their lifestyles within the past six months. These modifications are observable; however, complete behavior change is not yet accomplished. (5) *Maintenance* is the stage in which individuals work on consolidating the gains they achieved in Action in order to prevent relapse.

Decisional Balance. Decisional balance reflects individuals' assessment and balancing of the Pros (advantages) and the Cons (disadvantages) that are associated with target behavior (Velicer et al., 2000). The Pros and the Cons vary across the Stages of Change. Decisional Balance was developed on the basis of Decisional Balance Sheet developed by Janis and Mann (1977) who

described decision making process as weighing potential gains and losses. The model represents both cognitive and motivational aspects of decision making process (Velicer, DiClemente, Prochaska, & Brandenburg, 1985).

Self-efficacy. Self-efficacy is a measure of individuals' confidence in being able to cope with high-risks situations without relapsing to earlier Stages (Velicer et al., 2000). Bandura (1977) conceptualized Self-efficacy as a confidence in ability to successfully perform a behavior in order to obtain a desirable outcome. Multiple Self-efficacy constructs have been examined and used in the past to assess high and low risk relapse situations such as positive/social, negative/affective, habit/addictive (Velicer, DiClemente, Rossi, & Prochaska, 1990). In exercise domain, Self-efficacy assesses the confidence of individuals to exercise in different situations.

TTM and Exercise

Exercise stage distributions and stage transitions using the constructs of TTM have been addressed by several studies (Laforge, Velicer, Richmond, & Owen, 1999; Nigg & Courneya, 1998; Plotnikof, Hotz, Birkett, & Courneya, 2001; Prochaska, 1994; Prochaska, Velicer, Rossi, Goldstein, Marcus, Rakowski, Fiore, Harlow, Redding, Rosenbloom, & Rossi, 1994; Prochaska & Velicer, 1997; Sarkin, Johnson, Prochaska, & Prochaska, 2001; Velicer & Prochaska, 1999). According to these studies, a majority of adult population is distributed in the first three Stages (Precontemplation, Contemplation, Preparation). Marshal and Biddle (2001) examined exercise stage distribution

across 80 studies and showed that stage distribution across various countries is quite stable with most individuals distributed in the first three stages.

Cross-sectional studies of Nigg and Courneya (1998), Prochaska (1994), Prochaska et al. (1994), and Sarkin et al. (2001) reflected the concept of the TTM by providing evidence that the Pros of exercise tend to increase across Stages, while the Cons tend to decrease. Nigg and Courneya (1998), Prochaska (1994), and Prochaska et al. (1994) reported that the Pros increased across Stages, while the Cons decreased. Sarkin et al. (2001) showed that the Cons outweighed the Pros in Precontemplation, the transition from Precontemplation to Contemplation was marked by a rapid increase in the Pros, followed by a decrease in the Cons. Nigg and Courneya (1998) also examined pattern of Self-efficacy and demonstrated its' increase across Stages.

Dannecker, Hausenblas, Connaughton, & Lovins (2003) assessed the relationship between a 12-item barrier Self-efficacy scale and stages. Significant differences between Self-efficacy across stages were found. Discriminant function analysis indicated that Self-efficacy differentiated the early stages from the Action and Maintenance. Limited amount of research on exercise and TTM shows a consistent pattern of relationships between the Pros, Self-efficacy, and Stages. The relationship between the Cons and Stages is not well established, and more research in this area is required.

Measuring Physical Activity.

This study will employ two measures of exercise behavior to assess

exercise participation of Slovaks, the Godin Leisure-Time Physical Activity Measure, and International Physical Activity Questionnaire (IPAQ) will be used in this study. The two measures have different strengths. The Godin measure assesses structured and planned activities that individuals perform in their leisure time, but does not assess activities of daily living. On the other hand, the IPAQ was developed to measure primarily the activities of daily living, and provides a limited assessment of participation in structured planned activities.

The Godin measure assesses vigorous, moderate, and mild structured physical activities, while IPAQ is aimed at measuring vigorous, moderate, and walking lifestyle activities. Hausenblas, Dannecker, Connaughton, and Lovins (1999) used Godin questionnaire to validate the Stages of exercise change. A total exercise score was significantly higher for individuals in Maintenance compared to individuals in Action and Preparation. The total exercise score of individuals in Action was also significantly higher compared to individuals in Preparation. Precontemplation and Contemplation stages were not assessed. Schumann, Nigg, Rossi, Jordan, Norman, Garber, Riebe, and Benisovich (2002) reported that significant stage differences for strenuous and moderate exercise in that individuals in Action and Maintenance engaged significantly more in strenuous and moderate activities than individuals in Precontemplation, Contemplation and Preparation. These results were also supported by Schumann, Estabrooks, Nigg, and Hill (2003) who also reported stage differences for strenuous and moderate exercise, but also for mild exercise.

Strenuous and moderate exercise participation was significantly higher among individuals in Action and Maintenance compared to Pre-Action stages. Mild activities were significantly higher for individuals in Preparation and Maintenance compared to Precontemplation.

To establish the test-retest reliability of the IPAQ, Craig, Marshall, Sjöström, Bauman, Booth, Ainsworth, Pratt, Ekelund, Yngve, Sallis, and Oja (2003) administered different forms of IPAQ at two different time points. The version containing the items assessing the physical activity in the form of "during the last seven days" was administered no more than 8 days apart, and the version assessing the physical activity in the form of "during usual week" was administered no more than 10 days apart. The test-retest reliability for long version across 12 countries ranged from .46 (Rural South Africa) to .96 (South Carolina, USA). The remaining reliabilities were around .80. The pooled data had a reliability coefficient of $\rho = .81$. The various other long forms that were tested showed reliabilities of .76 to .83. IPAQ was not yet used to validate the Stage of exercise change.

Current Study

The goal of the current study is to: (a) evaluate the psychometric properties (internal validity) of three Transtheoretical measures (Decisional Balance Inventory, Situational Self-efficacy Inventory, and Family Support Inventory), and (b) to establish the external validity of the measures by investigating the relationship between the Stages of Change and four TTM

measures (Decisional Balance Inventory, Situational Self-efficacy Inventory, Family Support Inventory and two exercise behavior measures (Godin Leisure Time Exercise Inventory and the International Physical Activity Questionnaire).

Method

Participants.

Data collected from Slovak participants ($N = 213$) were entered into SPSS and EQS databases. A majority of participants were females (75%). Nationality of participants was representative of Slovak population with a majority being of Slovak origin (84%). The Czech nationality was overrepresented with 7.1% of Czech nationals compared to about 0.8% of Czechs in general population. Most were married (60%), and employed for wages (74%). Forty-five percent of participants indicated that they were in a good health, 10% indicating an excellent health, and only 5.3% indicating poor health. Table 3.1 summarizes the characteristics of participants. Mean age was 41, with the age range of 18 to 83. Forty-four individuals (21%) were smokers. Mean number of cigarettes smoked was 10.13 (Table 3.1). Distribution of individuals across Stages indicated that 70 (32.9%) participants were in Precontemplation, 19 (8.9%) in Contemplation, 80 (37.6%) in Preparation, 39 (18.3%) in Action or Maintenance. Five (2.3%) individuals could not be staged. Action and Maintenance Stages were merged into one stage due to a very small number of individuals in Action stage ($N = 6$). All analyses were performed using four Stages of Change (Precontemplation, Contemplation, Preparation,

and Action+Maintenance). The nature and the frequency of physical activities were collected using IPAQ. On an average, individuals spent 1042 (17h 22m) minutes per week walking, 1050 (17h 30m) minutes in moderate activity, and 590 (9h 50m) minutes in vigorous activity. Summary of total job, gardening, transportation, and leisure time activity minutes, and minutes in each individual activity (e.g., vigorous job related physical activity, minutes in transportational walking, minutes in leisure walking, minutes of sitting) are presented in Table 3.2.

Procedure.

The sample consisted of participants living in the city in eastern part of Slovakia (in and around the city of Košice). The sample consisted of participants who agreed to participate in this study voluntarily. The collection of data was accidental using "snowballing" data collection methods. Participants who were approached by the principal investigator were asked to complete the questionnaire and to contact other persons to complete the survey if possible. To participate in the study, participants had to be at least 18 years old. There were no other exclusionary criteria.

Questionnaires were translated into Slovak language using back translation procedures to assure greater equivalence in the research protocol. A group of local researchers evaluated the content of questionnaires for cultural sensitivity and precision. Participants were contacted randomly. They were asked to complete the survey and distribute it among other people they knew.

Participants were asked to read the informed consent prior to completing the survey and check the participation on the informed consent form. Participants completed surveys in their spare time. Local research collaborators collected completed surveys. Cultural sensitivity issues were minimized in that primary investigator is citizen of Slovakia and is knowledgeable about its cultural values, norms and beliefs. The local medical researchers were also involved in evaluation, distribution, and collection of survey.

Procedures of the Institutional Review Board (IRB), College of Sciences Human Participation Committee, and guidelines of APA ethical standards for research were followed. Participation was voluntary, and anonymity of all participants was assured. No names were attached to any of the surveys.

Measures.

The assessment was text-based. No direct contact between the source and the receiver was necessary (Velicer & Prochaska, 1999). A text-based assessment is also easily implemented. In this case, "snowballing" can reach more people compared to computer-based approach. Computers are used less widely in Slovakia than in the United States. Demographic questionnaire, Godin Leisure Time Activity, and International Physical Activity Questionnaire, Stages of Change, Decisional Balance, Self-efficacy, and Family Support Inventory were used in this study, and are described below.

Demographic Questionnaire. Demographic questionnaire included questions about participant's age, gender, nationality (Slovak, Hungarian,

Roma, Czech, Ruthenian, Ukrainian, German, Polish, and Other), overall health status, marital status, smoking habits, school and/or work commitments (part-time, full time, or no commitments).

Stages of Change Algorithm (Schumann et al., 2002). The short form of the Stages of Change was used to assess a status of an individual in a cycle of change. Survey describes regular exercise as any planned physical activity (i.e., brisk walking, jogging, bicycling) performed to increase fitness, performed at least 4 or more times per week with duration of 30 or more minutes per occasion, and performed at a level that would increase breathing rate and cause sweating. The Precontemplation item is defined as not exercising, and having no intention to exercise in the future. The Contemplation item is defined as having intention to begin regular exercise within next 6 months. Preparation item is defined as having intention to begin regular exercise within 30 days. Action item is defined as participating in a regular exercise for less than 6 months. Maintenance item is defined as exercising regularly for more than 6 months. Individuals will be placed into a stage for which they obtained the highest score. This algorithm differs from the algorithm proposed by Marcus, Rakowski, & Rossi (1992) in how the Preparation stage is defined. The Marcus version did not have behavioral intention as part of definition of Preparation; therefore, was inconsistent with the TTM (Reed, Velicer, Prochaska, Rossi, & Marcus, 1997).

Decisional Balance Inventory (Nigg, Rossi, Norman, & Benisovich,

1998). Decisional balance questionnaire assesses advantages (the Pros) and disadvantages (the Cons) of engaging in a regular exercise. It consists of five questions assessing the Pros of exercising, and five questions assessing the Cons of exercising. Individuals are asked to report on the five point scale (5 = Not Important, 4 = A little bit Important, 3 = Somewhat important, 2 = Quite important, and 1 = Extremely important) how important would the provided statements be in their decision to exercise or not to exercise. Lower scores on the Pros and higher scores on the Cons items indicate that an individual views exercise as being advantageous, while higher scores on the Pros and lower scores on the Cons indicate that an individual perceives exercise as disadvantageous.

Situational Self-efficacy Inventory (Benisovich, Rossi, Norman, & Nigg, 1998). The scale looks at the confidence of individuals to exercise when other things get in the way. The scale consists of six questions assessing the confidence to exercise under variety of circumstances. Participants are asked to rate items on a scale from 1 to 5 (1= Not at all confident, 2= Somewhat confident, 3= Moderately confident, 4= Very confident, 5= Completely confident). Higher scores indicate higher level of confidence that individuals have to exercise when different things get in their way.

Family Support Inventory (Redding, Rossi, Pallonen, Prochaska, Abrams, Velicer, Plummer, Meier, Greene, & Rossi, 1999). The scale consists of four items assessing the influence of families on health behavior change of

parents or adults. Participants are asked how often in the past 30 days has their family encouraged, discussed, reminded, and shared ideas about physical activity. Participants are asked to rate each item on a scale of 1 to 5 (1 = Never, 2 = Rarely, 3 = Sometimes, 4 = Often, 5 = Almost Always). Copies of all questionnaires in English can be found in Appendix E of this document. The translated Slovak questionnaires are included in Appendix F.

Godin Leisure-Time Exercise Questionnaire (Godin, & Shepard, 1985) was used to assess levels of physical activity of individuals in our study. Participants were asked to complete a self-explanatory four-item survey assessing their usual leisure-time exercise habits during the 7-day period. Individuals were asked to report how many times on an average they perform Strenuous (heartbeats rapidly, e.g., running, jogging, hockey, basketball), Moderate (not exhaustive, e.g., fast walking, tennis, dancing, baseball), and Mild (requires minimal effort, e.g., yoga, fishing, golf, bowling) exercise for more than 15 minutes during their free time. Additional question assessed the frequency (often, sometimes, never) with which individuals engage in any activity long enough to work up a sweat (heart beats rapidly). Lastly, participants were asked to add the time that they spend in physical activity each day, and to report the number of days that they participated in strenuous or moderate activities for at least 30 minutes per day during the past seven days. Godin Leisure-Time Exercise Questionnaire contains unique items measuring different levels of physical activity; therefore, psychometric properties of this measure

have not been established.

International Physical Activity Questionnaire. A long version of IPAQ (Craig et al., 2003) was used to assess the types and levels of PA of individuals across five domains: (1) job-related PA measured by 7 items, (2) the transportation PA measured by 6 items, (3) housework, house maintenance, and caring for family measured by 6 items, (4) recreation, sport and leisure time PA measured by 6 items, and (5) time spent sitting measured by 2 items. The questions are aimed at assessing the amount of PA performed during the past seven days. IPAQ contains unique items measuring different levels and types of physical activities; therefore, psychometric properties of this measure have not been established.

Results

Measurement Models

Decisional Balance Inventory. Structural modeling was used to test the fit of four competing measurement models. A null model was used as a comparison model. A one-factor model was tested with the expectation that it would not fit well. The next models tested were the two-factor correlated and the two-factor uncorrelated models consisting of five Pros items and five Cons items.

As expected, one factor ten item model did not fit well. The two-factor correlated and uncorrelated models also did not fit reasonably well. One item on the Pros and one item on the Cons were removed because they did not load

well on their underlined factors (.52 and .19 respectively). One factor eight item model was tested again. As expected, the one factor eight item model did not fit well, $\chi^2(20) = 162.69$, $p < .001$, CFI = .43, RMSEA = .22. The two-factor correlated and uncorrelated models consisting of four items for the Pros and four items for the Cons provided a reasonable fit. A correlated two-factor eight item model resulted in a better fit compared to models that used five items per scale, $\chi^2(19) = 30.60$, $p = .04$, CFI = .95, RMSEA = .06. A correlated model was chosen as the best fitting model. Correlated model provides the evidence that the Pros and the Cons are unrelated. A low correlation ($r = -.12$) between the latent factors suggests that these two latent factors are in fact different. Figure 3.1 depicts the best fitting measurement model for the Pros and the Cons of exercising in Slovak population. The Coefficient Alphas were .76 for the Pros scale, and .72 for the Cons scale. The unadjusted means and standard deviations are presented in Table 3.3 Part I.

Situational Self-efficacy Inventory. Two competing measurement models for exercise Self-efficacy were tested using the structural modeling. A null model was used as a comparison model. A one-factor model was tested with the expectation that it would fit well. As expected, one factor model provided a good fit, $\chi^2(9) = 9.08$, $p = .43$, CFI = 1.00, RMSEA = .01. Figure 3.2 depicts the best fitting measurement model for exercise Self-efficacy in Slovak population. The Coefficient Alpha was .79 for the Self-efficacy scale. The unadjusted means and standard deviations are presented in Table 3.3 Part II.

Family Support Inventory. Two competing measurement models for Family Support Inventory were tested using structural modeling. A null model was used as a comparison model. A one-factor model was tested with the expectation that it would fit well. As expected, one factor model provided a good fit, $\chi^2(2) = 3.10$, $p = .21$, CFI = .997, RMSEA = .06. Figure 3.3 depicts the best fitting measurement model for exercise Family Support in Slovak population. The Coefficient Alpha was .86 for the Family Support Inventory. The unadjusted means and standard deviations are presented in Table 3.3 Part III.

Relationship between Measures and Stage of Change

Decisional Balance Inventory. A multiple analysis of variance (MANOVA) showed that decisional balance scales were significantly different across the Stages of Change, $F(6, 310) = 9.27$, $\lambda = .72$, $p < .001$, $1 - \lambda = .28$, $\eta^2 = .15$.

A follow-up one-way ANOVA showed that the Pros scale was significantly different across the Stages of Change, $F(3, 156) = 19.30$, $p < .001$, $\eta^2 = .27$. Post hoc tests showed that Precontemplators scored significantly lower on the Pros for exercise than participants in all other stages (Table 3.3 Part I). The Cons scale was not significantly different across the Stages of Change. The standardized Pros and Cons by stage for exercise are illustrated in Figure 3.4.

Situational Self-efficacy Inventory. One-way ANOVA showed that the Self-efficacy scale was significantly different across the Stages of Change, $F(3, 162) = 11.41$, $p < .001$, $\eta^2 = .17$. Post hoc tests showed that individuals in

Precontemplation and Preparation were significantly lower on Self-efficacy than participants in Action/Maintenance Stage (Table 3.3 Part II). The standardized Self-efficacy scores by stage for exercise are illustrated in Figure 3.5. The pattern of Situational Self-efficacy was not linear as expected.

Family Support Inventory. An ANOVA indicated that Family Support was significantly different across stages, $F(3, 180) = 7.01, p < .01, \eta^2 = .11$. Post-hoc analysis showed that individuals in Precontemplation experienced significantly lower Family Support for exercise compared to individuals in Preparation and Action/Maintenance (Table 3.3 Part III). The standardized Family Support scores by stage for exercise are illustrated in Figure 3.5.

Godin Leisure-Time Exercise Inventory. A MANOVA showed that total physical activity was significantly different across stages, $F(9, 443) = 12.58, \lambda = .58, p < .001, 1 - \lambda = .42, \eta^2 = .17$. Breakdown by intensity indicated that participation in Strenuous Physical Activities, $F(3, 184) = 38.54, p < .01, \eta^2 = .42$, and Moderate Physical Activities, $F(3, 184) = 8.70, p < .01, \eta^2 = .12$, was significantly different across stages. Mild Physical Activities did not differentiate between Stages. Post-hoc analyses showed that individuals in Precontemplation, Contemplation, and Preparation engaged significantly less in strenuous and moderate physical activities compared to individuals in Action/Maintenance (Table 3.3 Part IV). The standardized exercise behavior scores by stage for exercise are illustrated in Figure 3.6.

International Physical Activity Questionnaire. A MANOVA indicated that

IPAQ activities differentiated between stages, $F(42, 568) = 2.25$, $\lambda = .63$, $p < .001$, $1 - \lambda = .37$, $\eta^2 = .14$, with a medium effect. Post-hoc analyses indicated that job related vigorous activities, $F(3, 204) = 3.16$, $p < .05$, $\eta^2 = .04$, garden related vigorous activities, $F(3, 204) = 2.89$, $p < .05$, $\eta^2 = .04$, garden related moderate activities, $F(3, 204) = 2.89$, $p < .05$, $\eta^2 = .04$, structured vigorous activities, $F(3, 204) = 9.94$, $p < .001$, $\eta^2 = .13$, structured moderate activities, $F(3, 204) = 9.05$, $p < .001$, $\eta^2 = .12$, sitting on the weekend, $F(3, 204) = 2.97$, $p < .05$, $\eta^2 = .04$, and weekly sitting, $F(3, 204) = 3.27$, $p < .05$, $\eta^2 = .05$, differentiated between stages. Individuals in Contemplation ($M = 407.37$, $SD = 964.90$) engaged in significantly more vigorous job related activities than individuals in Preparation ($M = 67.25$, $SD = 149.43$). Individuals in Contemplation ($M = 426.32$, $SD = 908.38$) engaged in significantly more vigorous garden related activities than individuals in Preparation ($M = 98.63$, $SD = 191.78$). Individuals in Contemplation ($M = 642.63$, $SD = 1255.04$) engaged in significantly more moderate garden related activities than individuals in Precontemplation ($M = 222.93$, $SD = 486.46$) and Preparation ($M = 228.38$, $SD = 349.45$). Individuals in Action/Maintenance ($M = 206.28$, $SD = 231.58$) engaged significantly more in vigorous structured activities than individuals in Precontemplation ($M = 33.21$, $SD = 154.81$), Contemplation ($M = 22.11$, $SD = 45.65$), and Preparation ($M = 56.13$, $SD = 169.06$). Individuals in Action/Maintenance ($M = 143.72$, $SD = 190.71$) engaged significantly more in moderate structured activities than individuals in Precontemplation ($M = 21.86$, $SD = 104.66$), Contemplation ($M = 41.05$, $SD =$

84.98), and Preparation ($M = 37.13$, $SD = 102.13$). Individuals in Preparation were significantly higher on sitting in minutes on the weekends ($M = 283.89$, $SD = 242.05$) and during the entire week ($M = 605.70$, $SD = 400.25$) compared to individuals in Action/Maintenance (weekend: $M = 182.05$, $SD = 121.40$, week: $M = 418.21$, $SD = 258.68$). Pattern of vigorous job, garden, and structured exercise behavior across stages is illustrated in Figure 3.7. Pattern of moderate job, garden, and structured exercise behavior across stages is illustrated in Figure 3.8. Pattern of other lifestyle activities across stages is illustrated in Figure 3.9.

Discussion

The Stage of Change for exercise distribution replicates the distribution of adults across stages reported by previous studies (Marshall & Biddle, 2001, Prochaska & Velicer, 1997, Prochaska et al., 1994, Sarkin et al., 2001) with a majority of population distributed across the first three stages.

The results of this study support cross-sectional studies the Decisional Balance Inventory of Nigg and Courneya (1998), Prochaska (1994), Prochaska et al. (1994), and Sarkin et al. (2001) and provide additional evidence that the Pros of exercise increase across Stages, while the Cons decrease. The results also support the evidence that Cons outweigh the Pros in Precontemplation, and that the transition from Precontemplation to Contemplation is marked by a rapid increase in the Pros, followed by a decrease in the Cons. This study has shown that the Pros, but not the Cons, are important in differentiating between

the Stages and moving individuals across Stages. Marshall and Biddle (2001) reported similar results after conducting the meta-analysis of 80 studies; although, they did find a weak evidence supporting the relationship between the stages and the Cons.

The Self-efficacy Inventory also increased across Stages supporting the study of Nigg and Courneya (1998). The increase appears to be non-linear as reported by Marshall and Biddle (2001) who found only small to moderate effects sizes for the relationship between Self-efficacy and stages. Self-efficacy in this study differentiated between those in Precontemplation and Preparation from those in Action/Maintenance providing a partial support of Dannecker et al. (2003) who reported that Self-efficacy differentiated the early stages from the Action and Maintenance.

The Family Support Inventory is a new concept in the domain of exercise behavior. Individuals across different age groups may receive a support for exercise from different sources. Adolescents or young adults may receive family support mainly from parents, siblings, and peers or other family members whom regard as important, while adults may receive support from their significant others, or those that they hold in high regard. This study provides strong evidence suggesting that this construct may be a very important one in relation to Stages. Structured physical activities as measured by Godin Inventory increased linearly across the stages with a significant increase from Preparation to Action/Maintenance which further confirms the relationship between physical

activity and stages. This study also supports the results of Hausenblas et al. (1999), Schumann et al. (2002), and Schumann et al. (2003) showing that strenuous and moderate activities differentiate Action and Maintenance stages from Pre-Action stages in that individuals in Action and Maintenance tend to engage significantly more in strenuous and moderate activities.

In this study, individuals in Pre-Action stages seem to engage more in lifestyle physical activities compared to individuals in Action/Maintenance. Godin and IPAQ measures showed that individuals in Action/Maintenance engage significantly more in structured physical activities compared to individuals in Pre-Action stages. Because individuals in Pre-Action stages engage in significantly more lifestyle activities, it could explain that they would less likely to engage in structured exercise due to lack of time or energy.

These results support the psychometric strength and construct validity of these measures as one basis for tailored interventions to increase exercise behavior in adults. Overall, this study supports other research that have found a consistent pattern of relationships between the Pros, Self-efficacy, and Stages. The relationship between the Cons and Stages remains unclear, and more research in this area is required. This study confirmed relationships between the TTM measures and Stages of Change for Slovak adults. The relationship between Family Support Inventory and Stages was also confirmed. Validation of these constructs against Stages of Change in a Slovak sample provides a strong support for the model of behavior change, and a strong support for

stability of these measures across different cultures.

Limitations. One of the limitations is a relatively small sample size.

Optimal sample size for structural equation procedures would be about 100 participants per group. In this study, individuals were staged into five Stages of Change with less than 100 participants per stage. Only six individuals were in Action stage; therefore, action and maintenance stages were combined.

Translation of measures requires further improvements. Some participants indicated that questionnaire was difficult to understand, and that the instructions were difficult to follow. Answering questions using Likert scale categories seemed to be problematic in that instead of using the scale to answer a set of questions, several individuals selected only one option from the Likert scale and matched this option to a single item on the questionnaire. Different assessment approach needs to be explored when working with populations in different cultures.

Some physical activity data were not normally distributed across the sample, and were positively skewed and leptokurtic. Logarithmic transformation did not correct the distribution. The amount of physical activities varies widely across individuals; therefore, removing extreme cases does not seem feasible and would not describe accurately exercise behavior across population.

Future Directions. Future studies should validate the relationship between Family Support and Stages, as well as further evaluate the Cons of exercise. Family Support is a promising concept and could be valuable part of

interventions to change exercise behavior. Validation of the TTM measures across different cultures requires numerous replications.

In the future, improved translation of the measures should be used when working with the Slovak population. This study was the first to use the TTM, Family Support, and Physical Activity instruments in Slovakia, and they provide a good starting point for the future explorations.

References

- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, 84, 191-215.
- Benisovitch, S. V., Rossi, J. S., Norman, G. J., & Nigg, C. R. (1998). Development of a multidimensional measure of exercise self-efficacy. *Annals of Behavioral Medicine*, 20, S190 (Abstract).
- Carpenter, M. (1997). Slovakia and the triumph of nationalist populism. *Communist and Post-Communist Studies*, 30, 205-220.
- Centers for Disease Control and Prevention. (1996). *Physical activity and health in Adults. A report of the surgeon general*. Atlanta, GA: Author.
- Craig, C. L., Marshall, A. L., Sjöström, M., Bauman, A. E., Booth, M. L., Ainsworth, B. E., Pratt, M., Ekelund, U., Yngve, A., Sallis, J. F., & Oja, P. (2003). International Physical Activity Questionnaire: 12-country reliability and validity. *Medicine and Science in Sports and Exercise*, 35, 1381-1395.
- Dannecker, E. A., Hausenblas, H. A., Connaughton, D. P., & Lovins, T. R. (2003). Validation of a stages of exercise change questionnaire. *Research Quarterly for Exercise and Sport*, 74, 236-247.
- Dishman, R. K. (1988). Exercise adherence research: Future directions. *American Journal of Health Promotion*, 3, 52-56.

- Fine, L. J., Philogene, G. S., Gramling, R., Coups, E. J., & Sinha, S. (2004). Prevalence of multiple chronic disease risk factors: 2001 National health interview survey. *American Journal of Preventive Medicine*, 27, 18-24.
- Godin, G., & Shepard, R.J. (1985). A simple method to assess exercise behavior in the community. *Canadian Journal of Applied Sport Sciences*, 10, 141-146.
- Janis, I. L., & Mann, L. (1977). Decision making: A psychological analysis of conflict, choice and commitment. New York: Free Press.
- Haase, A., Steptoe, A., Sallis, J. F., Wardle, J. (2004). Leisure-time physical activity in university students from 23 countries: Associations with health-beliefs, risk awareness, and national economic development. *Preventive Medicine*, 39, 182-190.
- Hausenblas, H. A., Dannecker, E. A., Connaughton, D. P., & Lovins, T. R. (1999). Examining the validity of the stages of exercise change algorithm. *American Journal of Health Studies*, 15, 94-99.
- Hlavačka, S., Wágner, R., & Riesberg, A. (2004). *Health Care Sustems in Transition: Slovakia*. Copenhagen: WHO Regional Office for Europe on behalf of the European Observatory on Health Systems and Policies.
- Laforce, R.G., Velicer, W.F., Richmond, R.L., & Owen, N. (1999). Stage distributions for five health behaviors in the United States and Australia. *Preventive Medicine*, 28, 61-74.

Mackay, J., & Mensah, G. (2004). *The Atlas of Heart Disease and Stroke*.

Geneva: WHO Marketing and Dissemination and CDC monserial publication.

Marcus, B. H., Rakowski, W. & Rossi, J. S. (1992). Assessing motivational readiness and decision-making for exercise. *Health Psychology*, 11, 257-261.

Marshall, S. J., & Biddle, J. H. (2001). The transtheoretical model of behavior change: A meta-analysis of applications to physical activity and exercise. *Annals of Behavioral Medicine*, 23, 229-246.

National Center for Chronic Disease Prevention and Health Promotion. (2004). *Chronic Disease Prevention: Overview*. Atlanta, GA: Author.

Nigg, C.R., & Courneya, K.S. (1998). Transtheoretical model: Examining adolescent exercise behavior. *Journal of Adolescent Health*, 22, 214-224.

Nigg, C.R., Rossi, J.S., Norman, G.J., & Benisovich, S.V. (1998). Structure of decisional balance for exercise adoption. *Annals of Behavioral Medicine*, 20, S211.

Plotnikoff, R.C., Hotz, S.B., Birkett, N.J., & Courneya, K.S. (2001). Exercise and the transtheoretical model: A longitudinal test of a population sample. *Preventive Medicine*, 33, 441-452.

- Prochaska, J.O. (1994). Strong and weak principles for progressing from precontemplation to action on the basis of twelve problem behaviors. *Health Psychology, 13*, 47-51.
- Prochaska, J.O., Velicer, W.F., Rossi, J.S., Goldstein, M.G., Marcus, B.H., Rakowski, W., Fiore, C., Harlow, L.L., Redding, C.A., Rosenbloom, D., & Rossi, S.R. (1994). Stages of change and decisional balance for 12 problem behaviors. *Health Psychology, 13*, 39-46.
- Prochaska, J.O., & Velicer, W.F. (1997). Stages of change: The temporal dimension of the transtheoretical model. *American Journal of Health Promotion, 12*, 38-48.
- Reed, G. R., Velicer, W. F., Prochaska, J. O., Rossi, J. S. & Marcus, B. H. (1997). What makes a good staging algorithm: Examples from regular exercise. *American Journal of Health Promotion, 12*, 57-67.
- Redding, C.A., Rossi, J.S, Pallonen, U.E., Prochaska, J.O., Abrams, D.B., Velicer, W.F., Plummer, B., Meier, K., Greene, G.W., & Rossi, S.R. (1999). Measures of family influence on healthy behavior changes in parents of adolescents. *Annals of Behavioral Medicine, 21*, S174 (Abstract).
- Saelens, B. E., Sallis, J. F., & Frank, L. D. (2003). Environmental correlates of walking and cycling: Findings from the transportation, urban design, and planning literature. *Annals of Behavioral Medicine, 25*, 80-91.

- Sarkin, J.A., Johnson, S.S., Prochaska, J.O., & Prochaska, J.M. (2001). Applying transtheoretical model to regular moderate exercise in an overweight population: Validation of a stages of change measure. *Preventive Medicine, 33*, 462-469.
- Schumann, A., Estabrooks, P. A., Nigg, C. R., & Hill, J. (2003). Validation of the stages of change with mild, moderate, and strenuous physical activity behavior, intentions, and self-efficacy. *International Journal of Sports Medicine, 24*, 363-365.
- Schumann, A., Nigg, C. R., Rossi, J. S., Jordan, P. J., Norman, G. J., Garber, C. E., Riebe, D., & Benisovich, S. V. (2002). Construct validity of the stages of change of exercise adoption for different intensities of physical activity in four samples of differing age groups. *American Journal of Health Promotion, 16*, 280-287.
- Velicer, W.F., DiClemente, C.C., Prochaska, J.O., & Brandenburg, N. (1985). A decisional balance model for assessing and predicting smoking status. *Journal of Personality and Social Psychology, 48*, 1279-1289.
- Velicer, W.F., DiClemente, C.C., Rossi, J.S., & Prochaska, J.O. (1990). Relapse situations and self-efficacy: An integrative model. *Addictive Behaviors, 15*, 271-283.
- Velicer, W.F., Prochaska, J.O. (1999). An expert system intervention for smoking cessation. *Patient Education and Counseling, 36*, 119-129.

Velicer, W.F., Prochaska, J.O., Fava, J.L., Rossi, J.S., Redding, C.A., Laforge, R.G., & Robbins, M.L. (2000). Using the transtheoretical model for population-based approaches to health promotion and disease prevention. *Homeostasis in Health and Disease*, 40, 174-195.

Table 3.1. *Participant Characteristics*

	<i>N</i>	<i>%</i>
<i>Gender (N = 210)</i>		
Male	52	24.8
Female	158	75.2
<i>Nationality (N = 211)</i>		
Slovak	177	83.9
Hungarian	17	8.1
Czech	15	7.1
Ukrainian	2	.9
<i>Marital status (N = 213)</i>		
Married	127	59.6
Living with a partner	10	4.7
Not married	55	25.8
Divorced	17	8.0
Widowed	4	1.9
<i>Employment (N = 212)</i>		
Employed for wages	156	73.6
Self employed	10	4.7
Out of work over 1 year	1	.5
Out of work under 1 year	1	.5
Student	33	15.6
Retired	11	5.2
	110	

Health in general (N = 209)

Poor	11	5.3
Fair	36	17.2
Good	94	45.0
Very Good	47	22.5
Excellent	21	10.0

Do you smoke? (N = 213)

No	169	79.3
Yes	44	20.7

*Children age 18 or less
who live with you (N = 209)*

Yes	51	24.4
No	158	75.6

	<i>Mean</i>	<i>SD</i>
<hr/>		
Age (N = 195)	41	13.80
If smoke, number of cigarettes per day (N = 40)	10.13	6.76
Height (inches) (N = 207)	66.56	3.53
Weight (lb) (N = 204)	153.55	29.00
Annual income(\$)(N = 106)*	3713.11	2303.86

* One extreme case was excluded (Income = \$46,308.21)

Table 3.2. *Total walking, vigorous, and moderate physical activities pertaining to job, gardening, transportation, and leisure-time.*

	N	Mean	SD
<i>Total Leisure-Time Activity</i>			
Walking: Transportational, Job, Leisure	204	1042.11	1296.68
Vigorous: Job, Gardening	213	321.31	771.62
Moderate: Job, Gardening, Household	213	885.14	1380.66
<i>Breakdown by Activity</i>			
Job related vigorous	78	145.77	660.81
Job related moderate	81	223.22	876.68
Job related walking	94	324.01	770.64
Motor vehicle	179	380.32	553.63
Biking	76	27.28	159.50
Transportational walking	165	417.32	642.88
Garden related vigorous	97	175.54	606.37
Garden related moderate	133	276.06	698.89
Household related moderate	164	385.87	806.31
Leisure walking	160	256.74	578.54
Vigorous Structured PA	97	71.74	241.05
Moderate Structured PA	96	51.10	172.87
Sitting on a weekday	199	278.05	188.56
Sitting on a weekend	200	247.66	189.43
Sitting - whole week	202	525.71	325.02

Table 3.3. *Decisional Balance, Self-efficacy, Family Support, and Godin across Stages: Means, Standard Deviations, and T-scores.*

Stage		N	Mean	SD	T-Score
<i>Part I. Decisional Balance</i>					
Pros	Precontemplation	52	9.98	4.00	42.78
	Contemplation	15	13.93	3.56	51.98
	Preparation	67	14.43	3.62	53.14
	Action/Maintenance	34	14.79	3.87	53.98
Cons	Precontemplation	49	6.47	3.65	51.85
	Contemplation	14	6.21	2.36	50.93
	Preparation	64	5.63	1.94	48.81
	Action/Maintenance	33	5.73	2.81	49.17
<i>Part II. Self-efficacy</i>					
Precontemplation		49	11.98	5.14	45.60
Contemplation		14	18.07	7.11	55.01
Preparation		70	14.11	6.33	48.90
Action/Maintenance		33	19.18	5.65	56.73
<i>Part III. Family Support</i>					
Precontemplation		58	8.21	3.62	45.57
Contemplation		17	10.06	3.58	49.73
Preparation		74	10.89	4.61	51.60
Action/Maintenance		35	12.00	4.68	54.09

Part IV. Godin Leisure Time Inventory

Strenuous PA Behavior				
Precontemplation	60	3.00	9.18	45.32
Contemplation	18	7.00	14.98	47.99
Preparation	74	7.36	9.58	48.23
Action/Maintenance	38	28.42	16.94	62.32

Moderate PA Behavior				
Precontemplation	61	8.20	10.76	47.87
Contemplation	18	11.11	22.72	50.20
Preparation	77	9.09	8.76	48.59
Action/Maintenance	39	18.97	12.42	56.48

Mild PA Behavior				
Precontemplation	63	13.52	7.17	50.04
Contemplation	19	12.32	8.83	48.41
Preparation	77	14.42	7.38	51.25
Action/Maintenance	39	12.54	7.18	48.71

Total PA				
Precontemplation	63	24.32	17.36	46.09
Contemplation	19	29.47	28.44	48.26
Preparation	78	30.19	16.23	48.56
Action	39	59.21	26.61	60.74

Figure 3.1. Structural model of decisional balance measure for the Slovak sample

Figure 3.2. Structural model of Self-efficacy measure for the Slovak sample.

Figure 3.3. Structural model of Family Support measure for the Slovak sample.

Figure 3.4. The Pros and the Cons across Stages.

Figure 3.5. Situational Self-efficacy and Family Support across Stages.

Figure 3.6. Godin Structured Physical Activities across Stages.

Figure 3.7. IPAQ Vigorous Physical Activities across Stages.

Figure 3.8. IPAQ Moderate Physical Activities across Stages.

Figure 3.9. IPAQ Lifestyle Physical Activities across Stages.

Chapter 4

Cross-Cultural Invariance of the Decisional Balance, Situational Self-efficacy, Family Support, and Godin Exercise Measures

Introduction

The amount and types of physical activities practiced by individuals vary across as well as within a culture. These variations are often a function of gender, age race, ethnicity, education, economic status, geographic region, or residence. Cross-cultural comparisons could provide important, more generalizable, and more culture specific information on factors that influence exercise participation, which is of crucial importance when promoting physical activity among culturally and ethnically diverse populations. More studies are needed in order to determine with greater consistency patterns of physical activity and exercise across diverse cultures. In view of that, the purpose of this study was to evaluate factorial invariance of the Decisional Balance, Situational Self-efficacy, and Family Support measures and to compare exercise participation across two different cultures, Slovakia and the United States. The models of factorial invariance test the structure of a model or parameters, and when parallel data exist across groups we have a powerful indication of equivalence across groups (Deng, Doll, Hendrickson & Scazzero, 2005). Measurement models that are invariant across groups provide increase the validity of structural parameters of a measure (Deng et al., 2005).

Justification of Cultural Selection. Slovakia was selected because it is culturally, ethnically, geographically environmentally, economically, politically different from the U.S. In recent years, associations between environmental attributes and physical activity have received some consideration. Slovakia, unlike the U.S, contains historically older towns and cities that are designed to facilitate walking. These types of towns and cities are characterized by a high walkability. According to Sallis, Kraft, and Linton (2002), only few studies within the health field in recent years focused on the impact of environmental correlates on physical activity. These few studies show consistent associations between environmental variables and physical activity by providing some evidence that people walk and cycle more for transportation when they live in traditional communities where they can walk to shops compared to more "modern" auto-dependent communities (Sallis et al., 2002).

Owen, Humpel, Leslie, Bauman, and Sallis, (2004) reviewed studies on objective and perceived environmental attributes and walking. Environmental attributes such as aesthetic nature of the local environment, the convenience of facilities for walking (footpaths, trails), accessibility of places to walk to (shops, beach), level of traffic on roads, and their composites were strongly associated with walking for specific purposes (Owen et al., 2004).

Walking is an important activity practiced by people in Slovakia on regular bases due to economical, social, and environmental factors that differ from those in the U.S. Therefore; we may find differences in the amount of

physical activity practiced within these two cultures. Environmental disparities between the U.S. and Slovakia may suggest that walking and cycling activities would be more common among Slovaks compared to the Americans.

Cross-cultural physical activity studies. Steptoe, Wardle, Cui, Bellisle, Zotti, Baranyai, and Sanderman (2002) identified a large cross-cultural variation in the levels of exercise among University students between 1990 and 2000 across 13 European countries. In 1990, the prevalence of physical exercise ranged from 52.6% in Portugal to 87.6% in Hungary for males, and from 29.4% in Greece to 95% in Hungary for females. In 2000, the prevalence of the physical activity defined as any exercise in the past two weeks ranged from 60.4% in Portugal to 87.8% in Poland for males and from 36.7% in Portugal to 87.4% in Hungary for females.

Haase, Steptoe, Sallis, and Wardle (2004) assessed leisure-time physical activity among university students in 23 countries (Belgium, Bulgaria, Colombia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, South Korea, the Netherlands, Poland, Portugal, Romania, Slovakia, South Africa, Spain, Thailand, United Kingdom, United States, and Venezuela). Researchers clustered the countries using cultural, geographical, and political criteria, resulting in following groupings: (1) North-Western Europe and the United States, (2) the former socialist states of Central and Eastern Europe (including Slovakia), (3) Mediterranean countries, (4) Pacific-Asian countries, and (5) developing countries. Haase et al. (2004) examined physical activity

across clusters and found that physical inactivity was the lowest in a group of North-Western countries and the United States (21%), and the highest in developing countries (35%). Physical inactivity in countries of Central and Eastern Europe was 25%, and in Mediterranean countries 30%. Haase et al. (2004) also examined physical activity rates across each individual country. Looking at the two countries of our interest, physical inactivity prevalence rates were slightly higher in Slovakia (about 19% for males, and 28% for females) compared to the U.S. (about 12% for males, and 15% for females). In their study, the rates of physical inactivity among university students are rather low and do not reflect the rates of physical inactivity reported by studies that examined physical inactivity among adults. Different rates may also reflect cultural differences in educational structure. University curricula in the U.S. is different compared to some other countries, and allows for greater exercise and physical activity participation.

Haase et al. (2004) also compared knowledge about the association between heart disorders and physical activity across each individual country and reported that the knowledge was highest in Slovakia (about 76% of men and 73% of females), and lowest in South Africa (slightly above 10% for both males and females). In the U.S., about 47% of females and 46% of males knew about the effects of physical activity on heart disease.

Benefits of Physical Activity

At least 50% of premature mortality is due to health behaviors in general

(Velicer, & Prochaska, 1999). Physical activity is an important behavior for the prevention of chronic diseases, and accounts for about 14% of premature mortality (National Center for Chronic Disease Prevention and Health, 2004). Regular exercise reduces (1) the risk of dying from coronary heart disease, (2) reduces the risk of developing high blood pressure, colon cancer, and diabetes, (3) reduces blood pressure in some people with hypertension, (4) helps maintain healthy bones, muscles, and joints, (5) reduces symptoms of anxiety and depression, and fosters improvements in mood and feelings of well-being, and (6) helps control weight, develop lean muscle, and reduce body fat (Centers for Disease Control and Prevention, 1996).

Despite the fact that regular exercise is known to be beneficial to overall health, reduces obesity, reduces risk of cardiovascular episodes, and relieves stress, tension, and anxiety, adherence to exercise seems to be very low (Nigg & Courneya, 1998). According to Dishman (1988), 50% of individuals who engage in exercise end up dropping out after three to six months. Effective intervention programs are necessary to increase the adherence to exercise. Designing effective interventions requires development of reliable measures, and measures that are stable across different situations and populations.

Transtheoretical Model

This study was aimed at confirming the stability of TTM measures that serve as bases of successful behavioral interventions.

Stages of Change. TTM views changes in behaviors as processes that

involve progression through five Stages named Precontemplation, Contemplation, Preparation, Action, and Maintenance (Velicer, Prochaska, Fava, Rossi, Redding, Laforge, & Robbins, 2000). (1) *Precontemplation* is the stage in which individuals have no intention to change within the next six months. These individuals are often unmotivated to change, or they resist change. (2) *Contemplation* is the stage in which individuals have intentions to change within the next six months. These individuals often experience a balance between the Pros and the Cons of changing behavior. Some individuals tend to be stuck in this stage for long periods, and are often characterized as chronic contemplators. (3) *Preparation* is the stage in which individuals have intentions to change in the immediate future, often within a month. Individuals in Preparation stage have taken some significant action towards behavior change in the past year, and they often have some plans to change their behavior. (4) *Action* is the stage in which individuals have already made specific modifications in their lifestyles within the past six months. These modifications are observable; however, complete behavior change is not yet accomplished. (5) *Maintenance* is the stage in which individuals work on consolidating the gains they achieved in Action in order to prevent relapse.

Decisional Balance. Decisional balance reflects individuals' assessment and balancing of the Pros (advantages) and the Cons (disadvantages) that are associated with target behavior (Velicer et al., 2000). The Pros and the Cons vary across the Stages of Change. Decisional Balance was developed on the

basis of Decisional Balance Sheet developed by Janis and Mann (1977) who described decision making process as weighing potential gains and losses. The model represents both cognitive and motivational aspects of decision making process (Velicer, DiClemente, Prochaska, & Brandenburg, 1985).

Self-efficacy. Self-efficacy is a measure of individuals' confidence in being able to cope with high-risks situations without relapsing to earlier Stages (Velicer et al., 2000). Bandura (1977) conceptualized Self-efficacy as a confidence in ability to successfully perform a behavior in order to obtain a desirable outcome. Multiple Self-efficacy constructs have been examined and used in the past to assess high and low risk relapse situations such as positive/social, negative/affective, habit/addictive (Velicer, DiClemente, Rossi, & Prochaska, 1990). In exercise domain, Self-efficacy assesses the confidence of individuals to exercise in different situations.

TTM and Exercise.

Exercise stage distributions and stage transitions using the constructs of TTM have been addressed by several studies (Laforge, Velicer, Richmond, & Owen, 1999; Nigg & Courneya, 1998; Plotnikof, Hotz, Birkett, & Courneya, 2001; Prochaska, 1994; Prochaska, Velicer, Rossi, Goldstein, Marcus, Rakowski, Fiore, Harlow, Redding, Rosenbloom, & Rossi, 1994; Prochaska & Velicer, 1997; Sarkin, Johnson, Prochaska, & Prochaska, 2001; Velicer & Prochaska, 1999). According to these studies, a majority of adult population is distributed in the first three Stages (Precontemplation, Contemplation, and

Preparation). Marshal and Biddle (2001) examined exercise stage distribution across 80 studies and showed that stage distribution across various countries is quite stable with most individuals distributed in the first three Stages.

Cross-sectional studies of Nigg and Courneya (1998), Prochaska (1994), Prochaska et al. (1994), and Sarkin et al. (2001) reflected the concept of the TTM by providing evidence that the Pros of exercise tend to increase across Stages, while the Cons tend to decrease. Nigg and Courneya (1998), Prochaska (1994), and Prochaska et al. (1994) reported that the Pros increased across Stages, while the Cons decreased. Sarkin et al. (2001) showed that the Cons outweighed the Pros in Precontemplation, the transition from Precontemplation to Contemplation was marked by a rapid increase in the Pros, followed by a decrease in the Cons. Nigg and Courneya (1998) also examined pattern of Self-efficacy and demonstrated its' increase across Stages.

Dannecker, Hausenblas, Connaughton, & Lovins (2003) assessed the relationship between a 12-item barrier Self-efficacy scale and Stages. Significant differences between Self-efficacy across Stages were found. Discriminant function analysis indicated that Self-efficacy differentiated the early Stages from the Action and Maintenance. Limited amount of research on exercise and TTM shows a consistent pattern of relationships between the Pros, Self-efficacy, and Stages. The relationship between the Cons and Stages is not well established, and more research in this area is required.

Current Study

The aims of this study were to (1) test the structural invariance of three Transtheoretical Model (TTM) measures (Decisional Balance Inventory, Situational Self-efficacy Inventory, and Family Support Inventory) across two different cultures, and (2) comparing physical activity participation across the same two different cultures. The analysis compared the internal or factorial validity of the measures, the exercise Stages of Change distribution, and the relation between the Stages of Change and the Pros and Cons scales from the Decisional Balance Inventory, the Situational Temptations Inventory, Family Support Inventory, and exercise behavior. Exercise behavior was assessed by Godin Leisure Time Activity Inventory in both Slovak and the U.S. samples.

Method

Participants.

USA Sample. The U.S. database ($N = 347$) was obtained from the principal investigator at the University of Rhode Island with prior permission. A majority of participants were females (64%). Ethnicity of participants was representative of Rhode Island population with a majority being of White origin (93.7%). Most participants were married (US=75%), and employed for wages (US=75%). Thirty-eight percent of U.S. participants indicated that they were in a good health, 12.2% indicated an excellent health, and only .6% indicated a poor health. The mean age of the U.S. participants was 46.83 between the ages of 33 and 81. Distribution of the U.S. individuals across Stages indicated that 94

(27.1%) participants were in Precontemplation, 66 (19%) in Contemplation, 147 (42.4%) in Preparation, 40 (11.5%) in Action.

Slovakia Sample. The sample consisted of participants living in the city in eastern part of Slovakia (in and around the city of Košice). Data collected from Slovak participants ($N = 213$) were entered into SPSS and EQS databases. A majority of participants were females (75%). Nationality of participants was representative of Slovak population with a majority being of Slovak origin (84%). The Czech ethnic group was overrepresented (7.1%) compared to the general population (0.8%) of Czechs living in Slovakia. Most were married (60%), and employed for wages (74%). Forty-five percent of Slovak participants indicated that they were in a good health, 10% indicating an excellent health, and only 5.3% indicating poor health. The mean age of Slovak participants was 41 between the ages of 18 and 83 (See Table 4.1). Distribution of Slovak individuals across Stages indicated that 70 (32.9%) participants were in Precontemplation, 19 (8.9%) in Contemplation, 80 (37.6%) in Preparation, 39 (18.3%) in Action or Maintenance. Five (2.3%) individuals could not be staged. Action and Maintenance Stages were merged into one stage due to a very small number of individuals in Action stage ($N = 6$). All analyses were performed using four Stages of Change (Precontemplation, Contemplation, Preparation, and Action+Maintenance).

Demographic Differences between Samples. Chi-square test (χ^2) was performed to determine if the demographic characteristics of individuals in the

Slovak sample differs from the demographic characteristics of individuals in the U.S. sample. The results indicated that the U.S. and the Slovak participants were distributed differently across gender, $\chi^2(1, N = 557) = 7.65, p < .01$, health in general, $\chi^2(4, N = 528) = 22.07, p < .001$, marital status, $\chi^2(5, N = 531) = 83.70, p < .001$, and employment status, $\chi^2(6, N = 530) = 71.75, p < .001$. Non-parametric chi-square test indicated that males, $\chi^2(1, N = 177) = 30.11, p < .001$, and females, $\chi^2(1, N = 380) = 10.78, p < .001$, were distributed differently across cultures. Within the general health category, the distribution of the Slovak and the U.S. samples was different for those who reported poor, $\chi^2(1, N = 13) = 6.23, p < .05$, very good, $\chi^2(1, N = 162) = 28.54, p < .001$, and excellent health, $\chi^2(1, N = 60) = 5.40, p < .05$. Within the marital status category, the distribution of the Slovak and the U.S. samples was different for those who were married, $\chi^2(1, N = 365) = 33.76, p < .001$, single, $\chi^2(1, N = 59) = 44.09, p < .001$, and divorced, $\chi^2(1, N = 64) = 14.06, p < .001$. Within the employment category, the distribution of the Slovak and the U.S. samples was different for those who were: employed for wages, $\chi^2(1, N = 394) = 17.07, p < .001$, self-employed, $\chi^2(1, N = 37) = 7.81, p < .01$, out of work for more than one year, $\chi^2(1, N = 10) = 6.40, p < .05$, out of work for less than one year, $\chi^2(1, N = 12) = 8.33, p < .01$, and students, $\chi^2(1, N = 36) = 25.00, p < .001$. Table 4.1 summarizes the characteristics of all participants.

Procedure.

USA Sample. An existing U.S. sample obtained from a study conducted

at the University of Rhode Island was matched to the Slovak sample.

Slovakia Sample. The sample consisted of participants who agreed to participate in this study voluntarily. The collection of data was accidental using "snowballing" data collection methods. Data collection and translation of questionnaires procedures are described in Dye (2006-b). To participate in the study, participants had to be at least 18 years old. There were no other exclusionary criteria.

Procedures of the Institutional Review Board (IRB), College of Sciences Human Participation Committee and guidelines of APA ethical standards for research were followed. Participation was voluntary, and anonymity of all participants was assured. No names were attached to any of the surveys.

Measures.

The assessment in both samples were text-based. No direct contact between the source and the receiver was necessary (Velicer & Prochaska, 1999). Demographic questionnaire, Godin Leisure Time Activity, and International Physical Activity Questionnaire, Stages of Change, Decisional Balance, Self-efficacy, and Family Support measures were used in this study, and are described below.

Demographic Questionnaire. Demographic questionnaire included questions about participant's age, gender, nationality of the Slovak sample (Slovak, Hungarian, Roma, Czech, Ruthenian, Ukrainian, German, Polish, and Other), and ethnicity of the U.S. sample, overall health status, marital status,

smoking habits, school and/or work commitments (part-time, full time, or no commitments).

Godin Leisure-Time Exercise Inventory (Godin, & Shepard, 1985) was used to assess levels of physical activity of individuals in our study. Participants were asked to complete a self-explanatory four-item survey assessing their usual leisure-time exercise habits during the 7-day period. Individuals were asked to report how many times on an average they perform Strenuous (heartbeats rapidly, e.g., running, jogging, hockey, basketball), Moderate (not exhaustive, e.g., fast walking, tennis, dancing, baseball), and Mild (requires minimal effort, e.g., yoga, fishing, golf, bowling) exercise for more than 15 minutes during their free time. Additional question assessed the frequency (often, sometimes, never) with which individuals engage in any activity long enough to work up a sweat (heart beats rapidly). Lastly, participants were asked to add the time that they spend in physical activity each day, and to report the number of days that they participated in strenuous or moderate activities for at least 30 minutes per day during the past seven days. Godin Leisure-Time Exercise Questionnaire contains unique items measuring different levels of physical activity; therefore, psychometric properties of this measure have not been established.

Stages of Change Algorithm (Schumann, Nigg, Rossi, Jordan, Norman, Garber, Riebe, & Benisovich, 2002). The short form of the Stages of Change was used to assess a status of an individual in a cycle of change. Survey

describes regular exercise as any planned physical activity (i.e., brisk walking, jogging, bicycling) performed to increase fitness, performed at least 4 or more times per week with duration of 30 or more minutes per occasion, and performed at a level that would increase breathing rate and cause sweating. The Precontemplation item is defined as not exercising, and having no intention to exercise in the future. The Contemplation item is defined as having intention to begin regular exercise within next 6 months. Preparation item is defined as having intention to begin regular exercise within 30 days. Action item is defined as participating in a regular exercise for less than 6 months. Maintenance item is defined as exercising regularly for more than 6 months. Individuals will be placed into a stage for which they obtained the highest score. This algorithm differs from the algorithm proposed by Marcus, Rakowski, & Rossi (1992) in how the Preparation stage is defined. The Marcus version did not have behavioral intention as part of definition of Preparation; therefore, was inconsistent with the TTM (Reed, Velicer, Prochaska, Rossi, & Marcus, 1997).

Decisional Balance Inventory (Nigg, Rossi, Norman, & Benisovich, 1998). Decisional balance inventory assesses advantages (the Pros) and disadvantages (the Cons) of engaging in a regular exercise. It consists of five questions assessing the Pros of exercising, and five questions assessing the Cons of exercising. Individuals are asked to report on the five point scale (5 = Not Important, 4 = A little bit Important, 3 = Somewhat important, 2 = Quite important, and 1 = Extremely important) how important would the provided

statements be in their decision to exercise or not to exercise. Lower scores on the Pros and higher scores on the Cons items indicate that an individual views exercise as being advantageous, while higher scores on the Pros and lower scores on the Cons indicate that an individual perceives exercise as disadvantageous.

Situational Self-efficacy Inventory (Benisovich, Rossi, Norman, & Nigg, 1998). The scale looks at the confidence of individuals to exercise when other things get in the way. The scale consists of six questions assessing the confidence to exercise under variety of circumstances. Participants are asked to rate items on a scale from 1 to 5 (1= Not at all confident, 2= Somewhat confident, 3= Moderately confident, 4= Very confident, 5= Completely confident). Higher scores indicate higher level of confidence that individuals have to exercise when different things get in their way.

Family Support Inventory (Redding, Rossi, Pallonen, Prochaska, Abrams, Velicer, Plummer, Meier, Greene, & Rossi, 1999). The scale consists of four items assessing the influence of families on health behavior change of parents or adults. Participants are asked how often in the past 30 days has their family encouraged, discussed, reminded, and shared ideas about physical activity. Participants are asked to rate each item on a scale of 1 to 5 (1 = Never, 2 = Rarely, 3 = Sometimes, 4 = Often, 5 = Almost Always). Copies of all the questionnaires in English can be found in Appendix E of this document. The translated Slovak questionnaires are included in Appendix F.

Results

Invariance Models

This study tested four types of structural invariance. (1) Configural Invariance requires only that the primary loadings be on the same factor. (2) Weak Factorial Invariance constrains model loadings to be proportional. (3) Pattern Identity Invariance constrains factor loadings to be the same across models, and (4) Strong Factorial Invariance constrains factor loadings, error variances, means, and standard deviations.

Decisional Balance Inventory. The best fitting four-item Decisional Balance models reported in Dye (2006-a) for the U.S. sample and in Dye (2006-b) for the Slovak sample were examined for structural invariance. The invariance test showed that the Pattern Identity Invariance provided a good fit to the model, $\chi^2(46) = 107.77$, $p = .00$, CFI = .93, RMSEA = .05 (Table 4.2).

Figure 4.1 presents the best fitting models for the Slovak and the U.S. samples.

Self-efficacy Inventory. A one-factor exercise Self-efficacy measurement model reported in Dye (2006-a) for the U.S. sample and in Dye (2006-b) for the Slovak sample was tested for invariance. The invariance test indicated that the Pattern Identity Invariance provided a good fit to the model, $\chi^2(24) = 31.51$, $p = .14$, CFI = .99, RMSEA = .03 (Table 4.2). Figure 4.2 presents the best fitting models for the Slovak and the U.S. samples.

Family Support Inventory. Family Support measurement model was also tested for invariance across cultures. A one-factor exercise Family Support

measurement model reported in Dye (2006-a) for the U.S. sample and in Dye (2006-b) for the Slovak sample was tested for invariance. The invariance test indicated that the Pattern Identity Invariance provided a good fit to the model, $\chi^2(8) = 20.08$, $p = .01$, CFI = .99, RMSEA = .05 (Table 4.2). Figure 4.3 presents the best fitting models for the Slovak and the U.S. samples.

Relationship between Measures and Stages of Change

Decisional Balance Inventory. A 2x4 MANOVA revealed a significant main effect of Stages on the Pros and the Cons of exercise indicating that the levels of the Pros and the Cons across Stages of Change were different, $F(6, 996) = 19.33$, $\Lambda = .80$, $p < .001$, $1-\Lambda = .20$, $\eta^2 = .10$. A follow up ANOVA revealed that only the Pros differentiated between the Stages of Change, $F(3, 499) = 38.83$, $p < .001$, $\eta^2 = .19$. Post hoc analysis showed that individuals in Precontemplation scored significantly lower ($M = 11.09$, $SD = .31$) on the Pros of exercise than individuals in Contemplation ($M = 14.28$, $SD = .52$), Preparation ($M = 15.20$, $SD = .27$), and Action/Maintenance ($M = 15.35$, $SD = .42$). Contemplators were also significantly lower on the Pros of exercise than individuals in Preparation.

The main effect of culture on the Pros and the Cons of exercise was not significant indicating the U.S. and the Slovak participants scored the same on the Pros and the Cons of exercise. There was no significant interaction between the Stages and the culture indicating that the effects of culture on the Pros and the Cons of exercise did not differ across Stages. Figure 4.4 illustrates the

pattern of the Pros and the Cons across Stages for both samples.

Situational Self-efficacy Inventory. A 2x4 ANOVA revealed a main effect of Stages on exercise Self-efficacy, $F(3, 499) = 16.56, p < .001, \eta^2 = .09$, indicating that exercise Self-efficacy is significantly different across the Stages of Change. Post hoc analysis showed that individuals in Precontemplation scored significantly lower ($M = 13.81, SD = .46$) on exercise Self-efficacy than individuals in Contemplation ($M = 17.67, SD = .77$), Preparation ($M = 15.61, SD = .38$), and Action/Maintenance ($M = 18.89, SD = .62$). Individuals in Preparation were also significantly lower on exercise Self-efficacy compared to individuals in Action/Maintenance.

A small but significant main effect of culture on exercise Self-efficacy was also found, $F(1, 499) = 5.19, p = .02, \eta^2 = .01$, indicating that the exercise Self-efficacy is significantly different for the U.S. and the Slovak participants. The U.S. participants were significantly higher ($M = 17.15, SD = .32$) on exercise Self-efficacy than the Slovak participants ($M = 15.84, SD = .48$).

There was also a small but significant interaction of Stages and culture on exercise Self-efficacy, $F(3, 499) = 4.18, p < .01, \eta^2 = .03$, indicating a differential effect of culture on exercise Self-efficacy across the Stages of Change. Figure 4.5 illustrates the pattern of Self-efficacy across Stages for both samples.

Family Support Inventory. An ANOVA revealed a main effect of Stages on Family Support for exercise, $F(3, 523) = 16.47, p < .001, \eta^2 = .09$, indicating

that Family Support for exercise is significantly different across the Stages of Change. Post hoc analysis showed that individuals in Precontemplation scored significantly lower ($M = 9.88$, $SD = .32$) on exercise Family Support than individuals in Contemplation ($M = 11.14$, $SD = .52$), Preparation ($M = 12.12$, $SD = .27$), and Action/Maintenance ($M = 13.36$, $SD = .44$). Individuals in Contemplation were also significantly lower on exercise Family Support compared to individuals in Action/Maintenance.

A main effect of culture on Family Support for exercise was also found, $F(1, 523) = 44.39$, $p < .001$, $\eta^2 = .08$, indicating that the Family Support for exercise is significantly different for the U.S. and the Slovak participants. The U.S. participants were significantly higher ($M = 12.96$, $SD = .23$) on exercise Family Support than the Slovak participants ($M = 10.29$, $SD = .33$). There was no significant interaction of the Stages and culture on Family Support for exercise. Figure 4.6 illustrates the pattern of the Family Support across Stages and cultures.

Godin Leisure-Time Exercise Inventory. A 2x4 MANOVA revealed a significant main effect of Stages on exercise indicating that exercise participation varies across the Stages, $F(9, 1275) = 17.45$, $\Lambda = .75$, $p < .001$, $1 - \Lambda = .25$, $\eta^2 = .09$. A follow up ANOVA revealed that Strenuous physical activities, $F(3, 526) = 44.72$, $p < .001$, $\eta^2 = .20$, and Moderate physical activities, $F(3, 526) = 17.23$, $p < .001$, $\eta^2 = .09$, differentiated between the Stages of Change. Mild physical activity did not differentiate between the Stages of

Change.

Post hoc analysis showed that individuals in Precontemplation scored significantly lower ($M = 4.57$, $SD = 1.08$) on participation in Strenuous exercise than individuals in Preparation ($M = 8.96$, $SD = .93$), and Action/Maintenance ($M = 25.12$, $SD = 1.48$). Individuals in Contemplation ($M = 7.05$, $SD = 1.73$) and Preparation also participated significantly less in Strenuous activities than individuals in Action/Maintenance.

Post hoc analysis showed that individuals in Precontemplation ($M = 8.14$, $SD = 1.04$), Contemplation, ($M = 10.25$, $SD = 1.66$), and Preparation ($M = 10.86$, $SD = .90$), scored significantly lower on participation in Moderate exercise than individuals in Action/Maintenance ($M = 20.48$, $SD = 1.42$).

The main effect of culture on exercise was not significant indicating that there was no difference between the U.S. and the Slovak on exercise participation. There was no significant interaction between the Stages and the culture indicating that the effects of culture on the Pros and the Cons of exercise did not differ across Stages.

No between culture differences were found on strenuous, moderate, or mild physical activity participation. Figure 4.7 illustrates the pattern of the strenuous, moderate, and mild physical activities across Stages and cultures.

Stage Distribution across Samples.

Chi-square test (χ^2) was performed to determine if the distribution of individuals in the Slovak sample across the Stages of Change differs from the

distribution found in the U.S. sample. The results indicated that the distribution of individuals in the Slovak sample across Stages of Change is significantly different from the distribution in the U.S. sample, $\chi^2(3, N = 555) = 15.45, p < .01$, Cramer's $V = .17$. Cramer's V indicates a weak association among cultural groups and Stages of Change in that only 17% of Stage distribution can be explained or predicted by cultures under investigation. Partitioning of chi-square showed that the distribution of the Slovak and the U.S. samples was different for Contemplation, $\chi^2(1, N = 85) = 25.99, p < .001$, and Preparation, $\chi^2(1, N = 227) = 19.78, p < .001$. The distribution of the Slovak and the U.S. samples was not significantly different for Precontemplation and Action/Maintenance Stages.

Discussion

Demographics of participants across two cultures under investigation were similar. The U.S. participants reported their ethnic status, while Slovak participants reported their nationality. Marital status varied across cultures, and there are some small differences between the U.S. and Slovak groups in reporting their health status. Height and weight of participants was also similar across groups. A big difference is seen in the annual income, with the U.S. individuals earning approximately 10 times the amount of Slovak individuals.

Stage distribution was similar across two cultures in that most of the participants in both cultures were in Precontemplation and Preparation Stages replicating the distribution of adults across Stages reported by previous studies (Marshall & Biddle, 2001, Prochaska & Velicer, 1997, Prochaska et al., 1994,

Sarkin et al., 2001). However, distribution of the Slovak and the U.S. individuals across Contemplation and Preparation Stages was significant different.

The results of this study support cross-sectional studies the Decisional Balance Inventory of Nigg and Courneya (1998), Prochaska (1994), Prochaska et al. (1994), and Sarkin et al. (2001) and provide additional evidence that the Pros of exercise increase across Stages, while the Cons decrease. In both samples, the Cons outweighed the Pros in Precontemplation, and the transition from Precontemplation to Contemplation was marked by a rapid increase in the Pros, followed by a decrease in the Cons. The Pros, but not the Cons, differentiated between the Stages. Marshall and Biddle (2001) reported similar results after conducting the meta-analysis of 80 studies by finding only weak evidence supporting the relationship between the Stages and the Cons.

The Self-efficacy Inventory increased across Stages in both samples supporting the study of Nigg and Courneya (1998). The increase was a non-linear in both samples supporting the findings of Marshall and Biddle (2001) who found only small to moderate effects sizes for the relationship between Self-efficacy and Stages. Self-efficacy in this study differentiated between those in the early Stages from those in Action/Maintenance providing a partial support of Dannecker et al. (2003) who reported that Self-efficacy differentiated the early Stages from the Action and Maintenance. The U.S. and the Slovak samples differed on exercise Self-efficacy and there was a differential effect of culture on Self-efficacy across the levels of Stages.

The Family Support Inventory is a new concept in the domain of exercise behavior. Individuals across different age groups may receive a support for exercise from different sources. Adolescents or young adults may receive family support mainly from parents, siblings, and peers or other family members whom regard as important, while adults may receive support from their significant others, or those that they hold in high regard. In this study, the Family Support increased linearly across Stages in both samples; although, the U.S. and the Slovak samples differed on exercise Family Support. This study provides strong evidence suggesting that this construct may be a very important one in relation to Stages.

Structured physical activities as measured by Godin Inventory increased linearly across the Stages in both samples with a significant increase from Preparation to Action/Maintenance which further confirms the relationship between physical activity and Stages. In this study, it was hypothesized that the Slovak, and the U.S. samples will differ on types of activities performed; however, no between group differences were found on the types of physical activities performed.

These results support the psychometric strength and construct validity of these measures as one basis for tailored interventions to increase exercise behavior in adults. Overall, this study supports other research that has found a consistent pattern of relationships between the Pros, Self-efficacy, and Stages. The relationship between the Cons and Stages remains unclear, and more

research in this area is required. This study confirmed relationships between the TTM measures and Stages of Change for Slovak adults and replicated the relationships found for the U.S. adults. The relationship between Family Support Measure and Stages was also confirmed across both samples. Validation of these constructs against Stages of Change in a Slovak sample provides a strong support for the model of behavior change, and a strong support for stability of these measures across different cultures.

Limitations

One of the limitations is a relatively small Slovak sample size. Optimal sample size for structural equation procedures would be about 100 participants per group. In this study, individuals were staged into five Stages of Change with less than 100 participants per stage. Only six individuals were in Action stage; therefore, action and maintenance Stages were combined. A limitation pertaining to the U.S. sample is that individuals in Maintenance were excluded from the study, and only small number of individuals were in Action stage (N = 40).

Self-reported surveys are not always effective and reliable methods of assessment. There is a tendency for people to answer in a more socially desirable way, rather than reporting the facts. Individuals may interpret the concept of regular exercise differently. The assessment of what constitutes a regular exercise may also differ depending on health status of participants (i.e., weight, heart problems, diabetes).

Translation of measures from English to Slovak requires further improvements. Some participants indicated that questionnaire was difficult to understand, and that the instructions were difficult to follow. Answering questions using Likert scale categories seemed to be problematic in that instead of using the scale to answer a set of questions, several individuals selected only one option from the Likert scale and matched this option to a single item on the questionnaire. Different assessment approach needs to be explored when working with populations in different cultures.

Some physical activity data were not normally distributed across both samples, and were positively skewed and leptokurtic. Logarithmic transformation did not correct the distribution. The amount of physical activities varies widely across individuals; therefore, removing extreme cases does not seem feasible and would not describe accurately exercise behavior across population.

Future Directions. Future studies should validate the relationship between Family Support and Stages, as well as further evaluate the Cons of exercise. Family Support is a promising concept and could be valuable part of interventions to change exercise behavior. Validation of the TTM measures across different cultures requires numerous replications.

In the future, improved translation of the measures should be used when working with the Slovak population. This study was the first to use the TTM, Family Support, and Physical Activity instruments in Slovakia, and they provide

a good starting point for the future explorations.

References

- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, 84, 191-215.
- Benisovitch, S. V., Rossi, J. S., Norman, G. J., & Nigg, C. R. (1998). Development of a multidimensional measure of exercise self-efficacy. *Annals of Behavioral Medicine*, 20, S190 (Abstract).
- Centers for Disease Control and Prevention. (1996). *Physical activity and health in Adults. A report of the surgeon general*. Atlanta, GA: Author.
- Dannecker, E. A., Hausenblas, H. A., Connaughton, D. P., & Lovins, T. R. (2003). Validation of a stages of exercise change questionnaire. *Research Quarterly for Exercise and Sport*, 74, 236-247.
- Deng, X., Doll, W. J., Hendrickson, A. R., & Scazzero, J. A. (2005). A multi-group analysis of structural invariance: An illustration using the technology acceptance model. *Information and Management*, 42, 745-759.
- Dishman, R. K. (1988). Exercise adherence research: Future directions. *American Journal of Health Promotion*, 3, 52-56.
- Dye, G. (2006-a). *Validation and reliability of the decisional balance, self-efficacy, family support and Godin exercise measures in a sample of parents*. Unpublished manuscript.

- Dye, G. (2006-b). *Validation and reliability of the decisional balance, self-efficacy, family support, and exercise behavior measures in a Slovak sample*. Unpublished manuscript.
- Godin, G., & Shepard, R.J. (1985). A simple method to assess exercise behavior in the community. *Canadian Journal of Applied Sport Sciences*, 10, 141-146.
- Haase, A., Steptoe, A., Sallis, J. F., Wardle, J. (2004). Leisure-time physical activity in university students from 23 countries: Associations with health-beliefs, risk awareness, and national economic development. *Preventive Medicine*, 39, 182-190.
- Janis, I. L., & Mann, L. (1977). *Decision making: A psychological analysis of conflict, choice and commitment*. New York: Free Press.
- Laforce, R.G., Velicer, W.F., Richmond, R.L., & Owen, N. (1999). Stage distributions for five health behaviors in the United States and Australia. *Preventive Medicine*, 28, 61-74.
- Marcus, B. H., Rakowski, W. & Rossi, J. S. (1992). Assessing motivational readiness and decision-making for exercise. *Health Psychology*, 11, 257-261.
- Marshall, S. J., & Biddle, J. H. (2001). The transtheoretical model of behavior change: A meta-analysis of applications to physical activity and exercise. *Annals of Behavioral Medicine*, 23, 229-246.

National Center for Chronic Disease Prevention and Health Promotion. (2004).

Chronic Disease Prevention: Overview. Atlanta, GA: Author.

Nigg, C.R., & Courneya, K.S. (1998). Transtheoretical model: Examining adolescent exercise behavior. *Journal of Adolescent Health, 22*, 214-224.

Nigg, C.R., Rossi, J.S., Norman, G.J., & Benisovich, S.V. (1998). Structure of decisional balance for exercise adoption. *Annals of Behavioral Medicine, 20*, S211.

Owen, N., Humpel, N., Leslie, A., Bauman, A., & Sallis, J. F. (2004). Understanding environmental influences on walking: Review and research agenda. *American Journal of Preventive Medicine, 27*, 67-76.

Plotnikoff, R.C., Hotz, S.B., Birkett, N.J., & Courneya, K.S. (2001). Exercise and the transtheoretical model: A longitudinal test of a population sample. *Preventive Medicine, 33*, 441-452.

Prochaska, J.O. (1994). Strong and weak principles for progressing from precontemplation to action on the basis of twelve problem behaviors. *Health Psychology, 13*, 47-51.

Prochaska, J.O., Velicer, W.F., Rossi, J.S., Goldstein, M.G., Marcus, B.H., Rakowski, W., Fiore, C., Harlow, L.L., Redding, C.A., Rosenbloom, D., & Rossi, S.R. (1994). Stages of change and decisional balance for 12 problem behaviors. *Health Psychology, 13*, 39-46.

- Prochaska, J.O., & Velicer, W.F. (1997). Stages of change: The temporal dimension of the transtheoretical model. *American Journal of Health Promotion, 12*, 38-48.
- Reed, G. R., Velicer, W. F., Prochaska, J. O., Rossi, J. S. & Marcus, B. H. (1997). What makes a good staging algorithm: Examples from regular exercise. *American Journal of Health Promotion, 12*, 57-67.
- Redding, C.A., Rossi, J.S, Pallonen, U.E., Prochaska, J.O., Abrams, D.B., Velicer, W.F., Plummer, B., Meier, K., Greene, G.W., & Rossi, S.R. (1999). Measures of family influence on healthy behavior changes in parents of adolescents. *Annals of Behavioral Medicine, 21*, S174 (Abstract).
- Sallis, J. F., Kraft, K., & Linton, L. S. (2002). How the environment shapes physical activity: A transdisciplinary research agenda. *American Journal of Preventive Medicine, 22*, 208.
- Sarkin, J.A., Johnson, S.S., Prochaska, J.O., & Prochaska, J.M. (2001). Applying transtheoretical model to regular moderate exercise in an overweight population: Validation of a stages of change measure. *Preventive Medicine, 33*, 462-469.

- Schumann, A., Nigg, C. R., Rossi, J. S., Jordan, P. J., Norman, G. J., Garber, C. E., Riebe, D., & Benisovich, S. V. (2002). Construct validity of the stages of change of exercise adoption for different intensities of physical activity in four samples of differing age groups. *American Journal of Health Promotion, 16*, 280-287.
- Step toe, A., Wardle, J., Cui, W., Bellisle, F., Zotti, A. M., Baranyai, R., & Sanderman, R. (2002). Trends in smoking, diet, physical exercise, and attitudes toward health in European university students from 13 countries, 1990-2000. *Preventive Medicine, 35*, 97-104.
- Velicer, W.F., DiClemente, C.C., Prochaska, J.O., & Brandenburg, N. (1985). A decisional balance model for assessing and predicting smoking status. *Journal of Personality and Social Psychology, 48*, 1279-1289.
- Velicer, W.F., DiClemente, C.C., Rossi, J.S., & Prochaska, J.O. (1990). Relapse situations and self-efficacy: An integrative model. *Addictive Behaviors, 15*, 271-283.
- Velicer, W.F., Prochaska, J.O. (1999). An expert system intervention for smoking cessation. *Patient Education and Counseling, 36*, 119-129.
- Velicer, W.F., Prochaska, J.O., Fava, J.L., Rossi, J.S., Redding, C.A., Laforge, R.G., & Robbins, M.L. (2000). Using the transtheoretical model for population-based approaches to health promotion and disease prevention. *Homeostasis in Health and Disease, 40*, 174-195.

Table 4.1. *Demographic Characteristics of the U.S. and the Slovak Samples.*

	U.S.		SVK	
	N	%	N	%
<i>Gender</i>	347	100	210	100
Male	125	36	52	24.8
Female	222	64	158	75.2
<i>Ethnicity</i>	319	100		
White	299	93.7		
American Indian/ Alaskan Native	16	5.0		
Hispanic or Latino	12	3.8		
Black or African American	8	2.5		
Asian	2	.6		
Native Hawaiian/Pacific Islander	2	.6		
<i>Nationality</i>			211	100
Slovak			177	83.9
Hungarian			17	8.1
Czech			15	7.1
Ukrainian			2	.9
<i>Marital status</i>	318	100	213	100
Married	238	74.8	127	59.6
Not married, living with a partner	18	5.7	10	4.7
Not married	4	1.3	55	25.8
Separated	7	2.2	17	8.0

Divorced	47	14.8	4	1.9
Widowed	4	1.3	not reported	
<i>Employment status</i>	318	100	212	100
Employed for wages (Hourly)	238	74.8	156	73.6
Self employed	27	8.5	10	4.7
Out of work/more than 1 year	9	2.8	1	.5
Out of work/less than 1 year	11	3.5	1	.5
Student	3	.9	33	15.6
Retired	6	1.9	11	5.2
<i>Health in general</i>	319	100	209	100
Poor	2	.6	11	5.3
Fair	42	13.2	36	17.2
Good	121	37.9	94	45.0
Very Good	115	36.1	47	22.5
Excellent	39	12.2	21	10.0

	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>
Age	46.83	6.35	41	13.80
Height (inches)	66.11	4.13	66.56	3.53
Weight (lb)	171.52	44.09	153.55	29.00
Annual income (\$)	4.2 ^a	1.48	3713.11 ^b	2303.86

^a 1 = Under 15,000; 2 = 15,000-29,999; 3 = 30,000-39,999; 4 = 40,000-59,999; 5 = 60,000-79,999; 6 = 80,000 and over

^b One extreme case was excluded (Income = \$46,308.21)

Table 4.2. *Invariance Models for the Decisional Balance, Situational Self-Efficacy, and Family Support Inventories.*

Invariance	χ^2	<i>p</i>	<i>df</i>	<i>RMSEA</i>	<i>CFI</i>
<i>Decisional Balance Inventory</i>					
Configural	92.41	.00	38	.05	.94
Weak Factorial	95.42	.00	40	.05	.94
Pattern Identity	107.77	.00	46	.05	.93
Strong Factorial	195.38	.00	54	.07	.85
<i>Situational Self-Efficacy Inventory</i>					
Configural	28.06	.06	18	.03	.98
Weak Factorial	28.13	.08	19	.03	.98
Pattern Identity	31.51	.14	24	.03	.99
Strong Factorial	93.04	.00	30	.07	.89
<i>Family Support Inventory</i>					
Configural	7.02	.13	4	.04	.997
Variances	9.45	.09	5	.04	.996
Variances, Loadings	20.08	.01	8	.05	.99
Strong Factorial	56.06	.00	12	.09	.96

Figure 4.1. Structural model of decisional balance measure for the Slovak and the U.S. exercisers.

Figure 4.2. Structural model of Self-efficacy measure for the Slovak and the U.S. exercisers.

Figure 4.3. Structural model of Family Support measure for the Slovak and the U.S. exercisers.

Figure 4.4. The Pros and the Cons across Stages and Samples.

Figure 4.5. The Self-efficacy across Stages and Samples.

Figure 4.6. The Family Support across Stages and Samples.

Figure 4.7. The Pattern of Strenuous, Moderate, and Mild Physical Activities across Stages and Samples.

Appendix A

The University of Rhode Island
Department of Psychology

Chafee Building, Kingston, RI 02881-0808
Phone: 401-874-2193

Title of Project: Exercise Staging Comparison Study

CONSENT FORM FOR RESEARCH

You have been asked to take part in a research project described below. You should feel free to ask questions. If you have more questions later, Gabriela Dye (401) 359-9259, **e-mail: gabdye@mail.uri.edu**, the person mainly responsible for this study, will discuss them with you. You must be at least 18 years old to be in this research project.

Description of the project:

You have been asked to take part in the study that is assessing your exercise habits, your beliefs about exercising, and your commitment to exercise in difficult situations.

What will be done:

If you decide to take part in this study, your participation will involve answering a survey.

You will be asked to check this form acknowledging that you agree to participate in this study. Secondly, you will be asked to read the instructions on how to complete the survey. After you read the instructions, you will be able to complete the questionnaire in your free time. The questionnaire should take about 30 minutes to complete. After you complete the questionnaire, you will be asked to mail it, or to deliver it in person to the address that is listed in the instructions.

Risks or discomfort:

Some questions might make you conscious about your exercise habits. You can choose NOT to answer questions that make you feel uncomfortable. You can quit at any time, if you do not feel comfortable answering the questions.

Benefits of this study:

Some questions might make you conscious about your exercise habits and may increase your motivation to engage in exercise and lead a healthier lifestyle. This study will also help the researchers to evaluate the beliefs, attitudes and barriers concerning exercise. This knowledge is important for designing the interventions which would lead to increased exercise participation, and improve general well-being and health of individuals.

Confidentiality:

Your part in this study is anonymous. This means that your answers to all questions are private. No one else can know if you participated in this study and no one else can find out what your answers were. Scientific reports will be based on group data and will not identify you or any individual as being in this project.

Decision to quit at any time:

The decision to take part in this study is up to you. You do not have to participate. If you decide to take part in the study, you may quit at any time, and you do not have to complete the questionnaire. If you decide to quit, simply DO NOT mail the questionnaire back to the investigator.

Rights and Complaints:

If you are not satisfied with the way this study is performed, you may discuss your complaints with Gabriela Dye, anonymously, if you choose. In addition, you may contact the office of the Vice Provost for Graduate Studies, Research and Outreach, 70 Lower College Road, Suite 2, University of Rhode Island, Kingston, Rhode Island, telephone: (401) 874-4328.

Investigator's statement:

I certify that I have explained the nature and the purpose of this research to this participant, including risks, benefits, costs, and any experimental procedures. I have described the rights and protections afforded to human subjects and have done nothing to pressure, coerce, or falsely entice this subject into participating. I am aware of my obligations under state and federal laws, and promise compliance. I have answered the subject's questions and have encouraged him/her to ask additional questions at any time during the course of this study.

Participant's Acknowledgment:

You have read the Consent Form. Your questions have been answered. Checking the box below means that you understand the information and you agree to participate in this study.

Signature of Researcher

Typed/printed Name

Date

Appendix B

The University of Rhode Island
Department of Psychology
Chafee Building, Kingston, RI 02881-0808
Phone: 401-874-2193
Názov Štúdie: Stupne Cvičenia Porovnávacia Štúdia

Informovaný Súhlas

Boli ste kontaktovaný (-á) za účelom účasti na štúdii ktorá je tu opísaná. Ak máte dodatočné otázky, prosím kontaktujte Gabrielu Rybárovú-Dye na t.č. 001401-359-9259, **e-mailová adresa: gabdye@mail.uri.edu**. Aby ste sa mohli zúčastniť na štúdii, musíte mať najmenej 18 rokov.

Opis štúdie:

Žiadame Vás aby ste sa zúčastnili na štúdii ktorej účelom je ohodnocovanie Vašej fyzickej aktivity, Vašich názorov o fyzickej aktivite, a Vášho postoju ku cvičeniu v obtiažnych situáciách.

Čo sa od Vás žiada:

Ak sa rozhodnete zúčastniť na štúdii, jediné čo sa od Vás žiada je vyplnenie dotazníka. Taktiež Vás žiadame aby ste označili krížikom na konci tohoto informovaného súhlasu ak súhlasíte s podmienkami štúdie a súhlasíte sa zúčastniť na štúdii. Potom Vás žiadame aby ste si prečítali inštrukcie ktoré upresňujú akým spôsobom treba vyplniť dotazník. Po prečítaní inštrukcií budete môcť začať vyplňovať dotazník, čo by za normálnych okolností nemalo trvať dlhšie než 30 minút. Po vyplnení dotazníka Vás žiadame aby ste ho odoslali alebo osobne priniesli na adresu uvedenú v inštrukciách.

Riziká alebo Nepohodlie:

Niektoré otázky môžu negatívne zvýšiť Vaše upovedomie týkajúce sa cvičebných zvykov. Ak sa necítite pohodlne odpovedať na ktorúkoľvek z otázok, nemusíte na ne odpovedať. Ak sa necítite pohodlne odpovedať na otázky, kedykoľvek môžete ukončiť Vašu účasť.

Úžitok Štúdie:

Niektoré otázky môžu pozitívne zvýšiť Vaše upovedomie týkajúce sa cvičebných zvykov a môžu zvýšiť Vašu motiváciu k cvičeniu a viesť zdravší životný štýl. Táto štúdia taktiež pomôže vedcom zhodnotiť názory na cvičenie, postoje ku cvičeniu, a bariéry týkajúce sa cvičebného režimu. Tieto vedomosti sú dôležité pri formulovaní intervenčných programov tým že by pomohli zvýšiť účasť na cvičení, a zlepšili by celkové zdravie ľudí.

Dôvera:

Vaša účasť na tejto štúdii je anonymná. To znamená že Vaše odpovede na otázky v dotazníku zostanú súkromné. Nikto nebude vedieť že ste sa zúčastnili na štúdii a nikto nebude mať prístup k vašim odpovediam. Vedecká správa bude založená na skupinových údajoch a nebude identifikovať žiadneho účastníka osobne.

Rozhodnutie Ukončiť Účasť:

Rozhodnutie zúčastniť sa štúdie je dobrovoľné. Štúdie sa nemusíte zúčastniť. Ak sa rozhodnete zúčastniť na štúdii, môžete ju kedykoľvek ukončiť, a nemusíte dokončiť vyplňovanie dotazníka. Ak sa rozhodnete nezúčastniť alebo nedokončiť účasť, jednoducho neodošlite dotazník.

Práva a Sťažnosti:

Ak nie ste spokojný (-á) so spôsobom akým je táto štúdia prevedená; môžete prediskutovať Vaše pripomienky s Gabrielou Rybárovou-Dye, ak si prajete aj anonymne. Na dôvažok, môžete kontaktovať nasledujúci úrad: Vice Provost for Graduate Studies, Research and Outreach, 70 Lower College Road, Suite 2, University of Rhode Island, Kingston, Rhode Island, telephone: (001401) 874-4328.

VYHLÁSENIE VÝSKUMNÍKA:

TÝMTO POTVRDZUJEM, ŽE SOM VYSVETLILA PODSTATU A ÚČEL TEJTO ŠTÚDIE TOMUTO ÚČASTNÍKOVY, VRÁTANE RIZÍK, ÚŽITKU, A PROCEDÚRY. OPÍSA LA SOM PRÁVA A KRYTIE OSÔB A NEVYTVO RILA SOM ŽIADNY NÁT LAK KTORÝM BY SOM NALÁKALA ĽUDÍ K ÚČASTI. SOM SI VEDOMÁ SVOJICH POVINNOSTÍ PODĽA ŠTÁTNYCH A FEDERÁLNYCH ZÁKONOV A SĽUBUJEM MOJU PODDAJNOSŤ. ZODPOVEDALA SOM NA OTÁZKY A POSMEL'UJEM ÚČASTNÍKOV ABY MA KONTAKTOVALI AK BY MALI EŠTE NEJAKÉ DODATOČNÉ OTÁZKY POČAS ICH ÚČASTI NA ŠTÚDII.

Potvrdenie Účastníkom Štúdie:

Prečítali ste si Informovaný Súhlas. Zodpovedali sme Vaše otázky. Tým že označíte štvorček potvrdíte že rozumiete podstatu a účel štúdie, a súhlasíte sa jej zúčastniť.

Podpis Výskumného Investigátora

Meno Tlačeným Písmom

Dátum

Appendix C

Instructions

- 1) This envelope contains 2 questionnaires. Please, complete 1 questionnaire. If you know anyone else who would be willing to participate, and is at least 18 years old, please let them complete the second questionnaire. You must be 18 years or older to participate.
- 2) Read the informed consent form. If you agree to participate in this study voluntarily, then you may begin answering the questions. **Please do not write your name on any forms.**
- 3) When you complete the questionnaire, please call Dr. Rybár for pick-up. You may also mail completed survey to the address below.
- 4) You may also return the complete questionnaire in person to:

MUDr. Rafael Rybár, CSc.
Cardio D&R spol. s r.o.
Mar. Koneva 1
04022 Košice
phone: 907-941-421

PLEASE, COMPLETE AND MAIL COMPLETED QUESTIONNAIRE TO THE ABOVE ADDRESS BEFORE JULY 15TH.

By completing the project, you will become a part of multicultural study that I designed as part of my Master Thesis. Your help is greatly appreciated. Your participation will help to complete my degree, which would not be possible without your help.

Thank you very much
Gabriela Dye

Appendix D

Inštrukcie

- 1) Táto obálka obsahuje 2 dotazníky. Vyplňte prosím iba jeden dotazník. Ak poznáte niekoho kto by bol ochotný vyplniť druhý dotazník a má aspoň 18 rokov dajte im vyplniť druhý dotazník. Aby ste sa mohli zúčastniť na štúdií, musíte mať aspoň 18 rokov.
- 2) Prečítajte prosím najprv Informovaný Súhlas. Ak sa súhlasíte zúčastniť na štúdií dobrovoľne, potom môžete začať odpovedať na otázky v dotazníku. **Prosím, nepodpisujte sa na žiadny document.**
- 3) Po vyplnení dotazníka, zavolajte Dr. Rybára ktorý si príde dotazníky vyzdvihnúť osobne. Dotazníky môžete aj odoslať na nasledujúcu adresu.
- 4) Vyplnený dotazník môžete vrátiť aj osobne na túto adresu:

MUDr. Rafael Rybár, CSc.
Cardio D&R spol. s r.o.
Mar. Koneva 1
04022 Košice
t.c.: 907-941-421

**PROSÍM VYPLNITE A ODOŠLITE VYPLNENÝ DOTAZNÍK NA VYŠIE
UVEDENÚ ADRESU NAJNESKÔR 15. JÚLA.**

Tým že vyplníte tento dotazník, stanete sa súčasťou medzinárodnej štúdie ktorá je súčasťou mojej Magisterskej práce. Som vďačná za Vašu pomoc ktorá my umožní dostať titul magistry a postupne dokončiť titul doktora.

Ďakujem veľmi pekne za pomoc

Gabriela Rybárová Dye

Appendix E

Questionnaire

DEMOGRAPHICS

Please Indicate Your Responses by Filling in the Correct Information or by Placing a Check-mark Next to the Option that Applies to You.

1. Your date of Birth: Day _____ Month _____ Year _____

2. Gender:: Male _____ Female _____

3. Nationality: Slovak _____
Hungarian _____
Roma _____
Czech _____
Ruthenian _____
Ukrainian _____
German _____
Polish _____
Other (Please Indicate) _____

4. What is your marital status? (Read choices 1 through 6.)

- a) Married
- b) Not married, living with a partner
- c) Not married
- d) Separated
- e) Divorced
- f) Widowed

5. Which of the following best describes your employment status?

a) Employed for wages (Salaried/Hourly)

Part Time _____

Full Time _____

b) Self employed

c) Out of work for more than one year

d) Out of work for less than one year

e) Homemaker

f) Student

Part Time _____

Full Time _____

g) Retired

6. What is your annual income? _____
7. Including yourself, what is the number of people in your household? _____
8. Do you have any **children under 18 living in your household?**
- a) No
 - b) Yes

Health Status

9. Would you say your health in general is:
- a) Poor
 - b) Fair
 - c) Good
 - d) Very Good
 - e) Excellent

10. Do you smoke? Yes _____ No _____

If "Yes", how many cigarettes do you smoke in a day? _____

11. Excluding yourself, how many people in your household smoke cigarettes? _____

Leisure-Time Exercise

How many times each week (on average) do you do the following types of physical activities for 30 minutes or more during your leisure or free time? If you did an activity that is not listed for more than 30 minutes then try to guess what type of activity it is most like and include it in that category. So, for each category, what is the total number of times per week for each level of activity?

12. **Strenuous Activity (Heart Beats Rapidly)**

(examples: running, jogging, fast bicycling, aerobic dance, swimming laps, basketball, martial arts)

Number of times per week: _____

13. **Moderate Activity (Not Exhausting)**

(examples: fast walking, slow bicycling, swimming, weight lifting, baseball, softball, tennis, badminton, volleyball, dancing)

Number of times per week: _____

14. **Mild Activity (Requires Minimal Effort)**

(examples: easy walking, bowling, fishing, golf, gardening, croquet/horseshoes, archery, calisthenics, yoga, house chores)

Number of times per week: _____

15. How often do you engage in any activity long enough to work up a sweat or breathe hard during your free time? Please circle one of the following options.

1 = NEVER/RARELY

2 = SOMETIMES

3 = OFTEN

16. Add up all the time you spend in physical activity each day. **Over the past 7 days, on how many days did you participate in strenuous or moderate activities for a total of at least 30 minutes per day?**

Number of days within the past 7 days: _____

We are interested in finding out about the kinds of physical activities that people do as part of their everyday lives. The questions will ask you about the time you spent being physically active in the **last 7 days**. Please answer each question even if you do not consider yourself to be an active person. Please think about the activities you do at work, as part of your house and yard work, to get from place to place, and in your spare time for recreation, exercise or sport.

Think about all the **vigorous** and **moderate** activities that you did in the **last 7 days**. **Vigorous** physical activities refer to activities that take hard physical effort and make you breathe much harder than normal. **Moderate** activities refer to activities that take moderate physical effort and make you breathe somewhat harder than normal.

PART 1: JOB-RELATED PHYSICAL ACTIVITY

The first section is about your work. This includes paid jobs, farming, volunteer work, course work, and any other unpaid work that you did outside your home. Do not include unpaid work you might do around your home, like housework, yard work, general maintenance, and caring for your family. These are asked in Part 3.

17. Do you currently have a job or do any unpaid work outside your home?

☐ Yes

☐ No → **Skip to PART 2: TRANSPORTATION**

The next questions are about all the physical activity you did in the **last 7 days** as part of your paid or unpaid work. This does not include traveling to and from work.

18. During the **last 7 days**, on how many days did you do **vigorous** physical activities like heavy lifting, digging, heavy construction, or climbing up stairs **as part of your work**? Think about only those physical activities that you did for at least 10 minutes at a time.

_____ **days per week**

☐ No vigorous job-related physical activity → **Skip to question 20**

19. How much time did you usually spend on one of those days doing **vigorous** physical activities as part of your work?

_____ **hours per day**
_____ **minutes per day**

20. Again, think about only those physical activities that you did for at least 10 minutes at a time. During the **last 7 days**, on how many days did you do **moderate** physical activities like carrying light loads **as part of your work**? Please do not include walking.

_____ **days per week**

☐ No moderate job-related physical activity → **Skip to question 22**

21. How much time did you usually spend on one of those days doing **moderate** physical activities as part of your work?

_____ **hours per day**
_____ **minutes per day**

22. During the **last 7 days**, on how many days did you **walk** for at least 10 minutes at a time **as part of your work**? Please do not count any walking you did to travel to or from work.

_____ days per week

☐

No job-related walking

**Skip to PART2:
TRANSPORTATION**

23. How much time did you usually spend on one of those days **walking as part of your work**?

_____ hours per day

_____ minutes per day

PART 2: TRANSPORTATION PHYSICAL ACTIVITY

These questions are about how you traveled from place to place, including to places like work, stores, movies, and so on.

24. During the **last 7 days**, on how many days did you **travel in a motor vehicle** like a train, bus, car, or tram?

_____ days per week

☐

No traveling in a motor vehicle

Skip to question 26

25. How much time did you usually spend on one of those days **traveling** in a train, bus, car, tram, or other kind of motor vehicle?

_____ hours per day

_____ minutes per day

Now think only about the **bicycling** and **walking** you might have done to travel to and from work, to do errands, or to go from place to place.

26. During the **last 7 days**, on how many days did you **bicycle** for at least 10 minutes at a time to go **from place to place**?

_____ days per week

☐

No bicycling from place to place

Skip to question 28

27. How much time did you usually spend on one of those days to **bicycle** from place to place?

_____ hours per day
_____ minutes per day

28. During the **last 7 days**, on how many days did you **walk** for at least 10 minutes at a time to go **from place to place**?

_____ days per week

☐

No walking from place to place

**Skip to PART
3: HOUSEWORK, HOUSE
MAINTENANCE, AND
CARING FOR FAMILY**

29. How much time did you usually spend on one of those days walking from place to place?

_____ hours per day
_____ minutes per day

PART 3: HOUSEWORK, HOUSE MAINTENANCE, AND CARING FOR FAMILY

This section is about some of the physical activities you might have done in the last 7 days in and around your home, like housework, gardening, yard work, general maintenance work, and caring for your family.

30. Think about only those physical activities that you did for at least 10 minutes at a time. During the **last 7 days**, on how many days did you do **vigorous** physical activities like heavy lifting, chopping wood, shoveling snow, or digging in the **garden or yard**?

_____ days per week

☐

No vigorous activity in garden or yard

**Skip to
question 32**

31. How much time did you usually spend on one of those days doing **vigorous** physical activities in the garden or yard?

_____ hours per day
_____ minutes per day

32. Again, think about only those physical activities that you did for at least 10 minutes at a time. During the **last 7 days**, on how many days did you do **moderate** activities like carrying light loads, sweeping, washing windows, and raking in the garden or yard?

_____ days per week

☐

No moderate activity in garden or yard

→ **Skip to
question 34**

33. How much time did you usually spend on one of those days doing **moderate** physical activities in the garden or yard?

_____ hours per day

_____ minutes per day

34. Once again, think about only those physical activities that you did for at least 10 minutes at a time. During the **last 7 days**, on how many days did you do **moderate** activities like carrying light loads, washing windows, scrubbing floors and sweeping **inside your home**?

_____ days per week

☐

No moderate activity inside home

→ **Skip to PART
4: RECREATION,
SPORT AND LEISURE-
TIME PHYSICAL ACTIVITY**

35. How much time did you usually spend on one of those days doing **moderate** physical activities inside your home?

_____ hours per day

_____ minutes per day

PART 4: RECREATION, SPORT, AND LEISURE-TIME PHYSICAL ACTIVITY

This section is about all the physical activities that you did in the **last 7 days** solely for recreation, sport, exercise or leisure. Please do not include any activities you have already mentioned.

36. Not counting any walking you have already mentioned, during the **last 7 days**, on how many days did you **walk** for at least 10 minutes at a time in your leisure time?

_____ days per week

☐

No walking in leisure time

Skip to question 38

37. How much time did you usually spend on one of those days **walking** in your leisure time?

_____ hours per day

_____ minutes per day

38. Think about only those physical activities that you did for at least 10 minutes at a time. During the **last 7 days**, on how many days did you do **vigorous** physical activities like aerobics, running, fast bicycling, or fast swimming in your leisure time?

_____ days per week

☐

No vigorous activity in leisure time

**Skip to
question 40**

39. How much time did you usually spend on one of those days doing **vigorous** physical activities in your leisure time?

_____ hours per day

_____ minutes per day

40. Again, think about only those physical activities that you did for at least 10 minutes at a time. During the **last 7 days**, on how many days did you do **moderate** physical activities like bicycling at a regular pace, swimming at a regular pace, and doubles tennis in your leisure time?

_____ days per week

☐

No moderate activity in leisure time

**Skip to PART 5: TIME
SPENT SITTING**

41. How much time did you usually spend on one of those days doing **moderate** physical activities in your leisure time?

_____ hours per day
_____ minutes per day

PART 5: TIME SPENT SITTING

The last questions are about the time you spend sitting while at work, at home, while doing course work and during leisure time. This may include time spent sitting at a desk, visiting friends, reading or sitting or lying down to watch television. Do not include any time spent sitting in a motor vehicle that you have already told me about.

42. During the **last 7 days**, how much time did you usually spend **sitting** on a **weekday**?

_____ hours per day
_____ minutes per day

43. During the **last 7 days**, how much time did you usually spend **sitting** on a **weekend day**?

_____ hours per day
_____ minutes per day

Exercise : Staging Stages of Change

Regular Exercise: is any *planned* physical activity (e.g., brisk walking, jogging, bicycling, swimming, basketball, aerobics classes, etc.) performed to increase physical fitness. Such activity should be performed *4 or more times* per week for *30 or more minutes* per session at a level that increases your breathing rate and causes you to break a sweat. Using this definition...

44. Do you currently engage in regular exercise (at least 4 times per week for 30 or more minutes per session)?

1. NO 2. YES

45. Do you intend to engage in regular exercise in the next 6 months?

1. NO 2. YES

46. Do you intend to engage in regular exercise in the next 30 days?

1. NO 2. YES

47. Have you been exercising regularly for the past six months or more?

1. No, for less than 6 months.
2. Yes, for 6 months or more.
-

Exercise : Decisional Balance

This section looks at the positive and negative aspects of exercise. Please indicate how important each statement is to your decision to exercise or not to exercise in your free time using the following 5 point scale:

- 1 = NOT AT ALL IMPORTANT
2 = SOMEWHAT IMPORTANT
3 = MODERATELY IMPORTANT
4 = VERY IMPORTANT
5 = EXTREMELY IMPORTANT
-

When deciding to exercise or not to exercise, how important is it that:

48. I would have more energy for my family and friends if I exercised regularly. _____
49. I would feel embarrassed if people saw me exercising. _____
50. I would feel less stressed if I exercised regularly. _____
51. Exercise prevents me from spending time with my friends. _____
52. Exercising puts me in a better mood for the rest of the day. _____
53. I feel uncomfortable or embarrassed in exercise clothes. _____
54. I would feel more comfortable with my body. _____
55. There is too much I would have to learn to exercise. _____
56. Regular exercise would help me have a more positive outlook on life. _____

57. Exercise puts an extra burden on my significant other. _____

Exercise : Confidence

Next are some situations in which some people might choose not to exercise when something gets in the way. Please rate how confident you are that you would participate in regular exercise in your free time, using the following 5 point scale:

- 1 = NOT AT ALL CONFIDENT
 - 2 = SOMEWHAT CONFIDENT
 - 3 = MODERATELY CONFIDENT
 - 4 = VERY CONFIDENT
 - 5 = COMPLETELY CONFIDENT
-

I am confident that I can do regular exercise even when ...

58. I am under a lot of stress. _____

59. I feel I don't have the time. _____

60. I have to exercise alone. _____

61. I don't have access to exercise equipment. _____

62. I am spending time with friends or family who do not exercise. _____

63. It's raining or snowing. _____

Exercise : Family Influences

How often in the past 30 days has your family done the following:

- 1. Never
- 2. Rarely
- 3. Sometimes
- 4. Often
- 5. Almost Always

64. Encourage each other to exercise regularly. _____

- 65. Discuss how being inactive is unhealthy. _____
- 66. Remind each other to exercise regularly. _____
- 67. Share ideas on how to be physically active on most days.

This is the end of the questionnaire, thank you for participating.

Appendix F

Dotazník

Osobné Údaje

Prosím odpovedzte na nasledujúce otázky tým že vyplníte správne údaje

1. Dátum narodenia: Deň _____ Mesiac _____ Rok _____

2. Pohlavie: Muž _____ Žena _____

3. Národnosť: Slovenská _____
Maďarská _____
Rómska _____
Česká _____
Ruteránska _____
Ukrajinská _____
Nemecká _____
Poľská _____
Iná (Prosím špecifikujte) _____

4. Aký je Váš manželský stav? (Vyberte si jednu z nasledujúcich možností) :

- a) ženatý / vydatá
- b) neženatý / nevydatá, žijúci (-ca) s partnerkou / partnerom
- c) slobodný / slobodná
- d) nežijem s manželkou (-lom)
- e) rozvedený / rozvedená
- f) vdovec / vdova

5. Z nasledujúcich možností, ktorá možnosť najlepšie vystihuje Váš súčasný pracovný stav?

a) Zamestnaný (-ná) [Platený (-ná) za hodinu]:

Na polovičný úväzok _____

Na plný úväzok _____

b) Súkromník (-čka)

c) Viac než rok nezamestnaný (-ná)

d) Menej než rok nezamestnaný (-ná)

e) Zamestnaný (-ná) v domácnosti

f) Študent (-ka):

Na polovičný úväzok _____

Na plný úväzok _____

g) Na dôchodku

7. Aký je Váš ročný príjem? _____

8. Máte deti mladšie než 18 rokov ktoré žijú s Vami?

- a) Áno
- b) Nie

Zdravotný Stav

9. Aký je v celku Váš zdravotný stav?

- a) Biedny
- b) Slušný
- c) Dobrý
- d) Veľmi Dobrý
- e) Vynikajúci

10. Fajčíte? Áno _____ Nie _____

Ak "Áno," koľko cigariet fajčíte denne? _____

11. Nepočítajúc seba, koľko ľudí vo Vašej domácnosti fajčí? _____

Cvičenie vo voľnom čase

Nasledujúci súbor otázok popisuje rôzne typy fyzickej aktivity. Ak ste vykonávali aktivitu ktorá nie je zahrnutá pri nasledujúcich otázkach, pokúste sa približne určiť o aký druh fyzickej aktivity sa vo vašom prípade jedná a zahrňte ju do primeranej kategórie.

Koľkokrát do týždňa v priemere vykonávate nasledujúce druhy fyzickej aktivity
30 minút a dlhšie počas Vášho voľného alebo oddychového času ?

12. Vyčerpávajúca aktivita (keď srdce bije rýchlo)

(vyčerpávajúca aktivita zahŕňa: jogging, rýchle bicyklovanie, aerobický tanec, plávanie olympijských kôl, basketbal, bojové umenia)

Koľkokrát do týždňa 30 minút alebo dlhšie? _____

13. Stredne ťažká (mierna) aktivita (nevyčerpávajúca)

(nevyčerpávajúca aktivita zahŕňa: rýchlu chôdzu, pomalé bicyklovanie, rekreačné plávanie, vzpieranie, basketbal, softbal, tenis, badminton, volejbal, tanec)

Koľkokrát do týždňa 30 minút alebo dlhšie? _____

14. Ľahká aktivita (Vyžaduje minimálne úsilie)

(Ľahká aktivita zahŕňa: prechádzku, pomalú chôdzu, bowling, rybačku, golf, prácu v záhradke, kriket, lukostrelectvo, kalanetiku, jogu, domáce práce)

Koľkokrát do týždňa 30 minút alebo dlhšie? _____

15. Ako často vykonávate ktorúkoľvek aktivitu počas Vašho voľného času dostatočne dlho na to aby viedla k poteniu alebo ku zrýchlenému dýchaniu? Prosím zakrúžkujte:

1 = Nikdy / Zriedkavo

2 = Niekedy

3 = Často

16. Spočítajte všetok čas ktorý strávite vykonávaním fyzickej aktivity každý týžden. **Počas koľkých dní v priebehu posledných 7 dní ste vykonávali vyčerpávajúcu alebo stredne ťažkú fyzickú aktivitu celkovo aspoň 30 minút denne?**

Medzinárodný Dotazník o Fyzickej Aktivite

Radi by sme zistili aký druh fyzických aktivít vykonávajú ľudia počas ich každodenného života. V nasledujúcej časti dotazníka sa Vás opýtame na čas strávený fyzickou aktivitou v posledných 7 dňoch. Prosím odpovedzte na každú otázku aj keď sa nepovažujete za fyzicky aktívnu osobu. Prosím uvažujte o aktivitách, ktoré robíte v práci, o domácich prácach a aktivite okolo domu, o tom ako sa pohybujete z jedného miesta na druhé a o vašom voľnom čase na rekreáciu, cvičenie alebo šport.

Rozmýšľajte o **veľmi vyčerpávajúcich** a **stredne vyčerpávajúcich** aktivitách ktorým ste sa venovali v posledných 7. dňoch. **Veľmi vyčerpávajúce** fyzické aktivity si vyžadujú veľké fyzické úsilie a významne sťažujú dýchanie v porovnaní s normálnym dýchaním. **Stredne vyčerpávajúce** aktivity si vyžadujú mierne fyzické zaťaženie a robia vaše dýchanie o niečo ťažšie než za normálnych okolností.

ČASŤ 1: K práci sa vzťahujúca fyzická aktivita

Prvá časť sa týka vašej práce. Zahŕňa platené zamestnanie, farmárčenie, dobrovoľnú prácu, školské úlohy a každú inú neplatenú prácu, ktorú robíte mimo Vášho domu. Nezahŕňajte neplatenú prácu, ktorú by ste mohli robiť okolo domu, ako sú domáce práce, veľké upratovanie, prácu v záhradke a starostlivosť o rodinu. Otázky týkajúce sa týchto aktivít sú v 3. časti tohoto dotazníka.

17. Ste v súčasnosti zamestnaný, alebo vykonávate nejakú neplatenú prácu mimo Vášho domu?

☐ Áno

☐ Nie → **Preskočte k Časti 2: DOPRAVA A FYZICKÁ AKTIVITA**

Nasledujúce otázky sa týkajú všetkých fyzických aktivít, ktoré ste robili v posledných 7 dňoch ako súčasť Vašej platenej alebo neplatenej práce. Nezahŕňa sa tu však cestovanie do a z práce.

18. Počas **posledných 7 dní**, ako často ste sa venovali **veľmi vyčerpávajúcej** fyzickej aktivite ako je napríklad zdvíhanie ťažkých bremien, kopanie, ťažké stavebné práce, alebo vystupovanie po schodoch v rámci Vašej práce? Uvažujte iba o tých fyzických aktivitách ktoré ste prevádzali bez prestania aspoň 10 minút.

_____ počet dní za týždeň

☐ Nevykonával(-a) som žiadnu veľmi vyčerpávajúcu aktivitu v práci. → **Preskočte na otázku 20**

19. Počas tých dní keď vykonávate veľmi vyčerpávajúcu aktivitu (ako to uvádzate v predchádzajúcej otázke) koľko času strávite zvyčajne vykonávaním **veľmi vyčerpávajúcej** fyzickej aktivity v rámci Vašej práce?

_____ počet hodín denne

_____ počet minút denne

20. Znovu sa zamyslite nad fyzickými aktivitami, ktoré ste robili bez prestania aspoň 10 minút. Počas **posledných 7 dní**, v koľkých dňoch ste vykonávali **stredne vyčerpávajúce** fyzické aktivity ako je nosenie ľahkých bremien v rámci **Vašej práce**? Prosím nezapočítavajte chôdzu.

_____ počet dní za týždeň

☐ Nevykonával(-a) som žiadnu stredne vyčerpávajúcu aktivitu v práci. → **Preskočte na otázku 22**

21. Počas tých dní keď vykonávate stredne vyčerpávajúcu aktivitu (ako to uvádzate v predchádzajúcej otázke) koľko času strávite zvyčajne vykonávaním **stredne vyčerpávajúcej** fyzickej aktivity

v rámci Vašej práce?

_____ počet hodín denne

_____ počet minút denne

22. Počas posledných 7 dní, v koľkých dňoch ste chodili bez prestania aspoň 10 minút v rámci Vašej práce? Posím nerátajte chôdzu do a z práce.

_____ počet dní za týždeň

☐

Nevykonával(-a) som žiadnu chôdzu v rámci práce.

**Preskočte k Časti 2:
DOPRAVA A FYZICKÁ
AKTIVITA**

23. Počas dní keď vykonávate chôdzu (ako to uvádzate v predchádzajúcej otázke) koľko času strávite zvyčajne chôdzou v rámci Vašej práce?

_____ počet hodín denne

_____ počet minút denne

ČASŤ 2: DOPRAVA A FYZICKÁ AKTIVITA

Tieto otázky sa týkajú prepravy z miesta na miesto, vrátane práce, obchodov, kín, a podobne.

24. Počas posledných 7 dní ako často ste cestovali v motorovom vozidle ako sú vlak, autobus, auto alebo električka?

_____ počet dní za týždeň

☐

Necestoval(-a) som v motorovom vozidle

Preskočte na otázku 26

25. Počas dní keď cestujete v motorovom vozidle (ako to uvádzate v predchádzajúcej otázke) koľko času strávite zvyčajne cestovaním vlakom, autobusom, autom, električkou alebo iným druhom motorového vozidla?

_____ počet hodín denne

_____ počet minút denne

Teraz sa zamyslite len nad bicyklovaním alebo chôdzou, ako spôsob Vašej prepravy do a z práce, pri vybavovaní, alebo iba na prepravu z miesta na miesto.

26. Počas **posledných 7 dní**, koľko dní ste bicyklovali bez prestania aspoň 10 minút pri preprave z **jedného miesta na iné?**

_____ počet dní za týždeň

☐ Necestoval(-a) som bicyklom → **Preskočte na otázku 28**

27. Koľko času strávite v daných dňoch bicyklovaním z miesta na miesto?

_____ počet hodín denne

_____ počet minút denne

28. Počas **posledných 7 dní**, v koľkých dňoch ste chodili pešky bez prestania aspoň 10 minút pri preprave z miesta na miesto?

_____ počet dní za týždeň

☐ Žiadna chôdza z miesta na miesto → **Preskočte k Časti 3: DOMÁCE PRÁCE, UDRŽIAVANIE DOMÁCNOSTI A STAROSŤ O RODINU**

29. Koľko času ste strávili v daných dňoch chôdzou z miesta na miesto?

_____ počet hodín denne

_____ počet minút denne

ČASŤ 3: DOMÁCE PRÁCE, UDRŽIAVANIE DOMÁCNOSTI STAROSŤ O RODINU

Táto časť sa týka fyzických aktivít ktoré ste mali možnosť vykonávať za posledných 7 dní vo Vašej domácnosti ako sú napríklad domáce práce, práce v záhradke, práca na dvore, všeobecne udržiavanie poriadku, a starostlivosť o rodinu.

30. Uvažujte iba o tých fyzických aktivitách ktoré ste vykonávali aspoň 10 minút bezprestajne. **V posledných 7 dňoch**, počas koľkých dní ste vykonávali **veľmi vyčerpávajúcu** fyzickú aktivitu ako je dvíhanie ťažkého bremena, rúbanie dreva, odhrňovanie snehu, alebo kopanie v záhradke alebo na dvore.

_____počet dní za týždeň

☐

Nevykonával(-a) som žiadnu veľmi vyčerpávajúcu prácu v domácnosti → **Preskočte na otázku 32**

31. Koľko času ste strávili počas jedného z udaných dňov vykonávaním veľmi vyčerpávajúcej fyzickej aktivity v záhradke alebo na dvore?

_____počet hodín denne

_____počet minút denne

32. Znovu, uvažujte iba o tej fyzickej aktivite ktorú ste prevádzali aspoň 10 minút bezprestajne. **Za posledných 7 dní**, počas koľkých dní ste vykonávali **stredne vyčerpávajúcu** fyzickú aktivitu ako je nosenie ľahkých bremien, zemetanie, umývanie okien, hrabanie **v záhradke a na dvore (vonku, nie v domácnosti)?**

_____počet dní za týždeň

☐

Nevykonával(-a) som žiadnu stredne vyčerpávajúcu prácu v záhradke a na dvore → **Preskočte na otázku 34**

33. V priebehu dní ktoré ste udali v predchádzajúcej otázke, koľko času ste zvyčajne strávili vykonávaním stredne vyčerpávajúcej fyzickej aktivity v záhradke alebo na dvore?

_____počet hodín denne

_____počet minút denne

34. Opäť, uvažujte iba o tej fyzickej aktivite ktorú ste prevádzkali aspoň 10 minút bezprestajne. **Za posledných 7 dní**, počas koľkých dní ste vykonávali **stredne vyčerpávajúcu** fyzickú aktivitu ako je nosenie ľahkých bremien, umývanie okien, drhnutie dlážky alebo zametanie v domácnosti?

_____ počet dní za týždeň

☐

Nevykonával(-a) som žiadnu stredne vyčerpávajúcu v domácnosti

**Preskočte k Časti 4:
REKREÁCIA, ŠPORT A ODDYCHOVÁ
FYZICKÁ AKTIVITA**

35. V priebehu dní ktoré ste udali v predchádzajúcej otázke, koľko času strávite zvyčajne vykonávaním stredne vyčerpávajúcej fyzickej aktivity vo vnútri Vášho domu?

_____ počet hodín denne

_____ počet minút denne

ČASŤ 4: REKREÁCIA, ŠPORT A ODDYCHOVÁ FYZICKÁ AKTIVITA

Táto časť sa týka všetkých fyzických aktivít ktoré ste vykonávali v posledných 7 dňoch len za účelom rekreácie, športu, cvičenia, alebo odpočinku. Prosím nezahŕňajte žiadne aktivity o ktorých ste sa už zmienovali.

36. Nepočítajúc chôdzu ktorá už bola spomínaná, v **posledných 7 dňoch** počas koľkých dní ste **chodili** aspoň 10 minút bez prestania **v rámci voľného času**?

_____ počet dní za týždeň

☐

Žiadna chôdza v rámci voľného času

Preskočte na otázku 38

37. Koľko času strávite zvyčajne chôdzou v priebehu dní ktoré ste udali v predchádzajúcej otázke?

_____ počet hodín denne

_____ počet minút denne

38. Uvažujte iba o tej fyzickej aktivite ktorú ste vykonávali v trvaní aspoň 10 minút bez prestania. Počas koľkých dní **v priebehu posledných 7 dní** ste vykonávali veľmi vyčerpávajúcu fyzickú aktivitu ako je aerobik, beh, rýchle bicyklovanie, rýchle plávanie **vo Vašom voľnom čase?**

_____ počet dní za týždeň

☐

Žiadna vyčerpávajúca aktivita vo voľnom čase →

Preskoč na otázku 40

39. Koľko času ste strávili vykonávaním veľmi vyčerpávajúcej fyzickej aktivity vo Vašom voľnom čase v priebehu dní ktoré ste udali v predchádzajúcej otázke?

_____ počet hodín denne

_____ počet minút denne

40. Uvažujte iba o tej fyzickej aktivite ktorú ste vykonávali v trvaní aspoň 10 minút bez prestania. Počas koľkých dní **v priebehu posledných 7 dní** ste vykonávali **stredne vyčerpávajúcu** fyzickú aktivitu ako je bicyklovanie v pravidelnom rytme alebo štvorhra v tenise **vo Vašom voľnom čase?**

_____ počet dní za týždeň

☐

Žiadna stredne vyčerpávajúca aktivita vo voľnom čase →

Preskoč na

ČASŤ 5: ČAS STRÁVENÝ

SEDENÍM

41. Koľko času ste strávili vykonávaním **stredne vyčerpávajúcej** fyzickej aktivity vo Vašom voľnom čase v priebehu dní ktoré ste udali v predchádzajúcej otázke?

_____ počet hodín denne

_____ počet minút denne

ČASŤ 5: ČAS STRÁVENÝ SEDENÍM

Posledné otázky sa týkajú Vášho času strávenom sedením v práci, doma, robením domácich úloh a vo voľnom čase. Tu sa môžu zahnúť aktivity ako čas strávený sedením za stolom, na návšteve priateľov, čítaním alebo sedením alebo pozeraním televízie. Nezahŕňajte žiadny čas strávený sedením v motorovom vozidle, o čom ste sa už zmieňovali.

42. V priebehu **posledných 7 dní**, koľko času ste strávili sedením počas pracovných dní?

_____ počet hodín denne

_____ počet minút denne

43. V priebehu **posledných 7 dní**, koľko času ste strávili sedením počas víkendu?

_____ počet hodín denne

_____ počet minút denne

Cvičenie: Stupne Zmien

Pravidelné cvičenie je akákoľvek plánovaná aktivita (napr. rýchla chôdza, beh, bicyklovanie, plávanie, basketbal, aerobik, a pod.) prevedená za účelom zvýšenia fyzickej kondície. Takáto aktivita by mala byť vykonávaná aspoň 4 krát do týždňa po dobu 30-tich a viac minút do úrovne ktorá by zvýšila frekvenciu dýchania a viedla k poteniu. Používajúc túto definíciu ...

44. Cvičíte pravidelne (t.j. aspoň 4 krát do týždňa po dobu 30 minút alebo dlhšie)?

1. Áno

2. Nie

45. Mienite začať pravidelne cvičiť v nasledujúcich 6-tich mesiacoch?

1. Áno

2. Nie

46. Mienite začať pravidelne cvičiť v najbližších 30-tich dňoch?

1. Áno

2. Nie

47. Venovali ste sa pravidelnému cvičeniu počas posledných 6-tich mesiacoch alebo už aj predtým?

1. Nie, cvičím pravidelne menej než 6 mesiacov

2. Áno, cvičím pravidelne 6 mesiacov alebo dlhšie

Cvičenie: Rozhodovanie o Účasti

Táto časť sleduje pozitívne a negatívne aspekty cvičenia. Čítajte nasledujúce konštatovania a označte či sú pre Vás tieto konštatovania viac alebo menej

významné pri rozhodovaní o tom či budete alebo nebudete cvičiť vo vašom voľnom čase. Prosím odpovedajte podľa nasledujúcej 5-stupňovej škály.

5 = konštatovanie nie je významné

4 = málo významné

3 = trochu viac významnejšie

2 = vcelku významné

1 = mimoriadne významné

Ak nesúhlasíte s tvrdením a nie ste si istý s odpoveďou, tvrdenie nie je asi pre vás významné.

Nakoľko su dôležité nasledujúce názory na Vaše rozhodnutie či cvičiť alebo nie?

48. Mal(-a) by som viac energie pre rodinu a kamarátov, ak by som cvičil(-a) pravidelne. _____

49. Cítil(-a) by som sa zahanbený(-á), ak by ma ľudia videli cvičiť. _____

50. Cítil(-a) by som sa menej stresovaný(-á) ak by som cvičil(-a) pravidelne. _____

51. Cvičenie mi bráni tráviť čas s kamarátmi(-kami). _____

52. Cvičenie zlepšuje moju náladu po zvyšok dňa. _____

53. Cítim sa neprijemne alebo zahanbene v cvičebnom úbore. _____

54. Cítil(-a) by som sa príjemnejšie a spokojnejšie s tým ako vyzerám, ak by som cvičil(-a) pravidelne. _____

55. Je veľa, čo by som sa mal(-a) ešte o cvičení naučiť. _____

56. Pravidelné cvičenie by mi pomohlo pozitívnejšie sa dívať na život. _____

57. Cvičenie navyše zaťažuje aj môjho partnera(-ku) a prípadne aj mojich príbuzných. _____

Cvičenie: Seba-istota

Niektorý ľudia by sa rozhodli v nasledujúcich situáciach necvičiť pretože niečo im v tom bráni. Prosím, ohodnotte aký(-á) ste si seba-istý(-á) že by ste cvičili v nasledujúcich situáciach. Použite prosím nasledujúcu 5-stupňovú škálu:

- 1 = Vôbec si nie som sebeistý(-á)
 - 2 = Viacmenej si nie som sebeistý(-á)
 - 3 = Som si stredne sebeistý(-á)
 - 4 = Veľmi sebeistý(-á)
 - 5 = Úplne sebeistý(-á)
-

Som si istý(-á) že by som cvičil(-la) keď:

- 58. Som veľmi stresovaný(-á) _____
 - 59. Citím že nemám čas _____
 - 60. Musím cvičiť sám/sama _____
 - 61. Nemám prístup k cvičebnému načiniu _____
 - 62. Trávim čas s priateľmi(-kami) alebo s rodinou, ktorý necvičia _____
 - 63. Prší alebo sneží _____
-

Cvičenie : Vplyv Rodiny

Počas posledných 30tich dní, ako často Vaša rodina robila nasledujúce:

- 1. Nikdy
 - 2. Zriedkavo
 - 3. Občas
 - 4. Často
 - 5. Takmer vždy
-
- 64. Povzbudíme jeden druhého k pravidelnému cvičeniu. _____
 - 65. Diskutujeme o tom aké nezdravé je byť neaktívny. _____
 - 66. Pripomíname jeden druhému aby sme pravidelne cvičili. _____
 - 67. Delíme sa s myšlienkami o tom ako byť fyzicky viac aktívny počas viacerých dní. _____

Týmto sa končí dotazník, ďakujem za Vašu účasť !

Bibliography

- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, 84, 191-215.
- Benisovich, S. V., Rossi, J. S., Norman, G. J., & Nigg, C. R. (1998). Development of a multidimensional measure of exercise self-efficacy. *Annals of Behavioral Medicine*, 20, S190 (Abstract).
- Bock, B. C., Marcus, B. H., Pinto, B. M., & Forsyth, L. A. H. (2001). Maintenance of physical activity following an Individualized motivationally tailored intervention. *Annals of Behavioral Medicine*, 23, 79-87.
- Boudreaux, E. D., Francis, J. L., Taylor, C. L. C., Scarinci, I. C., & Brantley, P. J. (2003). Changing multiple health behaviors: Smoking and exercise. *Preventive Medicine*, 36, 471-478.
- Carpenter, M. (1997). Slovakia and the triumph of nationalist populism. *Communist and Post-Communist Studies*, 30, 205-220.
- Caspersen, C. J., Powell, K. E., & Christenson, G. M. (1985). Physical activity, exercise, and physical fitness: Definitions, and distinctions for health-related research. *Public Health Report*, 100, 126-130.
- Centers for Disease Control and Prevention. (1996). *Physical activity and health in Adults. A report of the surgeon general*. Atlanta, GA: Author.
- Coups, E. J., Gaba, A., & Orleans, C. T. (2004). Physician screening for multiple behavioral health risk factors. *American Journal of Preventive Medicine*, 27, 34-41.

- Craig, C. L., Marshall, A. L., Sjöström, M., Bauman, A. E., Booth, M. L., Ainsworth, B. E., Pratt, M., Ekelund, U., Yngve, A., Sallis, J. F., & Oja, P. (2003). International Physical Activity Questionnaire: 12-country reliability and validity. *Medicine and Science in Sports and Exercise*, 35, 1381-1395.
- Dannecker, E. A., Hausenblas, H. A., Connaughton, D. P., & Lovins, T. R. (2003). Validation of a stages of exercise change questionnaire. *Research Quarterly for Exercise and Sport*, 74, 236-247.
- Deng, X., Doll, W. J., Hendrickson, A. R., & Scazzero, J. A. (2005). A multi-group analysis of structural invariance: An illustration using the technology acceptance model. *Information and Management*, 42, 745-759.
- Dishman, R. K. (1988). Exercise adherence research: Future directions. *American Journal of Health Promotion*, 3, 52-56.
- Dye, G. (2006-a). *Validation and reliability of the decisional balance, self-efficacy, family support and Godin exercise measures in a sample of parents*. Unpublished manuscript.
- Dye, G. (2006-b). *Validation and reliability of the decisional balance, self-efficacy, family support, and exercise behavior measures in a Slovak sample*. Unpublished manuscript.

Emmons K. M., Marcus B. H., Linnan L., Rossi J. S. & Abrams D. B (1994).

Mechanisms in multiple risk factor interventions: Smoking, physical activity, and dietary fat intake among manufacturing workers. *Preventive Medicine*, 23, 481-489.

Fang, J., Wylie-Rosett, J., Cohen, H. W., Kaplan, R. C., & Alderman, M. H.

(2003). Exercise, body mass index, caloric intake, and cardiovascular mortality. *American Journal of Preventive Medicine*, 25, 283-289.

Fine, L. J., Philogene, G. S., Gramling, R., Coups, E. J., & Sinha, S. (2004).

Prevalence of multiple chronic disease risk factors: 2001 National health interview survey. *American Journal of Preventive Medicine*, 27, 18-24.

Godin, G., & Shepard, R.J. (1985). A simple method to assess exercise

behavior in the community. *Canadian Journal of Applied Sport Sciences*, 10, 141-146.

Haase, A., Steptoe, A., Sallis, J. F., & Wardle, J. (2004). Leisure-time physical

activity in university students from 23 countries: Associations with health-beliefs, risk awareness, and national economic development. *Preventive Medicine*, 39, 182-190.

Hausenblas, H. A., Dannecker, E. A., Connaughton, D. P., & Lovins, T. R.

(1999). Examining the validity of the stages of exercise change algorithm. *American Journal of Health Studies*, 15, 94-99.

- Hlavačka, S., Wágner, R., & Riesberg, A. (2004). *Health Care Systems in Transition: Slovakia*. Copenhagen: WHO Regional Office for Europe on behalf of the European Observatory on Health Systems and Policies.
- Houghton, A. R., Harrison, M., Cowley, A. J., & Hampton, J. R. (2002). Assessing exercise capacity, quality of life and haemodynamics in heart failure: Do the tests tell us the same thing? *The European Journal of Heart Failure*, 4, 289-295.
- Indicators on economic development (2003). *Statistical Office of the Slovak Republic*. Retrieved December 2, 2003, from http://www.statistics.sk/webdata/english/index2_a.htm
- Iwane, M., Arita, M., Tomimoto, S., Satani, O., Matsumoto, M., Miyashita, K., & Nishio, I. (2000). Walking 10,000 steps/day or more reduces blood pressure and sympathetic nerve activity in mild essential hypertension. *Hypertension Research*, 23, 573-580.
- Janis, I. L., & Mann, L. (1977). *Decision making: A psychological analysis of conflict, choice and commitment*. New York: Free Press.
- Kirtland, K.A., Porter, D.E., Addy, C.L., Neet, M.J., Williams, J.E., Sharpe, P.A., Neff, L.J., Kimsey, C.D., & Ainsworth, B.E. (2003). Environmental measures of physical activity supports: Perception versus reality. *American Journal of Preventive Medicine*, 24, 323-331.

- Laforge, R.G., Velicer, W.F., Richmond, R.L., & Owen, N. (1999). Stage distributions for five health behaviors in the United States and Australia. *Preventive Medicine, 28*, 61-74.
- Linnan, L. A., Taylor, E. R., Bock, B. C., Roberts, M. B., Rossi, J. S., & Abrams, D. B. (1998). Evaluation of motivationally tailored vs. standard self-help physical activity interventions at the workplace. *American Journal of Health Promotion, 12*, 246-253.
- Mackay, J., & Mensah, G. (2004). *The Atlas of Heart Disease and Stroke*. Geneva: WHO Marketing and Dissemination and CDC monserial publication.
- Marcus, B. H., Rakowski, W. & Rossi, J. S. (1992). Assessing motivational readiness and decision-making for exercise. *Health Psychology, 11*, 257-261.
- Marshall, A. L., Bauman, A. E., Owen, N., Booth, M. L., Crawford, D., Marcus, B. H. (2003). Population-based randomized controlled trial of a stage-targeted physical activity intervention. *Annals of Behavioral Medicine, 25*, 194-202.
- Marshall, S. J., & Biddle, J. H. (2001). The transtheoretical model of behavior change: A meta-analysis of applications to physical activity and exercise. *Annals of Behavioral Medicine, 23*, 229-246.

- Moreau, K. L., Degarmo, R., Langley, J., McMahon, C., Howley, E. T., Bassett, D. R., & Thompson, D. L. (2001). Increasing daily walking lowers blood pressure in postmenopausal women. *Medicine and Science in Sports and Exercise*, 33, 1825-1831.
- National Center for Chronic Disease Prevention and Health Promotion. (2004). *Chronic Disease Prevention: Overview*. Atlanta, GA: Author.
- Nigg, C.R., & Courneya, K.S. (1998). Transtheoretical model: Examining adolescent exercise behavior. *Journal of Adolescent Health*, 22, 214-224.
- Nigg, C.R., Rossi, J.S., Norman, G.J., & Benisovich, S.V. (1998). Structure of decisional balance for exercise adoption. *Annals of Behavioral Medicine*, 20, S211.
- Owen, N., Humpel, N., Leslie, A., Bauman, A., & Sallis, J. F. (2004). Understanding environmental influences on walking: Review and research agenda. *American Journal of Preventive Medicine*, 27, 67-76.
- Pikora, T., Corti, B. G., Bull, F., Jamrozik, K., & Donovan, R. (2003). Developing a framework for assessment of the environmental determinants of walking and cycling. *Social Science and Medicine*, 56, 1693-1703.

- Plotnikoff, R.C., Blanchard, C., Hotz, S. B., & Rhodes, R. (2001). Validation of the decisional balance scales in the exercise domain from the transtheoretical model: A longitudinal test. *Measurement in Physical Education and Exercise Science*, 5, 191-206.
- Plotnikoff, R.C., Hotz, S.B., Birkett, N.J., & Courneya, K.S. (2001). Exercise and the transtheoretical model: A longitudinal test of a population sample. *Preventive Medicine*, 33, 441-452.
- Prochaska, J.O., DiClemente, C.C., & Norcross, J.C. (1992). In search of how people change: Application to addictive behaviors. *American Psychologist*, 47, 1102-1114.
- Prochaska, J.O. (1994). Strong and weak principles for progressing from precontemplation to action on the basis of twelve problem behaviors. *Health Psychology*, 13, 47-51.
- Prochaska, J.O., & Norcross, J.C. (1994). Comparative conclusions: Toward a transtheoretical therapy. In J.O. Prochaska, & J.C. Norcross (Eds.), *Systems of Psychotherapy: A Transtheoretical Analysis* (pp.453-492). Pacific Grove, CA: Brooks/Cole Publishing Company.
- Prochaska, J.O., Velicer, W.F., Rossi, J.S., Goldstein, M.G., Marcus, B.H., Rakowski, W., Fiore, C., Harlow, L.L., Redding, C.A., Rosenbloom, D., & Rossi, S.R. (1994). Stages of change and decisional balance for 12 problem behaviors. *Health Psychology*, 13, 39-46.

- Prochaska, J.O., & Velicer, W.F. (1997). Stages of change: The temporal dimension of the transtheoretical model. *American Journal of Health Promotion, 12*, 38-48.
- Redding, C.A., Rossi, J.S, Pallonen, U.E., Prochaska, J.O., Abrams, D.B., Velicer, W.F., Plummer, B., Meier, K., Greene, G.W., & Rossi, S.R. (1999). Measures of family influence on healthy behavior changes in parents of adolescents. *Annals of Behavioral Medicine, 21*, S174 (Abstract).
- Reed, G. R., Velicer, W. F., Prochaska, J. O., Rossi, J. S. & Marcus, B. H. (1997). What makes a good staging algorithm: Examples from regular exercise. *American Journal of Health Promotion, 12*, 57-67.
- Saelens, B. E., Sallis, J. F., & Frank, L. D. (2003). Environmental correlates of walking and cycling: Findings from the transportation, urban design, and planning literature. *Annals of Behavioral Medicine, 25*, 80-91.
- Sallis, J. F., Kraft, K., & Linton, L. S. (2002). How the environment shapes physical activity: A transdisciplinary research agenda. *American Journal of Preventive Medicine, 22*, 208.
- Sarkin, J.A., Johnson, S.S., Prochaska, J.O., & Prochaska, J.M. (2001). Applying transtheoretical model to regular moderate exercise in an overweight population: Validation of a stages of change measure. *Preventive Medicine, 33*, 462-469.

- Schoenborn, C. A., Adams, P. F., Barnes, P. M., Vickerie, J. L., & Schiller, J. S. (2004). Health behaviors of adults: United States, 1999-2001. National Center for Health Statistics. *Vital Health Statistics*, 10, 1-79.
- Schumann, A., Estabrooks, P. A., Nigg, C. R., & Hill, J. (2003). Validation of the stages of change with mild, moderate, and strenuous physical activity behavior, intentions, and self-efficacy. *International Journal of Sports Medicine*, 24, 363-365.
- Schumann, A., Nigg, C. R., Rossi, J. S., Jordan, P. J., Norman, G. J., Garber, C. E., Riebe, D., & Benisovich, S. V. (2002). Construct validity of the stages of change of exercise adoption for different intensities of physical activity in four samples of differing age groups. *American Journal of Health Promotion*, 16, 280-287.
- Shepard, R. J., & Vuillemin, A. (2003). Limits to the measurement of habitual physical activity by questionnaires. *British Journal of Sports Medicine*, 37, 197-206.
- Steptoe, A., Wardle, J., Cui, W., Bellisle, F., Zotti, A. M., Baranyai, R., & Sanderman, R. (2002). Trends in smoking, diet, physical exercise, and attitudes toward health in European university students from 13 countries, 1990-2000. *Preventive Medicine*, 35, 97-104.
- Swartz, A. M., Strath, S. J., Bassett, D. R., Moore J. B., Redwine, B. A., Groër, M., & Thompson, D. L. (2003). Increasing daily walking improves glucose tolerance in overweight women. *Preventive Medicine*, 37, 356-362.

- Troped, P. J., Saunders, R. P., Pate, R. R., Reininger, B., & Addy, C. A. (2003). Correlates of recreational and transportation physical activity among adults in a New England community. *Preventive Medicine, 37*, 304-310.
- Tudor-Locke, C., Ainsworth, B. E., Whitt, M. C., Thompson, R. W., Addy, C. L., & Jones, D. A. (2001). The relationship between pedometer-determined ambulatory activity and body composition variables. *International Journal of Obesity, 25*, 1571-1578.
- Tudor-Locke, C. E., Bell, R. C., Myers A. M., Harris, S. B., Lauzon, N., & Rodger, N. W. (2002). Pedometer-determined ambulatory activity in individuals with type 2 diabetes. *Diabetes Research and Clinical Practice, 55*, 191-199.
- Velicer, W.F., DiClemente, C.C., Prochaska, J.O., & Brandenburg, N. (1985). A decisional balance model for assessing and predicting smoking status. *Journal of Personality and Social Psychology, 48*, 1279-1289.
- Velicer, W.F., DiClemente, C.C., Rossi, J.S., & Prochaska, J.O. (1990). Relapse situations and self-efficacy: An integrative model. *Addictive Behaviors, 15*, 271-283.
- Velicer, W. F., & Prochaska, J. O. (1999). An expert system intervention for smoking cessation. *Patient Education and Counseling, 36*, 119-129.

- Velicer, W. F., Prochaska, J. O., Fava, J. L., Rossi, J. S., Redding, C. A., Laforge, R. G., & Robbins, M. L. (2000). Using the transtheoretical model for population-based approaches to health promotion and disease prevention. *Homeostasis in Health and Disease*, 40, 174-195.
- Velicer, W. F. (2003, September). *Behavioral Interventions for Disease Prevention in General Populations*. Paper presented at the meeting of German Society of Social Medicine and Prevention, Greifswald, Germany.
- Yanagimoto, Y., Oshida, Y., & Sato, Y. (2000). Effects of walking on bone quality as determined by ultrasound in the elderly. *Scandinavian Journal of Medicine and Science in Sports*, 10, 103-108.