

**PHYSICAL ACTIVITY STAGES OF CHANGE, SELF-EFFICACY, AND PERCEIVED
NEEDS AND INTERESTS OF COOPERATIVE EXTENSION FAMILY AND
CONSUMER SCIENCES AGENTS AND CLIENTELE.**

Tara Spruce Stimpson

Thesis submitted to the Faculty of the Virginia Polytechnic Institute and State University in
partial fulfillment of the requirements for the degree of

MASTERS OF SCIENCE
in
Human Nutrition, Foods and Exercise

Ruby H. Cox, Chair

Kathleen Poole

Michael Lambur

Debra S. Jones

August 7, 2000

Blacksburg, VA

Keywords: Physical Activity, Exercise, Stages of change, Self-Efficacy, Decisional Balance,
Family and Consumer Sciences

PHYSICAL ACTIVITY STAGES OF CHANGE, SELF-EFFICACY, AND PERCEIVED
NEEDS AND INTERESTS OF COOPERATIVE EXTENSION FAMILY AND CONSUMER
SCIENCES AGENTS AND CLIENTELE.

By

Tara Spruce Stimpson

Ruby H. Cox, Chairperson

Department of Human Nutrition, Foods and Exercise

(Abstract)

Extensive research has clearly revealed that people of all ages can enhance their health by simply incorporating moderate levels of physical activity into their daily routine. Physical activity significantly reduces the risk of morbidity and mortality from coronary heart disease while providing protective benefits from hypertension, diabetes mellitus, osteoporosis, and colon cancer. Physical activity can lead to positive psychological improvements by decreasing levels of anxiety and depression, and enhancing self-esteem. However, despite the tremendous physical and mental health benefits, 60% of American adults do not regularly engage in physical activity and 25% are completely inactive. Moreover, only 34 % of Virginians engage in regular physical activity. Immense progress has been made in terms of understanding physical activity behavior. Many techniques based on theoretical models have been developed for intervening with physical activity behaviors and designing of programs. The Transtheoretical model is considered one of the most promising approaches for enhancing physical activity behavior. This model integrates current behavioral status with a person's intention to change his/her behavior and suggests that individuals attempting to adopt a health behavior progress through five stages of change: precontemplation, contemplation, preparation, action, and maintenance. The concepts of self-efficacy (degree of confidence) and decisional balance (perceived benefits and barriers) are often used in conjunction with the stages of change for physical activity interventions to help individuals progress through the five stages of change.

A survey was conducted among 243 Family and Consumer Sciences educators and clientele in Virginia's Cooperative Extension program. Attitudes, preferences, stages of change, perceived incentives and barriers, along with desired education channels and activities were

analyzed to provide a basis for development of effective Extension publications and programs aimed to increase and improve levels of physical activity.

Results from this study indicate that almost half of the respondents are not regularly engaging in physical activity and 31% are not engaging in any activity. Data revealed significant relationships between the stages of exercise change with respondents' levels of confidence ($p < .0001$) and with decisional balance scores ($p < .0001$). Participants who lead sedentary lifestyles or participate occasionally in physical activity (precontemplation, contemplation, and preparation stages) viewed the barriers of physical activity to surpass the benefits. Consequently, these participants had low confidence in their ability to participate in physical activity. On the other hand, participants who exercised on a regular basis (action and maintenance stages) perceive the benefits for physical activity to outweigh the barriers. Furthermore, these participants had high confidence in their ability to exercise in challenging situations. Results from this study also suggest that stage of exercise change may be related to an individual's educational level.

Regardless of age and gender, educational channels in which respondents selected to receive physical activity information were brochures and newsletters. In addition, activities in which respondents were most frequently engaging were walking and yard work. The activity that subjects selected as a means to increase physical activity levels was also walking.

The results from this study can help Extension agents and specialists develop appealing physical activity educational materials and programs that meet the needs of FCS clients. These programs may help FCS clients incorporate regular physical activity in their daily lives, moving closer to achieving the State's objective for increasing physical activity among Virginia adults and, thus, leading to improved quality of life.

ACKNOWLEDGMENTS

I would like to express my sincere gratefulness to Dr. Ruby Cox for the endless amount of guidance she has provided throughout this project. Dr Cox's insights and tremendous gift of giving and caring made my experience at Virginia tech extremely enjoyable. I would also like to thank my committee members Dr Michael Lambur, Dr. Poole, and Debra Jones who have provided me with much assistance and encouragement throughout my time as a graduate student.

I am especially blessed and fortunate to have wonderful friends and family who have filled my life with unforgettable happiness and love. I would like to dedicate this thesis to my parents, Bonnie and David Stimpson. They gave me the special opportunity to follow my dreams and make them a reality. Their gifts of love, patience, and support gave me the strength and courage to accomplish my goals and I owe everything to them.

TABLE OF CONTENTS

ABSTRACT	II
ACKNOWLEDGMENTS	IV
LIST OF TABLES	VII
CHAPTER I INTRODUCTION.....	1
Overview	1
Statement of the problem	6
Purpose of the study	7
Objectives of the study	7
Limitations.....	7
Definition of Terms.....	8
CHAPTER II REVIEW OF LITERATURE	10
Public Health Challenge.....	10
Theoretical Models	14
Preferences for Types of Physical Activity and Channels of Information	24
Virginia Cooperative Extension.....	27
Use of Surveys in Research	30
Summary.....	33
CHAPTER III METHODOLOGY	35
Research Protocol.....	35
Subjects Surveyed	35
Instruments.....	36
Administration of the Surveys	37
Analysis of the Results.....	38
CHAPTER IV RESULTS AND DISCUSSIONS	41
Results.....	41
Response Rate	41

Characteristics of FCS Agents.....	41
Stage of Exercise Change among FCS Agents	44
Characteristics of FCS Clientele	44
Stage of Exercise Change Among FCS Clients	47
Preferences for Education Channels AND Physical Activities.....	50
Self-Efficacy, Decisional Balance, Pro and Con Measures.....	60
Discussion	72
Characteristics Among FCS Participants.....	73
Stages of Exercise Change	74
Self-Efficacy and Decisional Balance	79
Preferred Educational Channels AND Physical Activities.....	79
Limitations.....	81
CHAPTER V SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS.....	82
Summary.....	82
Conclusions	83
Recommendations for Future Research	85
REFERENCES	87
APPENDICES.....	97
A. FCS Client Informed Consent Form.....	98
B. FCS Agent Informed Consent Form.....	101
C. Cover Letter	105
D. Physical Activity Questionnaire	107
E. Extension Planning Districts.....	114
VITA.....	117

LIST OF TABLES

Table 1. Location of FCS Agents Responding to the Survey.....	47
Table 2. FCS Clientele Surveyed.....	48
Table 3. Main District FCS Clients are Located	50
Table 4. Demographic Characteristic of Extension Agents	51
Table 5. Demographic Characteristics of FCS Clients	54
Table 6. Distribution of Exercise Stages of Change among Clients and Agents	53
Table 7. Preferred Educational Channels for Physical Activity Information among Clients and Agents	51
Table 8. Physical Activities in which FCS Clients and Extension Agents were Currently Engaging.	52
Table 9. Activities that Agents and Clients Would do to Increase Levels of Physical Activity..	61
Table 10. Comparison of Pro, Con, Decisional Balance, and Self-efficacy Scores for Stage of Exercise Change among Clients and Agents.	63
Table 11. Comparison of Pro, Con, Decisional Balance, and Self-efficacy Scores for Stage of Change among Agents.....	62
Table 12. Comparison of Pro, Con, Decisional Balance, and Self-efficacy Scores for Stage of Exercise Change among Clients	63
Table 13. Exercise Self-Efficacy Responses among Client	66
Table 14. Decisional Balance Scores for Physical Activity of Extension FCS Clients.....	67

List of Figures

Figure 1. Relationships Between Stage of Change and Amount of Education Completed for FCS Clients.....	49
Figure 2. Comparison of the male and female FCS clients regarding physical in which they most frequently engage.	54
Figure 3. Activities in which female FCS clients were most frequently engaging.	55
Figure 4. Activities selected by males and female clients to increase their physical activity levels.	58
Figure 5. Activities selected by female clients to increase levels of physical activity.	59
Figure 6. Comparison of Exercise Self-efficacy Levels Based on Stage of Change.....	64
Figure 7. Comparisons of Exercise Decisional Balance Scores for Stage of Change	69
Figure 8. Comparison of Perceived Pros and Cons for Stage of Change	690
Figure 9. Comparison of Clients Perceived Exercise Pros and Cons by Stage of Change.....	711

CHAPTER I

INTRODUCTION

Overview

Extensive research has clearly revealed that people of all ages can enhance their health by simply incorporating moderate levels of physical activity into their daily routine.¹ The evidence linking adequate amounts of physical activity to numerous physical and mental health improvements is both voluminous and strong. Encouraging results from numerous scientific studies demonstrate that even a moderate amount of physical activity significantly reduces the risk of morbidity and mortality of coronary heart disease and provides protective benefits for hypertension, Type 2 diabetes, osteoporosis, colon cancer, and obesity.¹ Physical activity also offers positive psychological improvements by decreasing levels of anxiety and depression, and enhancing self-esteem. Furthermore, epidemiological studies have shown that sedentary lifestyles are associated with markedly increased all-cause mortality rates.² It has been estimated that over 200,000 deaths annually in the United States are attributable to the lack of regular physical activity.³

However, despite the immense physical and mental health benefits, 60% of American adults are not engaging in regular physical activity and 25% are completely inactive.¹ The importance of physical activity was recognized and addressed in *Healthy People 2000* and *Healthy People 2010*, the national goals for improving the health of all Americans. Health promotion and disease prevention objectives have been set in the hope of increasing the life span of healthy Americans. Unfortunately, findings reported in the *Healthy People 2000 Review*,⁵ clearly indicate that only one of the 13 physical activity and fitness objectives, increasing work site fitness programs, has been met.⁴ Therefore, the physical activity objectives have been retained for the year 2010.⁵

In an effort to promote the benefits of engaging in physical activity on a regular basis, a group of experts were assembled by the Centers for Disease Control and Prevention (CDC) and the American College of Sports Medicine (ACSM) to review the available scientific research and to develop clearly defined public health recommendations.² The goal was to promote physical

activity recommendations that are more acceptable and achievable to the American public than traditional exercise recommendations, which stress engaging in vigorous structured exercise. The newly established guidelines advise that all adults engage in at least 30 minutes of moderate-intensity physical activity on most days of the week in order to gain health benefits.² The fact that this activity can be accomplished either in a single session, or accumulated in multiple bouts with each lasting at least 8-10 minutes, should be more appealing than former guidelines. These lifestyle physical activities include leisure, occupational, or household activities that are either planned or unplanned and are part of everyday life. Examples include brisk walking, climbing stairs, performing house and yard work, and engaging in active recreational programs.⁶

While these newer recommendations are more appealing, the fact remains that the majority of American adults are inactive¹ and, thus, sedentary lifestyles continue to be a serious public health concern. A survey conducted by the CDC identified the prevalence of adults who met the new public health guidelines. Results indicated that only a third of U.S. adults met the recommendations for moderate activity and that women, ethnic minorities, adults with lower educational attainment, and the elderly were identified as being the least active.⁷

A study by Morrow et al.⁸ was conducted to determine the awareness of American adults regarding the Surgeon General's report on physical activity and health and to ascertain their knowledge about health messages contained within the report. Only one third of the adult population had heard of the report and their awareness and knowledge of the relationship between physical inactivity and specific chronic diseases was dependent on age, ethnicity, gender, and education level. Since many individuals are not aware of the new physical activity guidelines, they continue to assume that high-intensity exercise is the only means to achieve health benefits, thus, are discouraged and not interested.⁹

In recent years, considerable progress has been made in identifying the various components associated with inactivity such as demographic, cognitive and environmental factors.⁶ According to the Surgeon General Report on Physical Activity,¹ inactivity is more common among women, African Americans, Hispanic adults, and among poorly educated adults as well as individuals receiving low incomes. Important reviews on determinants and barriers to exercise indicate that many people feel that they do not have time to exercise, dislike the imposed conformity of gymnasium based exercise, and dislike vigorous exercise.⁶ Additional cognitive factors include one's perceptions that there are no benefits from moderate activity,

poor health prevents adherence to physical activity, physical activity is not enjoyable, and lack of confidence in one's ability to be active.³

Another reason that only a small number of American adults are physically active may be our high-technologically advanced society in which inactivity is encouraged. Only a few occupations require significant physical activity. Motorized transportation is used to get to work and to perform routine tasks. Leisure time is increasingly filled with sedentary behaviors, such as watching television and using the Internet.¹ Other environmental characteristics associated with inactivity include inadequate social support and activities that are not convenient, but are too expensive and exceedingly vigorous.^{10,11}

Dishman et al.¹² stated that the lack of progress toward the physical activity goals is a result of poor understanding of interventions and more needs to be learned about what motivates individuals to adopt and maintain a physically active lifestyle. Many interventions and health care professionals are under the assumption that an individual is already motivated to adopt regular physical activity and ready to take action.¹³ This action-oriented approach focuses on immediate behavior change and does not take into account how people change. There is often a mismatch between the type of program offered and the condition of the population, which leads to an increased drop-out rate and failure to participate.¹² Consequently, these programs do not attract sedentary individuals who have no desire to become physically active, but who are in the greatest need of physical activity interventions. Consistent research discoveries have indicated that the majority of sedentary individuals are not considering an increase in their physical activity level¹⁴ and over half of those who decide to become more physically active return to a sedentary lifestyle within three to six months.¹⁵

Immense progress has been made in terms of understanding physical activity behavior and many techniques based on theoretical models have been developed for designing and implementing programs.¹⁶ In 1983, James Prochaska and Carlo DiClemente introduced the Transtheoretical (stages of change) Model for integrating current behavioral status with a person's intention to change his/her behavior. They emphasized the importance of designing programs that are tailored to the appropriate stage of change.¹⁷ This model suggests that individuals attempting to eliminate or adopt a health behavior progress through five stages of change.¹⁷ The stages of change model, originally developed for smoking cessation, has been extensively used for many health behaviors, and has recently been modified by Marcus et al..¹⁴ to

apply to physical activity adoption and for the development of activity programs. The stages of change identified for physical activity are as follows:

1. Precontemplation: individuals are sedentary, not wanting to engage in any physical activity and have no intention of beginning to do so in the next six months.
2. Contemplation: individuals are not participating in physical activity, however, they intend on changing their sedentary behavior within the next six months.
3. Preparation: individuals are engaging in some physical activity, but not at goal level.
4. Action: individuals have been engaging in regular physical activity for less than six months.
5. Maintenance: individuals have sustained their physical activity change for greater than 6 months.

The concepts of self-efficacy and decisional balance are often used in conjunction with the stages of change model for physical activity interventions to help individuals progress through the various stages. The self-efficacy theory is based on the belief that the degree of confidence an individual has in his/her ability to perform a behavior under a number of specific circumstances, is positively associated with his/her actual ability to perform that specific behavior.¹⁸ Self-efficacy beliefs have been found to be associated with exercise performance¹⁰ and are related to stage of change, with precontemplators having the lowest self-efficacy levels and individuals in the maintenance stage possessing the highest level self-efficacy.¹⁹ Similarly, decisional balance, an individual's evaluation of the perceived benefits (pros) and barriers (cons) related to specific behaviors, help enhance the understanding of behavior change.²⁰ Prochaska et al.¹² demonstrate that pros and cons are reliable indicators for understanding and predicting transitions between the stages of change as individuals progress through each stage.

The transtheoretical framework is considered one of the more promising approaches for enhancing physical activity behavior.^{1,3,21} Using the stages of change framework, self-efficacy and decisional balance have been used to comprehend how individuals engaged and maintain physical activity. These concepts have been beneficial to the design and delivery of physical activity interventions for community groups,⁹ the workplace,^{22,23,24} and primary care settings.^{6,25} Results of studies have clearly indicated that targeting interventions to individual stage of change for physical activity shows promise for achieving increased physical activity, enhanced readiness to adopt physical activity, and improved stage progress toward physical activity adherence.²⁶

In addition, it is important to identify the type of advice or support that people prefer to assist them in initiating or maintaining physical activity. Health and nutrition professionals who work with the general public need training and guidance for determining priorities in educational programs. However, little is known about people's preferred sources of assistance for becoming more physically active.²⁷ Secondly, knowledge of which physical activities people are willing to adopt and maintain is of extreme value in planning physical activity interventions and educational programs. Interventions need to be centered on promoting activities that individuals enjoy and that are compatible with their life-style, as well as the surrounding environment.

The Cooperative State Research, Education, and Extension Service (CSREES) is a dynamic research and education network that provides educational programs to the public nationwide.²⁹ The Cooperative State Research, Education, and Extension Service links the research and education programs of the U.S. Department of Agriculture and works with land-grant institutions in each state, several territories and the District of Columbia.²⁹ These agencies allow the development and implementation of interactive distance education programs to reach diverse audiences and provide access to lifelong learning.²⁹ Over three million trained volunteers work with outreach education programs and over 9,600 local extension agents work in 3,150 counties nationwide.²⁹

Virginia Cooperative Extension (VCE) is an agency that has provided Virginians with educational programs for over 80 years.²⁸ Programs offered by VCE enable people to improve their lives through an educational process that uses scientific knowledge focused on issues and needs.²⁸ Virginia Cooperative Extension provides practical education through workshops, seminars and demonstrations, the telephone, research-based publications, radio and television programs, satellite broadcasts, the internet, and interactive computer programs to reach people in their homes, workplaces, and communities. According to John Dooley, FCS Extension Director, (July 17, 2000) this agency operates in 113 counties and independent cities. The Extension offices are served by 69 FCS agents. In 1998, educational programs offered by VCE reached over 4,926,819 Virginians.⁶⁹

Statement of the problem

Virginia Cooperative Extension (VCE) specialists and agents have recognized that the lack of physical activity and sedentary lifestyles contribute to chronic diseases that are the leading causes of illnesses and death in the U.S. population. According to 1995 statistics collected in the Behavioral Risk Factor Surveillance System, only 34 percent of Virginians engage in regular physical activity.⁷⁰ Therefore, the VCE 1999 Educational Program Description for Health Promotion, established the statewide objective “increase persons’ physical activity level”.³⁰ However, there are no defined educational curricula being used statewide in Virginia to emphasize the importance of physical activity. Consequently, this objective is not being addressed. To achieve this objective, educational programs must be developed to decrease Virginia’s prevalence of inactivity.

When developing physical activity education and intervention programs for the public, alternatives to structured exercise prescription need to be identified and encouraged. Blair et al.³ state that life-style interventions, in which increased activity is integrated into daily routines, may be easier for people to adopt than traditional structured exercise. Thus, moderate levels of physical activity such as brisk walking should be promoted and health benefits of these activities need to be strongly emphasized. Education programs must convince individuals of the many advantages of adopting physical activity while at the same time, convince them that the disadvantages of changing are not as great as they think. Interventions to increase physical activity should be tailored to individual needs, demographic variables, preferences, and stage of change. Physical activity and health promotion programs based on the stages of change model provide an alternative for a majority of people who are not prepared to take action and can help them change their attitudes and values about engaging in physical activity.³¹

Identifying perceived barriers and incentives, self-efficacy, and stage of exercise change to adopt physical activity within the target population is essential to developing effective physical activity educational programs. Program developers must also obtain information on the learning methods and activities that would appeal and attract the target audience. Once results of these investigations are available, educational programs can be developed. Knowledge of the

needs and interest of any population targeted by a specific education program is an essential foundation for the development of effective program methods and strategies.

Purpose of the study

The purpose of this study was to gain information regarding the preferences, stages of exercise change, perceived incentives and barriers, as well as preferred education channels of Family and Consumer Science (FCS) clientele and Extension agents. This information will be used in the development of educational publications and programming on physical activity for the promotion of optimal health.

Objectives of the study

1. Determine the prevalence of Extension agents and FCS clientele among the five stages of change related to physical activity.
2. Determine the relationship between stage of exercise change and the demographic variables of age, gender, race, marital status, number of dependents living at home, physical disabilities, education and income levels.
3. Identify the relationship between stage of change to adopt physical activity and self-efficacy among Extension FCS agents and clientele.
4. Assess the relationship between stage of change to adopt physical activity and perceived barriers and incentives to adopt such change among the Extension FCS clients and agents.
5. Determine education channels that would be most appealing to clientele for receiving information/guidance on physical activity and wellness.
6. Ascertain the physical activities in which Extension FCS clientele would be most likely to participate.

Limitations

There were several challenges in this study that are considered possible limitations.

1. Surveys were mailed by FCS agents to randomly selected clients. Researchers could not identify who were and were not respondents and could only assume that the predetermined number of survey forms were mailed.
2. All responses were self- reported which can result in biased conclusions.
3. Only one follow-up reminder was provided after the initial survey, due to a limitation in funds and time, which increased the chance of a small return rate.

Definition of Terms

Physical activity:

Any bodily movement that is produced by contraction of large muscle groups and results in increased energy expenditure.

Exercise:

Planned event and structured workout that is done to improve or maintain one's physical fitness level.

Vigorous Activity:

High-intensity physical activity for at least 20 minutes a day, three times per a week.

Moderate Activity:

Moderate-intensity activity for at least 30 minutes a day, on most days of the week.

Stage of Exercise Change (stages of change):

A transtheoretical model that suggests that behavioral change is a five-step process related to a person's readiness to adopt a physically active lifestyle. The stages have been identified as precontemplation, contemplation, preparation, action, and maintenance.

Self-efficacy:

The degree to which an individual believes they can successfully engage in a behavior during a specific situation.

Decision-making:

The comparison between perceived benefits and barriers for physical activity participation.

Cooperative State Research, Education, and Extension Service (CSREES):

A research and education network that provides educational programs to the public nationwide by linking the research and education programs of the U.S. Department of Agriculture with land-grant institutions in each state, territory and the District of Columbia.

Virginia Cooperative Extension (VCE):

An agency that provides Virginians with practical educational programs in agriculture, family and consumer sciences, and 4H.

Family and Consumer Sciences (FCS) Clients:

Clientele that have attended at least one educational event that a Family and Consumer Science agent or a paraprofessional has conducted and on which a mailing address is available.

CHAPTER II

REVIEW OF LITERATURE

Extensive research clearly states that the adoption and maintenance of moderate levels of physical activity provides tremendous benefits for physical and mental health.¹ Engaging in regular physical activity throughout life is essential for maintaining a healthy body, enhancing psychological well being, and preventing premature death. Regular physical activity is associated with lower death rates for adults, even when only moderate levels of physical activity are performed.³² On average, physically active people outlive those who are inactive.³² Substantial health benefits can be achieved by performing moderately intense activity for 30 minutes on most days of the week.¹³ Physical activity is important in the prevention and treatment of coronary heart disease, certain cancers, diabetes, osteoporosis, and obesity. The role of physical activity in preventing coronary heart disease is particularly important because this disease is the leading cause of death and disability in the U.S. In addition, participating in regular physical activity increases lean muscle and bone mass, while helping to decrease body fat.

Physical activity also aids in maintaining and improving strength and agility. Among the elderly population, functional and independent living is enhanced by physical activity while the likelihood of becoming institutionalized is decreased. Furthermore, regular physical activity increases the ability of people with specific chronic disability conditions to perform activities of daily living.³⁹ Consequently, regular physical activity can enhance the quality of life among all populations. The highest risk of death and disability is found among individuals not participating in physical activity; therefore, engaging in any amount of physical activity is better than none.

Public Health Challenge

In spite of the clear benefits of physical activity, it remains less clear how to motivate and encourage sedentary individuals to become physically active. According to the *Surgeon General's Report on Physical Activity and Health*,¹ 60 % of American adults are irregularly active and 25% of American adults are not active at all. Furthermore, over half of all individuals

who do decide to participate in a physical activity program, dropout within the first three to six months.¹⁵

In addition, the message that a sedentary lifestyle plays a role in both overweight and reduces the ability to lose weight needs to be better addressed, due to the increase in obesity. Overweight prevalence has increased among adolescents and adults for the entire U.S. population.³⁹ On February 4, 1999, the American College of Sports Medicine (ACSM) held a conference to provide an evidence-based review of the role physical activity plays in preventing and treating obesity.³³ Results indicated that sufficient evidence has been acquired to support the need to include increased physical activity in a program of weight control.³³ Many observational studies lend strong support to a place for regular physical activity in weight control suggesting that a decline in physical activities contributes to increasing overweight and obesity and that a restructuring of social conditions to allow and encourage physical activity would help to reverse trends.³³ The researchers concluded that an active lifestyle appears to diminish morbidity and mortality risk in overweight and obese individuals. However, American adults continue to spend time in sedentary activities such as television watching, playing video games, and using personal computers. Anderson (1998)³⁴ claim that these sedentary activities are contributing to the increased cases of overweight individuals.

Furthermore, the direct cost of a lack of physical activity, defined as absence of leisure-time physical activity, is approximately 24 billion dollars.³³ The medical costs of physical inactivity has been estimated to be high, based on the strength of its association with various diseases such as coronary hear disease, diabetes, gallstone disease, and other risk factors.³³ Thus, it is essential to encourage physical activity as a part of a daily routine, not only to enhance health but to also decrease economic costs.

Demographic Variables Associated with Sedentary Lifestyles.

Results of research have indicated that various types of demographic characteristics are associated with decreased physical activity levels. In the *Surgeon General's Report on Physical Activity and Health*,¹ inactivity reported to be more common in women than men, in African American and Hispanics adults than Caucasians, in elderly individuals than younger adults, in less affluent than people who receive a higher household income, and in less educated than

higher educated adults. Wong et al.³⁵ conducted a survey to determine who the least active people are among their sampled population. Results indicated that low physical activity was most prevalent among older women and married workers. In addition, the family characteristic of having children was strongly associated with performing less structured, less intense physical activity in daily living. According to literature regarding *Healthy People 2000/2010*³⁶, adults in northeastern and southern states are typically not as physically active as adults in north-central and western states. Also, people with disabilities are reported to be less active than healthy individuals. By age 75, one in three men and one in two women do not participate in regular physical activity.³⁷

Barriers to Physical Activity Adoption

The most commonly reported barriers faced by adults when trying to increase activity levels are the lack of time, access to convenient facilities, and safe environments.³⁹ Health promotion efforts need to identify barriers to physical activity that specific population groups are faced with and continue to improve and develop interventions that help eliminate these barriers. Participation in regular physical activity depends on the availability and on proximity of community facilities and to environments favorable to physical activity. People are unlikely to use community facilities located more than a few miles away.³⁷ Studies of adult participation in physical activity have found that use generally decreases as facility distance from a person's residence increases.³⁸ In addition, Carnegie et al.⁴⁰ have provided research that suggests that the U.S. is lacking in sufficient physical activity facilities and that increased access to community facilities would help facilitate the increase in physical activity.

Healthy People 2000

Only about 11% of U.S. adults report participation in regular, vigorous activity. Only, 23% of adults report participation in physical activity for five or more days per week for at 30 minutes and 23% do not engage in any physical activity.⁵ During the third and final review of progress in achieving Healthy People 2000 objectives, only one of the thirteen physical activity and fitness objectives had been achieved—*increasing worksite fitness programs*. Thus, progress

has been shown toward meeting only three of the targets, while there has been movement away from five of the targets and there has been little or no change toward the remaining targets.⁵

Worksite Programs

Although the majority of the nation's physical activity and fitness objectives have not been met, it is important to acknowledge the positive fact that worksite fitness programs have increased. Worksite physical activity and fitness programs provide a means for reaching large numbers of adults and for increasing physical activity levels of program participants.⁴¹ Evidence that worksite programs are cost-effective is growing. Cole et al.⁴¹ stated that employer cost for insurance premiums and medical expenses may be reduced and there may be additional benefits such as increased productivity, reduced absenteeism, reduced employee turnover, improved morale, and enhanced recruitment. The benefits to be gained by increasing physical activity are not just personal ones, as employers also profit from a healthier workforce. Physically fit adults have a 33% lower work absentee rate than their unfit counterparts and cost approximately 130 dollars less per year in medical insurance claims.⁴¹ Furthermore, low physical activity was associated with illness absenteeism, and self-reported stress in women.³⁵

Healthy People 2010

Healthy People 2010³⁹ proposed two overall goals: "to increase quality and years of healthy life and to eliminate health disparities." The national goal for the physical activity and fitness focus is to "improve health, fitness, and the quality of life through daily physical activity. In addition, Healthy People 2010 has been revised to include new objectives to encourage American adults to make physical activity a part of their everyday life. The new objectives are as follows:

- (22-1) reduce the proportion of adults who engage in no leisure-time physical activity. The target is to increase to 20%, compared with the baseline of 40% in 1997.
- (22-2) increase the proportion of adults who engage regularly, preferably daily, in moderate physical activity for at least 30 minutes a day. The target is to increase to 30%, compared with a baseline of 15% in 1997.

- (22-14) increase the proportion of trips made by walking (i.e. trips of one mile or less). The target is 25% versus a baseline of 16% in 1995 (for adults aged 18 and older).
- (22-15) increase the proportion of trips made by cycling. (Target 2010 is 2% from baseline of .6% in 1995. The activity includes trips less than 5 miles for adults aged, 18 and over).

It appears that many interventions are designed for individuals who have decided to become or continue to be physically active, but the majority of Americans appear not to be interested in engaging in physical activity programs and, thus, remain practically inactive. Dishman¹² states that this mismatch between current offerings (action-oriented programs) and the condition of American adults (inactive and not interested in physical activity) indicates that successful interventions must be tailored to the needs of the targeted population.

Theoretical Models

Theoretical constructs derived from the social cognitive theory,¹⁸ decision-making theory,⁴² and the transtheoretical model¹⁷ have been used to gain insight on how individuals decide to become physically active.

Transtheoretical Model. The transtheoretical model, commonly recognized as the stages of change model, has been successfully applied to tailoring interventions.⁶ This model has been effectively used in tailoring treatment to individuals not interested in engaging in physical activity and has been useful in guiding and developing successful physical activity interventions.^{6,43} Increasingly, researchers are using the transtheoretical model of behavior change as a theoretical framework for examining the exercise adoption and maintenance process.⁴⁴ This model has been used to understand the stages individuals progress through, and the related constructs (stage of change, exercise self-efficacy and decision making) are used to design strategies for changing health behaviors. The stages of change model proposed by Prochaska and DiClemente¹⁷ describes the different phases involved in the acquisition and maintenance of a behavior. These researchers suggest that individuals engaging in a new behavior move in an orderly progression through five different stages: (1) Precontemplation (no intention to change behavior); (2) Contemplation (intention to change behavior); (3) Preparation

(making small changes); (4) Action (involved in behavior change); (5) Maintenance (sustained behavior change). A particular strength in applying the stages of change model to the study of physical activity behaviors is its dynamic nature.¹² The model focuses on the transitions that occur in adoption and maintenance of a behavior, with individuals progressing through the stages at varying rates. Movement through the stages does not always occur in a linear manner, but may also be cyclical as most individuals make several attempts at behavior change before the goal is met.⁴³ Also appealing to exercise adoption is that the stage of change model suggests that behavior change is not an all or nothing phenomenon and that those individuals who stop performing a behavior may tend to start again.

Extensive research has been conducted with physical activity and interventions. The transtheoretical stages of change model has been found useful in determining how people change health behaviors. Recently, Prochaska's¹⁷ model has been successfully applied to the study of exercise behavior change).⁴⁵ Interventions designed to improve rates of successful change were shown to be helpful in a meta analysis examining physical activity interventions to improve physical activity adoption. The results of the analysis indicated that success rates improved from 50% to 67% with various types of physical activity programs.⁴⁶ Physical activity interventions using behavior modification strategies, emphasizing lower intensity activity, and using a mediated delivery approach were found to effectively increase the rate of successful change.⁴⁷ Project Active was a two-year randomized trial that compared lifestyle physical activity with a structured exercise program. Both groups at six months became significantly more active. The materials were developed to specifically target cognitive and behavior stages of change based on Prochaska and DiClement,s¹⁷ stages of change model and Bandura's¹⁸ cognitive theory that analyzed self-efficacy. Results indicate that change during the first six months predicted physical activity behavior at 24 months.

Decisional Balance. Decision making theories are an important component in understanding behavior change. Studies of decisional balance measure, the individual's evaluation of the pros and cons related to physical activity behavior. Results have shown an association between a person's relative view of pros and cons and readiness for physical activity adoption.^{19,48} Prochaska et al.⁴⁹ have concluded that the original eight central constructs developed by Janis and Mann⁴² could be reduced to a simpler two-factor model consisting of Pros (benefits) and

Cons (barriers). Pros represent the perceived benefits of behavior change, whereas, the cons represent the perceived barriers to behavior change. Prochaska et al.^{17,49} maintain that pros and cons are excellent indicators of an individual's progress from precontemplation to contemplation to preparation. Studies conducted at the Cancer Prevention Research Center have concluded that the cons outweigh the pros at the precontemplation stage, while the pros outweigh the cons during the action and maintenance stages.⁵⁰

Self-Efficacy. Investigations applying the stages of change model to exercise behavior have also focused on the construct of exercise self-efficacy.⁵¹ Self-efficacy is the degree of confidence that an individual has in his/her ability to be physically active in specific situations. Self-efficacy has been shown to be positively associated with the adoption and maintenance of physical activity behavior¹⁰ and motivational readiness for physical activity participation. Bandura¹⁸ maintains that individuals with high confidence in their ability to perform a given task will be more likely to engage in that task. Research using the transtheoretical model has found that self-efficacy scores correlate highly with stages of change.⁵⁰ In the precontemplation stage, self-efficacy scores have a tendency to be lower than in the maintenance stage.

Identifying Stages of Change, Self-efficacy, Benefits and Barriers of Physical Activity

Applications of the stages of change and self-efficacy to exercise were examined by Marcus, Selby, Niaura and Rossi.¹⁴ These researchers developed a stage of exercise scale based on the framework of the transtheoretical (stages of change) model. A five-item self-efficacy measure was constructed which was used to determine the confidence an individual has in his/her ability to exercise in specific situations. The scales were used to assess prevalence information on stage of change for exercise and the relationship between the stage of change and self-efficacy among two work site samples (1,491 employees). In the first work site sample, 34% of the subjects were classified in the action or maintenance stage; whereas, 39% of the employees from the second work site sample were participating regularly in physical activity. Results from the self efficacy items significantly differentiated employees at most stages ($p < .001$). In contrast with those who exercised regularly, employees who had not yet begun to exercise had little confidence in their ability to exercise.

As a part of the same study, Marcus et al.¹⁴ investigated the reliability of both instruments. For the five-item self-efficacy measure, internal consistency was .76. Test–retest reliability for the self-efficacy scale over a 2-week period was .90. The Kappa index of reliability for the stages of change instrument, over a two-week period, was .78.

As part of a health promotion study, Burn et al.⁵² explored the relationship between readiness to adopt exercise (expressed through the stages of change measure) and coronary heart disease risk factors for 709 employees participating in a worksite lifestyle-screening program. Questionnaires were administered to determine stage of change for exercise adoption, exercise self-efficacy, and exercise behavior among the subjects. The results revealed that the greatest proportion of the subjects were classified in the maintenance stage. The amount of aerobic exercise subjects reported, increased significantly across the stages except between action and maintenance stages ($p < .001$). Self-efficacy scores differed significantly between precontemplation and maintenance stage ($p < .001$).

In 1990, Barke et al.⁵³ conducted a study to measure the stages of change in an elderly sample and compared the stages between active and inactive groups. Results indicated that action and maintenance scores were significantly higher than precontemplation scores, demonstrating that the stages of change could distinguish groups of older adults who differ in level of physical activity.

The relationship between exercise stage of change and demographic variables and beliefs about the benefits of exercise were examined in 4,404 Australian adults by Booth et al.²⁷ Data implied that the intention to do more exercise generally decreases with increasing age, and increases with level of education.

Marcus and Simkin⁴³ examined the concurrent validity of the stage of exercise change instrument by comparing it with Blair's⁵⁴ Seven-Day Physical Activity Recall Questionnaire. The researchers used these scales to measure the stages of exercise behavior change and the individuals' level of activity at each stage. A sample of 235 employees were administered the Stage of Change and Seven Day Physical Activity Recall questionnaires. Of the participating employees, 51% did not engage in exercise and were categorized in the precontemplation and contemplation stage, while the remaining 49% were in the preparation, action, or maintenance stage. Scores on physical-activity behavior items significantly differentiated employees among

the specific stages of change ($p < .001$). These results indicated that the stage of change instrument has concurrent validity for measuring exercise adoption.

Similarly, the ability of the stage of exercise scale to differentiate between subjects classified into each of the theoretically posited stages was studied by Cardinal²³ in a sample of 178 female adults. The purpose of the study was to determine whether the stage of exercise scale would differentiate between participants who had been classified into stage of exercise by several behavioral and biometric physical activity variables (leisure-time exercise behavior, frequency of sweating, body fat percentage, physical activity rating, and VO_2 peak ml/kg/min). Results showed that the scale was able to significantly differentiate between subjects classified by stage in terms of exercise energy expenditure ($p < .0001$), physical activity energy expenditure ($p < .0001$) and VO_2 peak ml/kg/min ($p < .0001$).

Wyse et al.⁵¹ also examined the concurrent validity of the Stages of Exercise Behavior Change (SEBC) scale in 244 young British adults. Their results provide additional support for the concurrent validity of the SEBC scale. Differences between the categories of exercise behavior change were clearly defined based on self-reported levels of strenuous and moderate exercise behavior.⁵¹ The SEBC was found to have the ability to discriminate between categories of exercise behavior change for both males and females ($p < .0001$). Results revealed significant differences between the Exercise Behavioral Categories in self-reported levels of exercise behavior ($p < .01$). The data for self-reported levels of exercise behavior revealed that subjects in the Action and Maintenance stages scored higher than those in preparation, who in turn scored higher than subjects classified in the precontemplation and contemplation stages.

Significant differences were also found with self-efficacy scores ($p < .05$). These results appear to confirm the SEBC scale's relationship with exercise behavior (planned structured and repetitive bodily movement done to improve or maintain one or more components of physical fitness).⁵¹ Subsequent cross validation analysis, using a randomly selected 40% sub-sample, showed that approximately 70% of the subjects were assigned to the correct category. Researchers concluded that results appear to confirm the concurrent validity of the SEBC scale in terms of self-reported exercise behavior. Furthermore, the utility of the SEBC scale for the development of future exercise interventions appears to be appropriate for the characterization of exercise behavior patterns, as it assesses the intentions of sedentary individuals to initiate exercising. However, the majority of the subjects were in the action and maintenance stages,

which may be attributed to the young age of the study group. Therefore, the populations at greatest risk for sedentary lives were not targeted.

Further support for usefulness of the stage of change model within the exercise domain has been extensively researched by Cardinal.⁵⁵ He stated that, in previous research using the transtheoretical model within the exercise domain, data have been limited to self-reported measures. The purpose of Cardinal's study was to circumvent this limitation and extend the current literature by determining the degree of association among stage of exercise and behavioral, biometric and psychological variables (body mass index, cardiorespiratory fitness, exercise behavior, barriers and self-efficacy). A cross-sectional study was conducted with 235 adult volunteers. Significant differences were found between stage of change and the overall set of variables ($p < .0001$). Results extend the current literature supporting the construct validity of the stages of exercise behavior and offer objective support for the stage of change model within the exercise domain.

Marcus et al.⁴⁸ were also successful in the development of a decisional balance measure for exercise adoption. A sample consisting of 778 men and women from five different worksites completed a questionnaire composed of the positive and negative aspects of exercise. Analysis of variance showed that the pros and cons were significantly associated with stage of exercise adoption ($p < .0001$).

Another study conducted by Jaffee et al.⁵⁶ examined incentives and barriers that working women exhibit when attempting to incorporate physical activity in their lives. Measures for incentives, barriers, and a stage of change questionnaire were used to evaluate physical activity among 393 employed women. Based on responses, 4% of the participants were in precontemplation, 21% in contemplation, 30% in preparation, 12% in action, and 34% in the maintenance stage. Significant differences existed in incentives and barriers for physical activity. In agreement with previous studies, the results suggest that precontemplators expect few positive benefits from physical activity and, in general, the perceived benefits increase as participants move toward the action and maintenance stage. These researchers propose that employed women in different stages of change encounter different incentives and barriers to physical activity.

When applying both the decisional balance measure and self-efficacy scale with the stages of change model, results of studies show promise for further understanding of exercise

behavior and for designing physical activity programs. In 1992, Marcus and Owen¹⁹ successfully conducted a cross-sectional study to investigate the prevalence of stages of exercise change and their relationship to self-efficacy and the costs and benefits of exercising among U.S. (1,093) and Australian (n=801) employees. When combining results from both samples, 41% of the subjects were classified in the precontemplation and contemplation stages, with 59% in the preparation, action and maintenance stages. Data obtained from the self-efficacy measure were significantly related to the stage of change ($p < .05$). Likewise, the scores on the decisional balance scales were significantly associated with stage of change ($p < .001$).

In another study, Marcus et al.⁵⁷ examined the relationships among stage of change (exercise behavior), self-reported level of physical activity, self-efficacy for exercise, and decision-making for exercise among 698 employees. Results revealed that the variance in stage of exercise model could be explained by the independent components: pros, cons, and self-efficacy for exercise. In addition, the variance in physical activity was expressed by stage and the stage of change model was able to predict exercise behavior six months ahead. These researchers concluded that individuals' levels of physical activity can be predicted by knowing their stage of exercise behavior, their perceived benefits and barriers to exercise participation, and their self-efficacy for exercise.

Herrick et al.⁵⁰ examined differences in decisional balance and self-efficacy scores across the five stages of change among four health behaviors including exercise. A total of 393 employees completed a health behavior survey, with participants of the corporate wellness program and a sample of non-participants providing comparison groups. As expected, the wellness participants produced a higher response rate than the non-participants (41%). Significant differences for decisional balance and self-efficacy scores were found across the five stages of change ($p < .001$). Consistent with previous research, the pros and self-efficacy scores were higher during the action and maintenance stage compared to the precontemplation stage. A limitation among the majority of these studies was that the subjects were composed of a convenience sample of educated and employed Caucasians, which under represented less educated and low income individuals who are at a greater risk for sedentary lifestyles.

Interventions Incorporating the Transtheoretical Model and Its Key Components

Intervention studies have demonstrated the utility of the transtheoretical model and appear to be effective for developing physical activity programs and increasing physical activity adoption in the targeted population.^{57,58} It has been recommended that interventions to increase physical activity participation be designed using the psychological constructs of stages of change, self-efficacy, and decision-making.⁹

Prochaska et al.⁴⁹ reviewed interventions using the transtheoretical model of health behavior change. Basic research has generated a general rule of thumb for at-risk populations, with 40% being in precontemplation, 40% being in contemplation, and 20% being in preparation. Across 12 health behaviors, consistent patterns have been found between the perceived pros and cons of a behavior and the stages of change. Applied research has demonstrated dramatic improvements in recruitment, retention and progression using stage-matched interventions. The most promising outcomes to date have been found with computer-based individualized and interactive interventions.

In 1992, Marcus and Banspach⁵⁸ used the stage of change model to develop a stage-matched intervention to increase physical activity participation in a sample of 610 community volunteers. A six-week intervention consisted of three sets of self-help materials, a resource manual describing activity options, weekly fun walks, and activity nights. Stage of change was assessed at baseline and at the end of six weeks. Results indicated that the participants became significantly more active during the intervention ($p < .0001$).

Peterson et al.²⁴ evaluated the effect of a stage-based exercise intervention in a randomized trial of 527 adults working in a corporate setting. Employees were randomly assigned to one of three groups for a period of six weeks. The groups consisted of a stage-based intervention group (given written messages tailored to their individual stage of change), a generic intervention group (given non-tailored materials based on information from the Surgeon General's Report on physical activity), and a control group (were not given any materials). At baseline and follow-up, stage of change and physical activity levels were assessed. Analysis of this data indicated that the stage-based group demonstrated a significant increase in activity compared with the other groups ($p < .05$). There were also differences among the groups in the

magnitude and direction of stage movement. Movement from lower stages at baseline to higher stages at follow-up was significantly greater among employees who received the stage-based messages ($p < .0001$).

Cardinal and Sachs⁵⁹ investigated the efficacy of mail-delivered, self-instructional exercise packets designed to motivate women's progression through the stages of change. The study sample consisted of 81 employed women. Participants' stages of change were assessed at one month and seven months after baseline. The participants were randomly assigned to receive one of three mail-delivered, self-instructional, personalized written exercise packets: (1) lifestyle exercise packet tailored to each specific stage and encouraging more activity in daily routine, (2) structured exercise packet encouraging subjects to follow a standard exercise prescription including recommendations for frequency, duration and intensity, and (3) fitness feedback packet informing subjects of their health status. Subjects receiving the lifestyle exercise packet had better adherence to the study and the percentage of participants who improved their stage of exercise status was higher in this group. The results from this study led researchers to conclude that tailored, mail-delivered programs are an effective and relatively inexpensive method for assisting people to progress through the stages of exercise. Consideration should be given to the fact that results were analyzed from a very small sample size.

There is evidence indicating that physical activity interventions can be delivered through a variety of channels. In studies conducted by Cardinal and Sachs,⁵⁹ written lifestyle, structured, or fitness feedback materials were delivered through the mail. This minimal contact resulted in significant increases in stage of motivational readiness in all groups, with 10% of participants increasing their level of physical activity. Similarly, Marcus et al.²² found that mailed interventions were effective in a three-month worksite health promotion program. They also tested a computerized, individualized tailored intervention with standard American Heart Association material, both delivered by mail.⁹ Both groups significantly improved their self-reported physical activity at three and six months and the group, receiving the individualized tailored materials, increased their physical activity significantly more than the group that received the standard materials. The motivationally-matched manuals and expert system feedback reports included specific strategies for minimizing the barriers, while emphasizing the benefits of physical activity participation. Specific targeted messages were included, which were designed to increase self-efficacy and behavioral change strategies associated with physical

activity adoption. However, in these studies, channels that the targeted population would most prefer for receiving physical activity interventions were never assessed.

Interventions based on the transtheoretical models have also been applied to the training of physicians in methods of providing exercise counseling to patients.⁶⁰ Marcus et al.⁶⁰ wanted to determine if physician counseling could be improved when interventions were matched to the patient's level of readiness to become active. Physicians were instructed to counsel their patients according to their stage of exercise behavior, provide a written activity prescription, a stage-matched self-help manual, and a schedule for a follow-up visit. Results revealed that patients who received the stage matched self-help manual increased their activity levels and self-confidence.

Similarly, Project Pace (Provider Based Assessment and Counseling for Exercise) was designed to provide physician training in counseling patients at various stages of readiness to adopt exercise. At five months of the intervention, results indicated that 50% of the precontemplators reported beginning an activity program and 66% of contemplators made recommended changes in their physical activity levels.²⁵

Program cost seems to present a significant barrier to traditional exercise programs,⁹ in that household income and perceived costs are determinants of physical activity participation. Individual tailoring, in conjunction with motivationally matched print materials, appears to be an effective and low cost method of administering individualized public health messages.⁹ Expert systems offer a method of providing individually tailored, health behavior interventions to a broad range of individuals at lower cost than traditional clinic-based programs. Such systems can provide individualized health behavior intervention, while maintaining very low cost per client served.

These studies show promise that exercise adoption can be enhanced by using an individual's stage of exercise adoption to design physical activity interventions. However, most lifestyle interventions to increase physical activity do not appear to have had a significant public health effect largely because these interventions have been delivered to mostly small groups of individuals in clinical settings.⁶ On the other hand, lifestyle interventions delivered by mail and telephone suggest that there may be opportunities to reach large numbers of individuals to increase the adoption of physical activity.^{9,22,23,59} In addition, most of the literature reviewed dealt with the stage of exercise behavior based on structured exercise guidelines and not the

newer recommendations for physical activity by the Centers for Disease Control (CDC) and American College of Sports Medicine (ACSM).

Preferences for Types of Physical Activity and Channels of Information

Physical activity. Preferences regarding type of physical activity and intensity is another factor in physical activity adoption as well as long-term exercise maintenance.¹¹ According to the 1995 Summary of Travel Trends,⁶¹ walking is one of the more popular types of physical activity among all adults in the U.S. However, it is surprising that over 75% of trips less than a mile were made by automobile in 1995 according to information from the National Bicycling and Walking Study. Consequently, the number of walking trips as a percentage of all trips, has declined over the years.⁶²

The type of preferred physical activity also differs with age and gender. For example, a study conducted by Booth et al.²⁷ illustrated that preference for walking was more common among older women and men, while younger women preferred aerobics classes and younger men preferred jogging. Unfortunately, only a few reports appear in the literature on the preferred activities of individuals.^{10,11,27}

Education channels. For individuals that are not currently engaged in physical activity, it is valuable to first educate them on the benefits of exercise before implementing an action based physical activity program. Appropriate physical activity information can be used to increase confidence levels in sedentary individual about their abilities to perform exercise and can help convince them that participating in physical activity is enjoyable and rewarding. It is critical to determine channels that are most appealing to the targeted population since there are various methods for delivering educational materials.

Marcus et al.²⁶ conducted a study to review physical activity interventions and gain insight on methods used in the delivery of information. Their results indicated that the majority of interventions have used mail delivered print materials^{25,60} physician counseling,^{25,60} and telephone contacts.⁶³ Compliance may be further increased through channels such as television, interactive computer programs, worksite group classes, or home visits. Unfortunately, there are only a limited number of studies reported in the literature that have been conducted to determine individual preferences on sources of education regarding physical activity. More understanding

of preferred activities and preferred sources of assistance will further improve efforts in designing attractive interventions to increase physical activity.

Comparisons Among Physical Activity & Structured Exercise Interventions

Data suggest the importance of tailoring type, intensity, frequency, and duration of activity to the needs of targeted groups.⁶⁴ Extensive research clearly indicates that moderate levels of physical activity yield comparable results for physical and mental health benefits as vigorous exercise.^{2,6,65} However, many of the studies designed to investigate exercise and physical activity interventions have used activity goals based on previous recommendations for vigorous exercise⁶⁶ (30 continuous minutes of vigorous activity three times a week) and not the newer guidelines. In an effort to decrease the number of sedentary adults in America, new public health recommendations for physical activity were developed by the Centers for Disease Control (CDC) and American College of Sports Medicine (ACSM),² which include 30 minutes of moderate activity on most days of the week. Previous studies have indicated that adherence to traditional structured exercise programs is often poor⁶⁷ and that many individuals do not engage in exercise because they dislike the imposed conformity of gymnasium-based exercise and dislike vigorous exercise.⁶ In addition, physical activity programs, such as walking, have higher adherence rates (25%-35%) than vigorous exercise programs such as running (50% dropout rate).¹⁰ Thus, using the CDC/ACSM physical activity recommendations in combination with cognitive strategies to develop interventions may be more appealing to increase physical activity participation in individuals who are not motivated to change.⁶⁵

Dunn et al.⁶⁵ reported the six-month results of Project Active on cardiovascular disease (CVD) risk factors among healthy, sedentary, middle-aged men and women. Project Active is a randomized clinical trial that compares a lifestyle physical activity intervention with traditional structured exercise intervention. These researchers also examined the psychological strategies used in each group to reach the level of physical activity recommended by the CDC and ACSM and to achieve changes in CVD risk factors. A total of 235 sedentary men and women were randomly assigned to a six month lifestyle, physical activity counseling intervention or a six month gymnasium-based, structured program. After six months of intervention, 78% of lifestyle participants and 85% of structured participants were meeting the CDC/ACSM recommendations

of accumulating 30 minutes or more of moderate intensity physical activity on most days of the week. Results indicated a significant increase in cardiorespiratory fitness (VO_2 peak) in both groups ($p < .0001$). There was also significant reductions in total cholesterol, total cholesterol/HDL-C ratio, diastolic blood pressure and body fat percent ($p < .05$). Results also indicated that those who adopted regular physical activity increased their use of cognitive behavior strategies. Individuals that achieved the CDC/ACSM criteria increased their self-efficacy, perceived benefits, and stage of motivational readiness to participate in physical activity.

There is a need for using more representative and diverse samples in physical activity studies. Population surveys are needed to gain understanding for the effectiveness of public health messages. For example, do individuals understand and actually perform moderate amounts and intensities of physical activity. Lifestyle approaches need to be tested in special populations, such as underserved groups, and on the effects of targeted messages on those who are least active.

Limited Resource Families

Despite the clear importance of developing strategies to encourage exercise adoption in sedentary individuals, research to determine effective strategies has been sparse.⁶⁴ Research consistently identifies certain groups to be at a greater risk for inactivity, including elderly adults, women, those who are less educated, and overweight individuals. However, few interventions have been tailored to their preferences and needs. Many programs and research endeavors have focused on individuals who seek exercise programs and are motivated, or have a history of exercise participation.

Other populations that are in great need of interventions are people with low incomes, members of ethnic minority groups, and people with disabilities. These specific population groups are more likely to be sedentary than the general population^{1,5} According to Healthy People 2000,⁵ prevalence of physical inactivity ranged as high as 43% in these population groups and, therefore, these individuals are more likely to develop chronic diseases related to sedentary lifestyles. Interventions to increase physical activity levels in these populations are important for improving the quality of life and reducing health care costs.⁸² Wendell et al.⁸²

summarized interventions that have targeted populations at risk for inactivity, but few physical activity intervention studies for these population groups were identified. Thus, increasing physical activity levels for these population groups remains a public health challenge.

Cooperative State, Research, Education, and Extension Services

The national Cooperative State Research, Education, and Extension Service (CSREES) is an agency of the United States Department of Agriculture.²⁹ This nationwide network is a dynamic, ever changing organization pledged to meeting the country's needs for research, knowledge, and educational programming that will enable people to make practical decisions for living.²⁹ Its mission is to help people improve their lives through an educational process that uses scientific knowledge focused on issues and needs.²⁹

Virginia Cooperative Extension

Virginia Cooperative Extension (VCE), functioning under the umbrella of CSREES and Virginia Tech provides over one million Virginians yearly with educational programs.⁶⁸ Virginia Cooperative Extension professionals and volunteers work with individuals in communities, homes, and businesses. VCE is an effective organization advocating positive personal and societal changes that will lead to more productive lives and prospering communities. This organization enables people to shape their futures through research based educational programs.

The vision of VCE is:

- To help clientele improve their lives.
- To use a systems approach to programming, with task-oriented work teams that respond to the needs of individuals, groups and organizations.
- To provide residents with prompt access to information and programs through an innovative human and technological system
- To work with the disenfranchised and under-served who need special attention by targeting resources to programs for low-income groups.

- To fully integrate a culturally diverse paid and volunteer staff in planning, implementing and evaluating programs.
- To collaborate with public and private partners to better use resources, heighten impact, and reach a more diverse audience.

Thus, VCE is an educational agency, with the people who work for VCE being educators. Their strength is in quality educational programs that make a difference in the lives of citizens and communities.⁶⁹

Family and Consumer Sciences (FCS)

Family and Consumer Sciences (FCS) is a program component of Cooperative Extension. In Virginia, FCS programming deals with three major programming foci: (1) Nutrition and Wellness; (2) Family Resource Management; (3) Family and Child Development. These areas are designated as the general FCS emphasis; however, FCS also offers programs that are specifically designed for low income families, including the Expanded Food and Nutrition Education Program (EFNEP) and the Food Stamp Nutrition Education Program (FSNEP).

A principal focus among Family and Consumer Sciences is to help ensure that Virginia has healthy communities. According to the Directors Report- VCE/VESA Conference⁶⁹, from July 1, 1998 to June 30, 1999, the program area of FCS had 1,178,798 participants and almost 6,000 volunteers. These data clearly illustrate that many Virginians use and rely on the educational programs and information offered by FCS.

Virginia's State Health Objectives

Most states have created state objectives patterned after the national objectives, which are tailored to each state's population needs. In 1997, the Virginia Department of Health provided, *Healthy Virginia Communities, A Report on Year 2000 Health Status and Risk Reduction Indicators for the Commonwealth of Virginia and Health Districts*.⁷⁰ The Virginia Public Health Department designed this document to help identify and understand health-related issues that affect Virginia citizens. The health care field is rapidly changing, thus, there is a strong need for useful and updated information to encourage Virginians' to make better and more informed

decisions to long-term health. Listed under goal number 2, *Decrease the Burden of Chronic Disease*, is the subcategory “Physical Activity”. The objective regarding physical activity recommends that we “increase to at least 40% the proportion of people aged 18 and older who engage regularly, preferably daily, in light to moderate physical activity for at least 30 minutes per session”. Unfortunately, only about one-third of Virginians surveyed in 1995 indicated that they exercised on a regular basis (three or more times a week for at least 20 minutes per session, and at more that 50% capacity).

The number one cause of death for the state of Virginia is cardiovascular diseases, which account for 39% of all deaths.⁷⁰ One of the contributing risk factors is no-leisure time physical activity. According to Behavioral Risk Factor Surveillance System (BRFSS) in 1996, 30% of adults living in Virginia were sedentary.⁷⁰ Likewise, obesity is a contributing risk factor for cardiovascular disease. Data from the BRFSS in 1996 indicated that almost 28 % of all Virginia adults were identified as overweight.⁷⁰ As stated previously, engaging in only moderate amounts of physical activity on a daily basis can help prevent and treat obesity and cardiovascular disease. Therefore, it is essential to develop and implement physical activity educational programming and interventions for the state of Virginia.

Need for Physical Activity and Health Promotion Educational Programming

It is quite clear that there is a tremendous need for designing effective physical activity interventions and education programs for the entire U.S. population and especially for populations at risk for inactivity. Marcus and Owen¹⁶ reviewed physical activity interventions using mass media, print media, and information technology. Results indicated that only seven interventions have been campaigned at the state or national level, and media based physical activity interventions were extremely limited for socially disadvantaged groups.

Family and Consumer Sciences specialists and agents are well aware that the lack of physical activity and sedentary lifestyles are causative factors for the leading causes of illnesses and death in the U.S. population. Moreover, according to statistics collected in the BRFSS, two thirds of Virginians lead sedentary lifestyles.⁷⁰ Virginia Cooperative Extension’s mission is to enable people to improve their lives through an educational process that focuses on their needs. Therefore, in the VCE 1999 Educational Program Description³⁰ for Nutrition and Wellness,

Family Resource Management, and Family and Child Development this state goal is listed: “Virginians to enjoy a good quality of life.” Furthermore, the VCE Planning and Reporting 1999 Educational Program Description for Nutrition and Health Promotion included the statewide objective “increase persons’ physical activity level”.³⁰

There are no defined educational programs with curricula available for use in VCE-FCS programming to emphasize the importance of physical activity and address this objective. To achieve this objective, the development of educational programs regarding physical activity is essential to decrease Virginia’s prevalence of inactivity. First, interventions need to be designed using information from the target group to maximize the acceptability of the intervention. This information can be collected through surveys, in which the needs, attitudes, preferences, and barriers can be thoroughly assessed before the development of the intervention. Tailoring interventions to the target audience to meet their needs appears to be the most effective physical activity intervention.¹⁶ This can be accomplished by utilizing the stages of exercise change model in combination with the key components of self-efficacy and decisional balance, which may enhance physical activity participation in sedentary individuals and improve long-term health.

Use of Surveys in Research

Surveying is one of the most frequently used methods in research.⁷¹ Surveys are conducted to learn about a specific population’s needs and to help predict trends. In addition, survey research makes important contributions to knowledge and can be extremely beneficial in designing appealing and useful programs. There are several ways to conduct surveys, including face-to-face and telephone interviews and mail surveys.

Face to face and telephone interviews. Telephone and face-to-face interviews tend to have higher response rates than other methods.⁷² One advantage of a telephone survey is that multiple calls can be made until the respondent is reached.⁷³ Paxon et al.⁷¹ stated that a telephone follow-up reminder is more effective than a mailed follow-up. The reason being that participants may feel more important.

However, several challenges often result from face-to-face and telephone interviewing. One problem is the difficulty in locating respondents. This interviewing process is a highly

skilled activity in which experience as well as training plays important roles. Family and Consumer Sciences clients and educators are geographically dispersed all over the state of Virginia. Thus, traveling to participants' homes would be extremely costly and time consuming. The geographical dispersion of households and the inability to locate respondents present a challenge and cost problem with telephone and face-to-face interviews.⁷³ Another drawback may be the limited time interviewers have to contact individuals for interviews. For example reaching individuals, who work full-time or who are not at home during daytime hours, is difficult.⁷³ Furthermore, people are often unwilling to allow strangers into their homes.⁷³ Call screening and answering machines can create problems with telephone surveys.⁷⁴

Mail surveys. According to Pressley et al.,⁷² mail questionnaires are one of the most popular tools for gathering data in research. Mail surveys have several advantages over face-to-face and telephone interviews. Mail surveys are relatively fast, low in cost, and geographically flexible and the researcher can contact a widely dispersed sample simultaneously.⁷² The mail questionnaire has a higher probability of reaching respondents versus other methods. Respondents who are not at home when interviewers call, either in person or telephone, usually get their mail.⁷³

Nevertheless, it must be stated that there are limitations with use of mail questionnaires. The major disadvantage is the typical low response rate. While Pressley et al.⁷⁶ state that response rates of 20 to 30% are common, returns of more than 50% are unusual. Lack of immediate responses can be time consuming for the researcher. There is an estimated lag time of about two months from initial contact to return of all the surveys.⁷³ In addition, a mail survey may simply be unanswered, or thrown away. It is the individual's personal decision regarding whether to cooperate with the survey.⁷¹ Furthermore, the response rates to mail questionnaires are generally lower than those obtained by either telephone or face-to-face interviews. Low response rates can introduce a major source of error through non-response bias.⁷¹

Response rates. Accuracy of the findings from mail surveys, depend on a good response rate which ensures that the sampled population is representative of the general population and, thus, findings can be generalized.⁷³ According to Dillman et al.,⁷³ several steps should be followed when trying to maximize survey response. One way to encourage people to return the surveys is

to minimize the cost to respond by providing a self-addressed, prepaid envelope with the survey.⁷³ Another method is to provide and maximize the rewards for completing the survey. Informing participants that they are part of a carefully selected sample and their responses are needed for the study to be successful, represents one positive way to encourage participants to return the surveys. In addition, including original signatures on the letter and asking participants for personal comments regarding their opinions usually encourages people to respond.⁷³

Yammarino et al.⁷⁵ performed a meta-analysis on 115 studies that focused on the techniques used to increase mail survey response rates. A central finding was an increased response rate when an appealing cover letter was added and the survey was less than four pages in length. In addition, the inclusion of a prepaid return envelope, performing repeated contacts in the form of follow-up notes, preliminary notices and financial incentives all increased response rates of mail surveys.

Paxson et al.⁷¹ also agree that to further increase response rates, researchers should emphasize the usefulness of the survey, get a university to represent the survey, have several follow-up contacts, provide incentives, and use personalized cover letters. The recipient will return the questionnaire if the costs of doing so are less than the perceived benefits. Time and effort are two barriers. A participant may reject an unsatisfactory design, or a lengthy and confusing questionnaire because it will take too much time to complete.⁷¹ In order to decrease participants' assumptions that the questionnaire will be too time consuming, the questionnaires needs to be clear, concise, and have a less formidable appearance.

The use of a user-friendly survey may also encourage respondents to participate and complete the survey. Dillman et al.⁷⁶ stated that it is best to address the cover letter individually and include an original signature in pen. The letter should be brief and confined to two or three short paragraphs that present purposes, potential benefits of completing the survey, and significance of the results obtained from the survey. Also of importance, is to point out that the survey responses will be held in confidence and respondents' names will not be associated with their answers to questions. The number of questions contained on the questionnaire should be minimal, with repetition eliminated. Confusion needs to be eliminated by simplifying questions and adding directions. To save the respondent cost and time, it is beneficial to include a stamped, self-addressed return envelope with first-class postage. When researchers do not have

the resources to provide monetary incentives, one way to promote participation is to provide results to the respondents.⁷⁶

Dillman et al.⁷⁶ state that mail survey research verifies that the most powerful influence on response rate is the number of contacts made. Studies using the Total Design Method of Dillman et al.⁷³ with mail surveys have been successful with an average of 52.6 % response rate. The high response rates were achieved when the following methods were executed. One week after the initial mailing, all the participants were mailed a reminder postcard. The postcard thanked those who had responded and courteously reminded those who had not completed and returned the survey. Three weeks after the initial mailing, a letter and a replacement questionnaire were mailed to all the non-respondents. Lastly, a third contact was made by telephone to encourage people to respond to the study. A disadvantage of the Total Design Method is the high cost of mailing multiple surveys, providing first class mail, and making telephone follow-ups. This method is also extremely time consuming.

In contrast, several researchers were not able to improve response rates of mail surveys when they sent prior notification to recipients about the survey, offered a two dollar incentive and a raffle ticket for a home theater system, and provided two follow-up reminders.⁷⁷ Yet, with a single mailing method, the average response rate is around 20%.⁷¹ When conclusions are based on surveys with low response rates, there is a risk of drawing incorrect conclusions and contributing misinformation.⁷¹ The opinions obtained from a low response rate (such as 20%) will not adequately represent the population. The 80% who did not respond may differ significantly from the 20 % who responded.⁷¹ This may create a higher probability of bias due to non-response. What may meet the needs of the respondents may not reflect the views of the non-respondents and, thus, not allow valuable generalization to the total population. Thomas et al.⁷⁸ state that results from a small return rate (10 to 20%) cannot be given much credibility. People who have a particular interest in the topic surveyed are more likely to respond than people who are less interested. Thus, these respondents are self-selected and the responses are almost invariably biased in ways that are directly related to the purposes of the research.⁷⁸

Summary

It is essential to investigate successful strategies for behavior change by gender, age, stage of exercise change and risk status. Marcus et al.⁹ have demonstrated that “one size fits all”

programs are not as effective as programs that tailor treatment to meet the needs of the group. Identifying preferences for physical activities and educational channels among the target population will allow the design of an effective program that will attract individuals. Using the theoretical models, stage of change, self-efficacy, and decisional balance, may increase understanding of physical activity behavior. Knowledge of participants' pro and con beliefs, in addition to confidence levels, demographic variables, education and activity preferences will enhance the ability of leaders to design effective health promotion and physical activity material and programs.⁴⁸

With any health promotion program, proper assessment and planning will influence the program's success.⁷⁹ Population based surveys are one way to assess the needs and attitudes of the community.⁹ A needs assessment survey can help reveal population specific preferences before the development of a physical activity program. This will allow FCS agents to design physical activity programs that meet the needs of their clients and can be integrated into daily routines. Designing appealing interventions to enhance physical activity participation is essential to decrease the number of sedentary adults, increase physical activity levels, and meet the nation's objectives for health promotion and disease prevention.

CHAPTER III

METHODOLOGY

The purpose of this study was to gain information on the preferences for types of physical activity, stages of exercise change, and perceived incentives and barriers among Virginia Cooperative Extension (VCE), Family and Consumer Sciences (FCS) clientele and agents for use in designing educational publications and programming on physical activity. The study involved the use of a physical activity survey in 32 counties located within six districts throughout Virginia (Northern, Central, Northwest, Northeast, Southeast and Southwest Virginia). The study design was cross sectional and involved a self-administered mail survey distributed to a convenience sample of Extension agents and FCS clients.

Research Protocol

Approval for this study was granted by the Institutional Review Board of Research Involving Human Subjects at Virginia Polytechnic Institute and State University and by the Department of Human Nutrition, Foods and Exercise.⁸⁰ Each participant was instructed to sign a consent form and was assured that individual information provided by the participant was anonymous and would be kept strictly confidential (see Appendix A & B).

Subjects Surveyed

FCS Agents. The first selected study sample consisted of 32 FCS agents. An Extension specialist was involved with the recruitment of the agent sample. An electronic message was sent to all FCS agents (n = 60) working for Virginia Cooperative Extension asking (1) if they would be willing to participate in a physical activity study and (2) would be willing to involve their FCS clientele.

FCS Clientele. The second convenience study sample consisted of 555 Family and Consumer Science (FCS) clients. To be eligible for the study, participants need to be over the age of 18 years, participated in at least one educational program event/activity that an Extension FCS agent

had conducted, and be on a VCE mailing list. Client participants were randomly selected from mailing lists of 20 of the 32 agents who agreed to have their clients participate.

Instruments

A four-page questionnaire was designed and consisted of four instruments. The instruments were labeled as specific sections (Part I, II, III, and IV). The questionnaire was self-administered and all instruments had a checklist format for responding. The questionnaire was not pre-tested by a sample of FCS clients; however, it was reviewed by a group of co-workers from Extension.

The first survey instrument (Part I) was designed to collect information on (1) basic demographics, (2) current physical activities in which the participants were engaging, (3) physical activity preferences, and (4) preferred educational channels by which the participants would like to receive physical activity and health promotion information.

The additional instruments used in this study assessed the psychological constructs associated with physical activity adoption: stages of change (Part II), decisional balance (Part III), and self-efficacy (Part IV).

The five-item stage of change instrument for physical activity was developed and modified by Marcus et al.¹⁴ was used to determine the physical activity stage of change for each individual. Concurrent validity for this instrument has been shown in prior research with the standard interviewer administered Seven Day Physical Activity Recall Questionnaire⁴³ and has demonstrated a Kappa index of reliability of .78 over a two-week period.¹⁴ Prior studies have also demonstrated that movement from the early to the more advanced stages of change for physical activity adoption is significantly associated with changes in functional capacity (estimated peak VO₂).^{23,65}

Decisional balance (pro minus con scores) was measured using a 16-item inventory developed by Marcus et al.⁴⁸ that evaluated the perceived pros and cons to physical activity behavior. Participants were asked to evaluate each statement based on their own circumstances, using a five point Likert scale with 1 indicating “not at all important” and 5 indicating “extremely important.” Earlier research has shown this measure to have good reliability based on internal consistency (pros = .95 and cons = .79).⁴⁸

Self-efficacy for physical activity was measured using a five-item instrument developed by Marcus et al.¹⁴ which represented areas of negative effect, resisting relapse and making time for physical activity. Participants were presented with five common situations that may challenge their ability to participate in physical activity. Participants also responded by using a five point Likert scale with 1 indicating “not at all confident” and 5 being “very confident”. These researchers demonstrated that this measure shows an alpha coefficient of 0.82 and that the scores significantly differentiate subjects at most stages of change of physical activity adoption¹⁴ (see Appendix D).

Administration of the Surveys

The survey was administered in two phases. In phase I of the study, questionnaires were mailed to 32 FCS agents, to be completed and returned directly to the researchers. In phase II of the study, FCS agents were solicited to administer the questionnaire to a sample of their clientele. Twenty willing FCS agents were instructed, via telephone and electronic delivered mail, to randomly select a predetermined number of clientele from their mailing list to receive the questionnaire. Table 2 shows the sampling size of each participating Extension units proportionate to total population of eligible FCS clientele. After the sampling size was configured for each unit, over sampling of FCS clientele was performed by 50%. If an agent had 325 clients on her mailing list, she was instructed to select twenty clients (4% of the total clients from her Extension unit) plus an additional 2% for over sampling. With the selection being random, the agent was further instructed to start with the 5th person on the mailing list and select every 15th person until she had obtained a total of twenty clients.

All information was based on self-report. One designated questionnaire was mailed by the researchers to be completed by each FCS agent. The researchers also mailed an additional package of questionnaires to the 20 agents who were to separate and mail them to the pre-selected FCS clients. Instructions on how to complete the questionnaire, an explanation of the study, and a self-addressed, pre-paid return envelope were included with each questionnaire. The FCS agents mailed a follow-up postcard, one week following the initial mailing of the questionnaires, as a reminder to complete and return the survey. The postcard provided a toll-free telephone number to call if the survey had been lost and an additional one was needed.

Analysis of the Results

Data were analyzed using the Statistical Package for the Social Sciences (SPSS 10.0). Frequency counts were used to determine the distribution of individuals on Part I of the physical activity survey (all the demographic variables). One-way analyses of variance (ANOVA) was performed to assess the relationships between the stages of change and the self-efficacy and decisional balance measures. Scoring for the self-efficacy measure was pre-determined by calculating a summarized subject score by computing the mean of all five items for each subject. A t-score ($X = 10$, $SD = 50$) was computed for each of the summarized subject scores.¹⁴ Decisional balance scores were measured by computing raw mean scores for the 10 PRO items and the 6 CON items.

- $PROS = (item\ 1 + item\ 2 + item\ 4 + item\ 5 + item\ 6 + item\ 8 + item\ 9 + item\ 10 + item\ 12 + item\ 14) / 10$
- $CONS = (item\ 3 + item\ 7 + item\ 11 + item\ 13 + item\ 15 + item\ 16) / 6$

T-scores were computed for each of the PROS and CONS means. The difference in the t-score means yielded the decisional balance t-score.⁴⁸

Correlations were calculated between stage of change and specific demographic variables using Pearson R correlation. Additional ANOVAs and independent t-tests were performed to assess significant effects among various demographics, preferences, and stages of change. Tukey's post hoc comparison test was used to determine significant differences between the specific stages of change.

Table 1. Location of FCS Agents Responding to the Survey

Extension Unit	Extension Unit
Accomack	Chesapeake
Bedford	Frederick
Fauquier	Halifax
Franklin	Loudoun
James city	Mecklenburg
Prince William	Orange/Madison
Lancaster	Orange/Madison
Northern district office	Prince Edward
Northeast district office	Prince George
Pittsylvania	Pulaski
Southwest district office	Rockingham
Wise	Shenandoah
Amelia	Spotsylvania
Arlington	Suffolk
Augusta	Wythe
Buchanan	York

1 FCS agent from each of the listed Extension units responded.

Table 2. Location and Sampling Size of FCS Clientele Respondents.

Extension Unit	Total Clients	Sample Size No. (%)
Amelia	600	41(7)
Arlington	83	3(1)
Augusta	296	12(3)
Buchanan	150	8(2)
Fredrick	800	31(8)
Halifax	253	12(3)
Loudoun	1000	46(12)
Meckleburg	224	12(3)
Orange	200	8(2)
Prince Edward	242	12(3)
Prince George	68	3(1)
Chesapeake	30	2(0.5)
Pulaski	247	12(3)
Rockbridge	250	12(3)
Rockingham	429	19(5)
Shenandoah	505	23(6)
Spotsylvania	325	15(4)
Suffolk	475	19(5)
Wythe	260	12(3)
York	2256	99(26)
TOTAL	8693	100%

CHAPTER IV

RESULTS AND DISCUSSIONS

RESULTS

Response Rate

For a detailed list of number of returns within each district, refer to Table 3. A total of 587 surveys were mailed to Extension agents and Family and Consumer Sciences (FCS) program clients. Thirty-two of these participants were FCS agents and the remainder were clients of twenty of the FCS agents. The twenty agents were relied on to mail the surveys directly to their pre-selected clients within the designated county or city. Among both the agent and client participants, 245 completed surveys were returned, giving a response rate of 42%. When the researchers received completed surveys, they were separated into two groups, consisting of agents and clients. All 32 FCS agents completed and returned the surveys for a response rate of 100%. For the clients, 213 of the 555 surveys received by clients were completed and returned for a response rate of 38%.

Characteristics of FCS Agents

A description of the demographic characteristics for the agent population is provided in Table 4. The majority of the FCS agents in the sampled population consisted of white (n=27; 84.4%) females (n = 31; 97 %). Only one of the agents was male and four were African American. The majority of agent respondents were in the 40 to 59 age category (n = 26; 82.3%). Twenty-five (78%) of the agents had a household income greater or equal to \$50,000 annually and all had received at least a four year college degree. Twenty-two (69%) agents were married and 20 reported no had children living at home. In addition, six of the agents reported that they had physical disabilities.

Table 3. Location of FCS Clients by Extension District (N=185)

<u>Main District</u>	<u>No. (%)</u>
Southeast Virginia	26 (7.0)
Southwest Virginia	15 (17.4)
Northeast Virginia	37 (17.4)
Northwest Virginia	52 (24.4)
Northern Virginia	27 (12.7)
Central Virginia	28 (13.1)

*28 missing cases 13.1%

Table 4. Demographic Characteristic of Extension Agents (N= 32)

Characteristic	No.	%
Age		
18-29	2	6.3
30-39	2	6.3
40-49	14	43.8
50-59	12	37.5
60+	2	6.3
Female	31	96.9
Educational level		
College degree	32	100
Race		
Caucasian	27	84.4
African American	4	12.5
Other	1	3.1
Household Income		
\$20,000-\$34,999	1	3.1
\$35,000-\$49,000	5	15.6
\$50,000+	25	78.1
Employed fulltime	31	96.9
Married	22	68.8
Single, divorced, widowed	10	31.3
Physical Disabilities	6	18.8
Children living at home		
None	20	62.5
One	4	12.5
Two	8	25

Stage of Exercise Change among FCS Agents

The distribution of exercise stages among agents is summarized in Table 6. When categorizing the agents into specific stages of change for exercise adoption, only one agent (3.1%) was identified in the precontemplation stage. Seven of the FCS agents (21.9 %) were placed in the contemplation stage, nine (28.1 %) were categorized in the preparation stage, two (6.3 %) were in the action stage, and the remaining twelve agents (37.5 %) were identified to be in the maintenance stage. Less than half (43.8 %) of the FCS agents were regularly participating in physical activity (action or maintenance). The mean stage of exercise change among all the agents was between the preparation and action stage ($M=3.55$; $SD = 1.31$, with “3” representing the scoring code for the preparation stage and “4” designating the score for participants in the action stage of exercise adoption). One agent did not respond to any of the questions regarding stages of change and, thus, was omitted from this section.

Characteristics of FCS Clientele

Table 5 contains a detailed list of demographic variables for participating clients. The final study sample of clients consisted of 213 respondents, including 18 males and 195 females. These subjects were predominately white ($n = 180$; 84.5 %) females ($n = 184$; 86%). Twenty-three of the clients were African Americans and six (2.6%) were identified as either Hispanic ($n=3$) or American Indian/Alaskan Native ($n = 3$). Four respondents did not identify their race and ten clients neglected to specify their gender. The client sample was predominately over the age of 39 ($n= 166$; 77.9%). Only seven (3.3%) clients were categorized in the age group 18-29. The mean age group was between the age ranges of 40-49 and 50-59 years. Over half of the clients were married ($n = 132$; 62%) and did not have children living at home ($n = 138$; 64 %). One hundred and twenty seven clients (59.6%) received a total household income of at least \$35,000 annually. The mean household income was between the ranges \$20,000-\$34,999 and \$35,000-\$49,999. Sixteen respondents neglected to identify their household income.

Table 6. Distribution of Exercise Stages of Change among Clients (N=203) and Agents (N=31).

Stage of Exercise Change	<u>Clients</u> No. (%)	<u>Agents</u> No. (%)
Precontemplation	18 (8.5)	1 (3.1)
Contemplation	50 (23.5)	7 (21.9)
Preparation	33 (15.5)	9 (28.1)
Action	29 (13.6)	2 (6.3)
Maintenance	73 (34.3)	12 (37.5)

¹ = 10 clientele did not respond.

² = 1 agent did not respond.

Table 5. Demographic Characteristics of FCS Clients (N=213).

Characteristic	No (%).
Age	
18-29	7 (3.3)
30-39	40 (18.8)
40-49	47 (22.1)
50-59	45 (21.1)
60+	74 (34.7)
Female	184 (86.4)
Male	19 (8.9)
Educational level	2.8 (6)
No High school	
H.S. Degree or GED	24.4 (52)
Some College (no degree)	29.6 (63)
College Degree	38.5 (82)
Race	180 (84.5)
Caucasian	
African American	23 (10.8)
Other	6 (2.8)
Household Income	9 (4.2)
<\$10,000	
\$10,000-\$19,999	20 (9.4)
\$20,000-\$34,999	41 (19.2)
\$35,000-\$49,999	46 (21.6)
>\$50,000	81 (38)
Employment Status	79 (37.1)
Fulltime	
Not employed	82 (38.5)
Part-time	35 (16.4)
Home based business	15 (7)
Married	132 (62)
Single, divorced, widowed	79 (37.1)
Disabilities	37 (17.4)
Children living at home	
None	137 (64.3)
One	36 (16.9)
Two	27 (12.7)
>two	13 (6.1)

One hundred and forty five clients (65%) were employed either part-time, fulltime, or operated a home based business. The remaining 82 (38.5%) clients were classified as unemployed. Two participants did not state their employment status. Over half of the FCS clients (n= 145; 68.1%) had at least some college education. Fifty-two (24.4%) clients had received a high school degree and six (2.8%) clients did not complete high school. Of the entire FCS clientele sample, 37 (17%) stated they had some type of physical disability.

Stage of Exercise Change Among FCS Clients

The distribution of exercise stages among clientele is summarized in Table 6. Ten of the 213 client participants were excluded due to missing and incomplete data. Thus, these clients were not analyzed and categorized into specific stages of exercise change. Of the eligible FCS clients, 18 (8.5%) participants were identified in the precontemplation stage, 50 (23.5%) in the contemplation stage, 33 (15.5%) were in the preparation stage, 29 (13.6%) in the action stage, and 73 (34.3%) were categorized in the maintenance stage. Less than half (n = 101; 47.9%) of the clients were regularly participating in physical activity (categorized as either in the action or maintenance stage of exercise adoption). Therefore, approximately half of the sampled clientele sample was not regularly engaging in physically activity (precontemplation, contemplation and action stages). Furthermore, 32% (n=68) of the clientele population was identified as sedentary (precontemplation and contemplation). The mean stage of exercise change among the clients was between the preparation and action stage (M = 3.45; SD = 1.41) (“3” represented preparation stage and “4” represented the score code for the action stage).

Relationships Between Demographic Variables and Stage of Exercise Change

Figure 1 provides the relationship between education completed with stage of change for FCS clients. Analysis of variance was used to determine the relationships between the demographic variables within the identified stage of exercise change. A significant difference ($p < .032$) was found between stage of change and amount of education completed among the clientele sampled. A Tukey’s post-hoc comparison test revealed that FCS clients in the precontemplation stage had received a significantly lower amount of education than the clients

identified in the action stage ($p < .012$) and the maintenance stage ($p < .032$). The results from Pearson r correlation, revealed

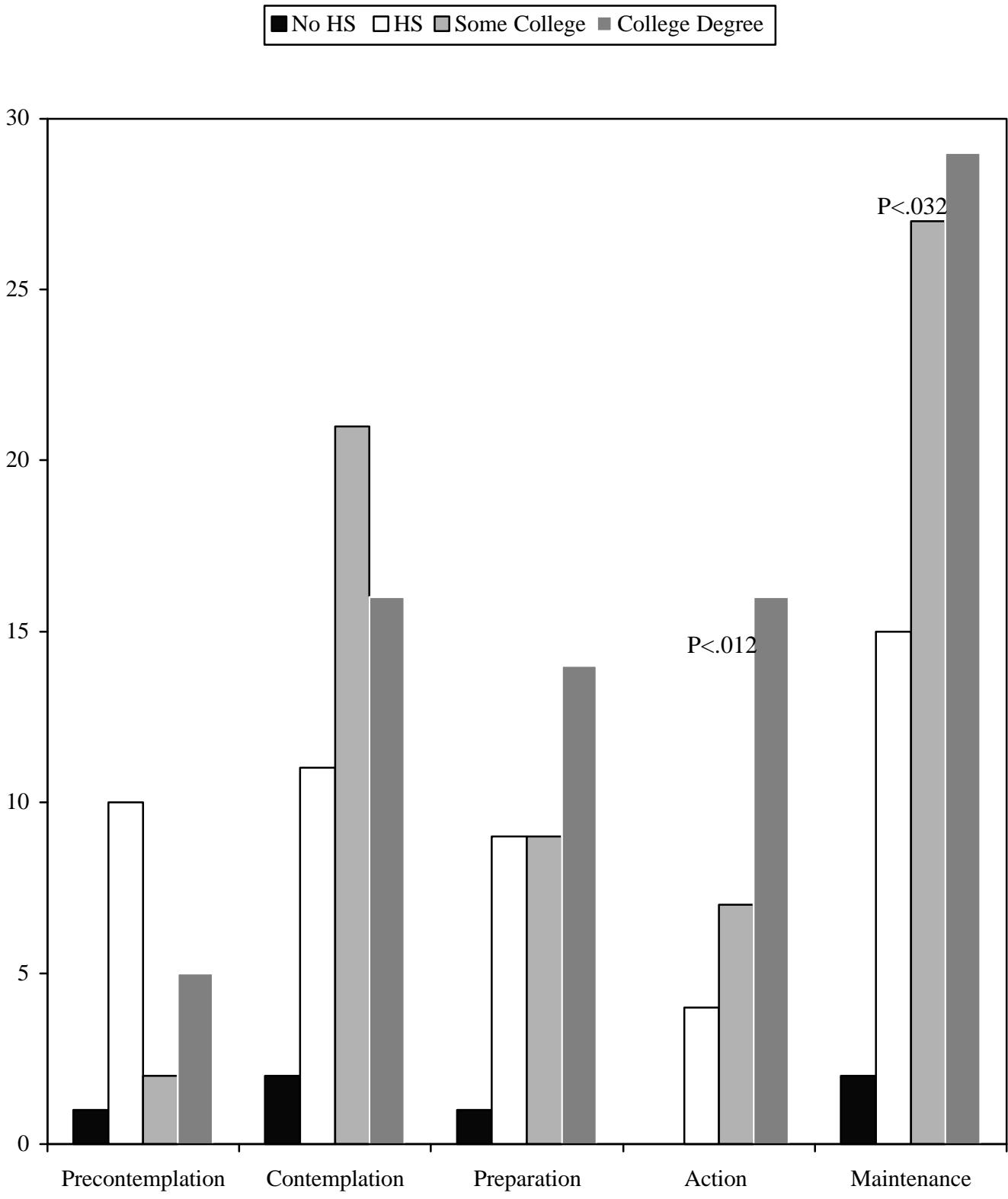


Figure 1. Relationships Between Stage of Change and Amount of Education Completed for FCS Clients.

that there were no significant differences between the subjects' identified stage of change and other demographic variables including age, gender, income, race, marital status, employment, number of dependents living at home, and designated district. Consequently, the results from the study sample size did not reveal significant relationships between the specified demographic characteristics and stage of exercise change.

Preferences for Education Channels

Table 7 illustrates the total number and percentages of the preferred educational channels for receiving physical activity information among FCS agents and clients.

Agents. The most popular educational channels selected by agents for receiving or providing physical activity and wellness information consisted of brochures (n = 22; 68.8%), newsletters (n = 20; 62.5%), and the Internet (n = 13; 40.6%). An additional suggestion provided by the agents was to distribute physical activity information to the public on video and cassette tapes.

Clients. A similar trend was found among FCS clients in their selection of preferred education sources. The most popular educational channels elected were brochures (n= 145; 68.1%) and newsletters (n=118; 55.4%) mailed directly to them. The third and fourth most frequent choices were slightly different between the males and females. More males than females preferred television programs and information provided in newspapers. On the other hand, more women than men preferred to receive physical activity information during group classes offered in their community. Additional sources suggested by clientele included telephone calls, classes offered at local schools and through the public health department, videotapes, and community center bulletin boards.

Physical Activities Currently Performed

The types of physical activities in which all FCS respondents are currently engaged are listed in Table 8.

Table 7. Preferred Educational Channels for Physical Activity Information among FCS Clients (N= 213) and Extension Agents (N=32).

Preferred Educational Channel	<u>Clients</u>	<u>Agents</u>
	No. (%)	No. (%)
Brochures	145 (68.1)	22 (68.8)
Newsletters	118 (55.4)	20 (62.5)
Newspapers	85 (39.9)	5 (15.6)
Group Class in the Community	79 (37.1)	9 (28.1)
Television Programs	40 (18.8)	8 (25)
Group Class at the Extension Office	40 (18.8)	6 (18.8)
Internet	32 (15)	13 (40.6)
Group Class at the Worksite	32 (15)	9 (28.1)
Radio Programs	14 (6.6)	3 (9.4)
Home Visits	12 (5.6)	1 (3.1)
Suggestions		
Telephone Calls	3 (1.4)	
Video Tapes Containing Lessons	2 (0.9)	1 (3.1)
Community Center Bulletin Boards	1 (1.5)	
Public Health Department	1 (0.5)	
Cassette Tapes		1 (3.1)

Table 8. Physical Activities in which FCS Clients (N=213) and Extension Agents (N=32) are Currently Engaging.

Type of Activity	<u>Clientele</u>	<u>Agents</u>	Type of Activity	<u>Clientele</u>	<u>Agents</u>
	No. (%)	No. (%)		No. (%)	No. (%)
Walking	149 (70)	22 (68.8)	Roller Blading/ Skating	8 (3.8)	1 (3.1)
Yard Work	118 (55.4)	18 (56.3)	Elliptical Mover	6 (2.8)	3(9.4)
Treadmill	34 (16)	8 (25)	Intramural/ Team Sports	3 (1.4)	
Aerobics	32 (15)	6 (18.8)	Kick Boxing	3 (1.4)	0
Weight Training	32 (15)	5 (15.6)	Other Activities		
Cycling	28 (13.1)	3 (9.4)	Housework	4 (1.9)	
Hiking	24 (1.3)	2 (6.3)	Tennis	3 (1.4)	
Yoga/Stretching	22 (10.3)	4(12.5)	Bowling	2 (0.9)	
Running	21 (9.9)	1 (3.1)	Skiing	2 (0.9)	1 (3.1)
Swimming	19 (8.9)	1 (3.1)	Horseback Riding	2 (0.9)	
Exercise Video	15 (7)	1 (3.1)	Tae Bo	1 (0.5)	
Stairmaster	11 (5.2)	1 (3.1)	Golf	1 0.5	
None		2 (6.3)			

Agents. The dominant activities in which agents were participating were walking (n=22; 68.8%), yard work (n= 18; 56.3%), and aerobics (n=6; 18.8%). All other physical activity choices were selected by less than 15% of the agent sample.

Clients. Similar to agents, the most frequent activities in which clients were participating, regardless of age or gender, were walking (n= 149; 70%) and yard work (n= 118; 55.4%). The remaining activity selections were chosen by less than 15% of all clientele respondents. Other activities in which clients were participating were not listed on the survey, but were listed under “other” by clients. These included golf, bowling, tae-bo, skiing, horseback riding, and tennis (n=11; 6%).

Clientele Gender Differences. Figure 2 shows a comparison of the most frequent activities for males and females. The two most frequent activities for both male and female respondents were walking (males 63.2%; females 70%) and yard work (males 68.47%; females 52.7%). Additional activities in which males are currently participating are cycling (31.6%), weight training (26.3%) and running (21.1%). All other activities were selected by less than 14% of the entire male sample.

Activities in which female were frequently engaged were aerobics classes (16.3%), using a treadmill (16.3%), and weight training exercises (14.7%). All other activities were selected by fewer than 13% of the females.

Clientele Differences Among Age Groups. Descriptive data showing differences between age groups and activities that female clients are performing can be seen in Figure 3. When clientele were grouped by age, (30-39, 40-49, 50-59, and 60+), results from frequency counts suggested that females were engaging in different physical activities based on age groups. For the purposes of this study, the male (n=18) clients were excluded from this analysis as well as clientele between the ages of 18 and 29 (n=7) due to the small number of participants. Regardless of the age group, the most frequently reported physical activities were walking and yard work. However, differences were found among the next most frequently selected activities. Females categorized in the age groups 30–39 years (20%) and 40-49 years (28%) were participating in

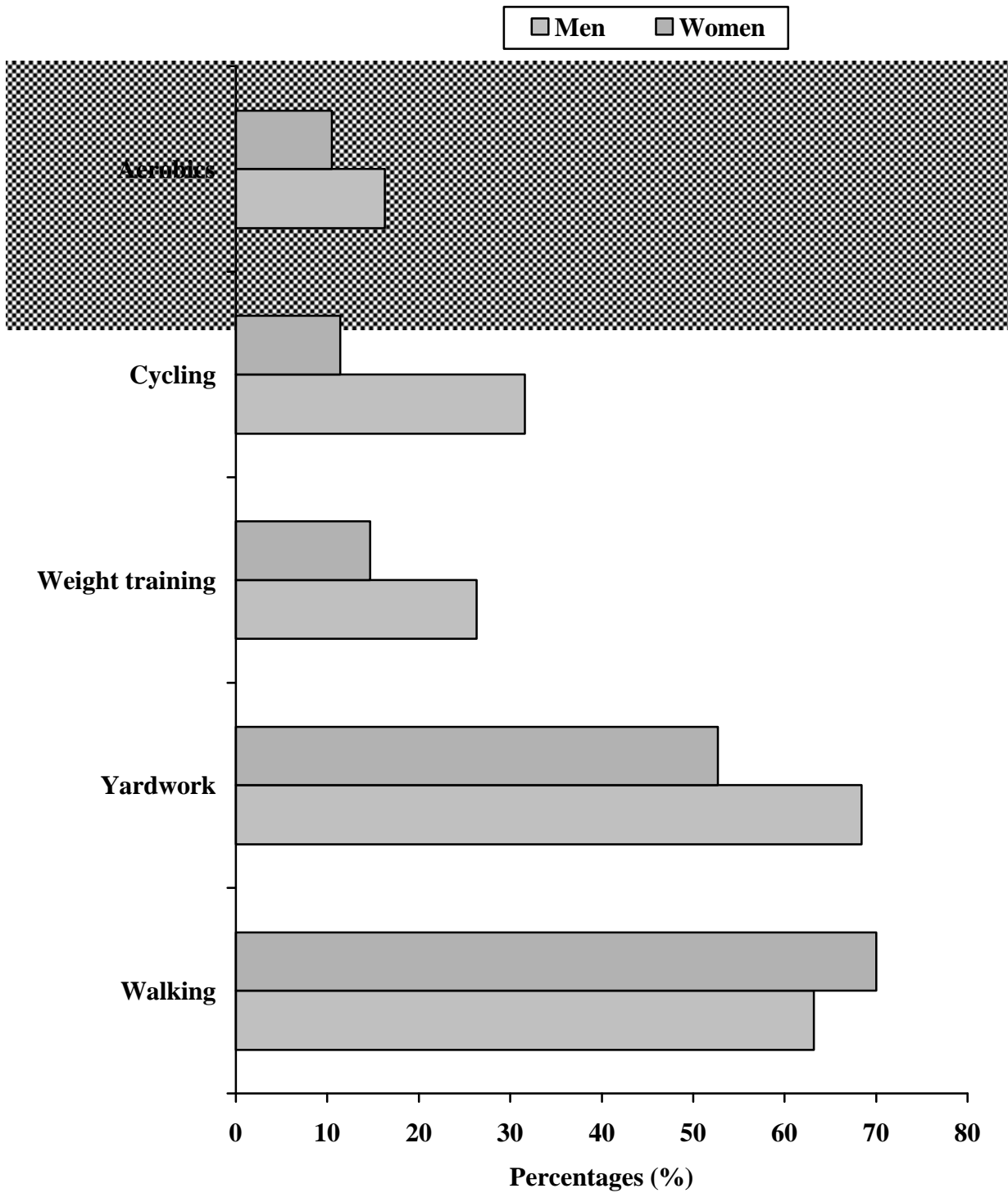


Figure 2. Comparison of the male and female FCS clients regarding physical activity in which they most frequently engage (N=18 males and 195 females).

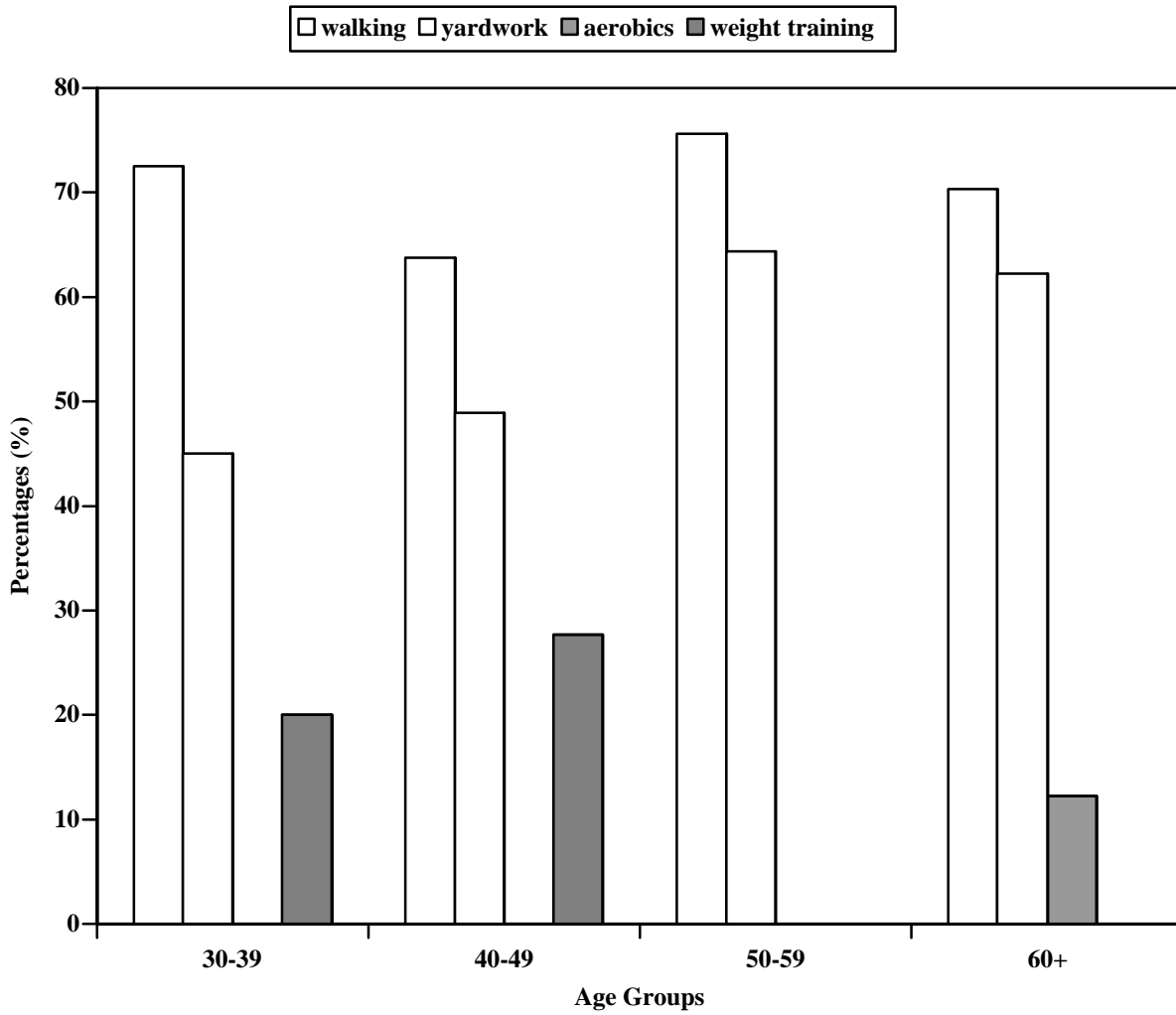


Figure 3. Activities in which female FCS clients are most frequently engaged by age.

greater amounts of weight training than females aged, 60 years and older. As for females aged 60 years and older (12%), results indicate that these females are more frequently participating in aerobics classes than females at younger ages.

Preference of Activities to Increase Physical Activity Levels

Physical activities in which all FCS respondents would be willing to engage to increase activity levels are shown in Table 9.

Agents. Activities most frequently selected by FCS agents as those they would be most likely to do to increase their physical activity were walking (n=19; 59.4%), yard work (n=12; 37.5%), cycling and hiking (n=8; 25%), and weight training, exercise videos and yoga classes (n= 7; 21.9%).

Clients. Activities most frequently selected by FCS clients as being those they would be most likely to do to increase their physical activity were walking (n=96; 45.1%), yard work (n=61; 28.6%) aerobics classes (n=56; 26.3%), and swimming (n=54; 25.4%).

Clientele Differences Among Gender. Figure 4 shows a comparison between male and female clients on the activities most frequently selected to increase or adopt physical activity. Activities males selected most frequently were swimming (42%), running (36.8%), and walking (31.6%) and yard work. As for the female clients, the most frequently selected activities to increase physical activity were walking (44.6%), yard work (28.3%), aerobics (27.7%) and swimming (24.5%). All other activities listed on the survey were selected by less than 20% of both the male and female sampled groups.

Clientele Differences Among Age Groups. When the clientele sample was grouped by aged, results conveyed differences between age groups regarding and specific preferences for various activities (see figure 5). Males were excluded from this analysis due to their limited number (n=18) of participants within each age group. All age groups most frequently selected walking as an activity they might engage to increase their physical activity level. When comparing

Table 9. Activities that Agents (N=32) and FCS Clients (N=213) Believe they Would Most likely do to Increase Levels of Physical Activity.

Type of Activity	<u>Clients</u>	<u>Agents</u>	Type of Activity	<u>Clients</u>	<u>Agents</u>
	No. (%)	No. (%)		No. (%)	No. (%)
Walking	96 (45.1)	19 (59.4)	Roller Blading/Skating	16 (7.5)	3 (9.4)
Yard Work	61 (28.6)	12 (37.5)	Stairmaster	13 (6.1)	0
Aerobics	56 (26.3)	6 (18.8)	Kick Boxing	11 (5.2)	3 (9.4)
Swimming	54 (25.4)	4 (12.5)	None	6 (2.8)	1 (3.1)
Cycling	45 (21.1)	8 (25.0)	Intramural/Team Sports	4 (1.9)	1 (3.1)
Yoga/Stretching	43 (20.2)	7 (21.9)	Elliptical Mover	3 (1.4)	2 (6.3)
Treadmill	41 (19.2)	11 (34.4)	Other		
Exercise Video	37 (17.4)	7 (21.9)	Jump-roping		1 (3.1)
Weight Training	27 (12.7)	7 (21.9)	Tennis	4 (1.9)	1 (3.1)
Hiking	31 (14.6)	8 (25.0)	Skiing		1 (3.1)
Running	28 (13.1)	4 (12.5)			

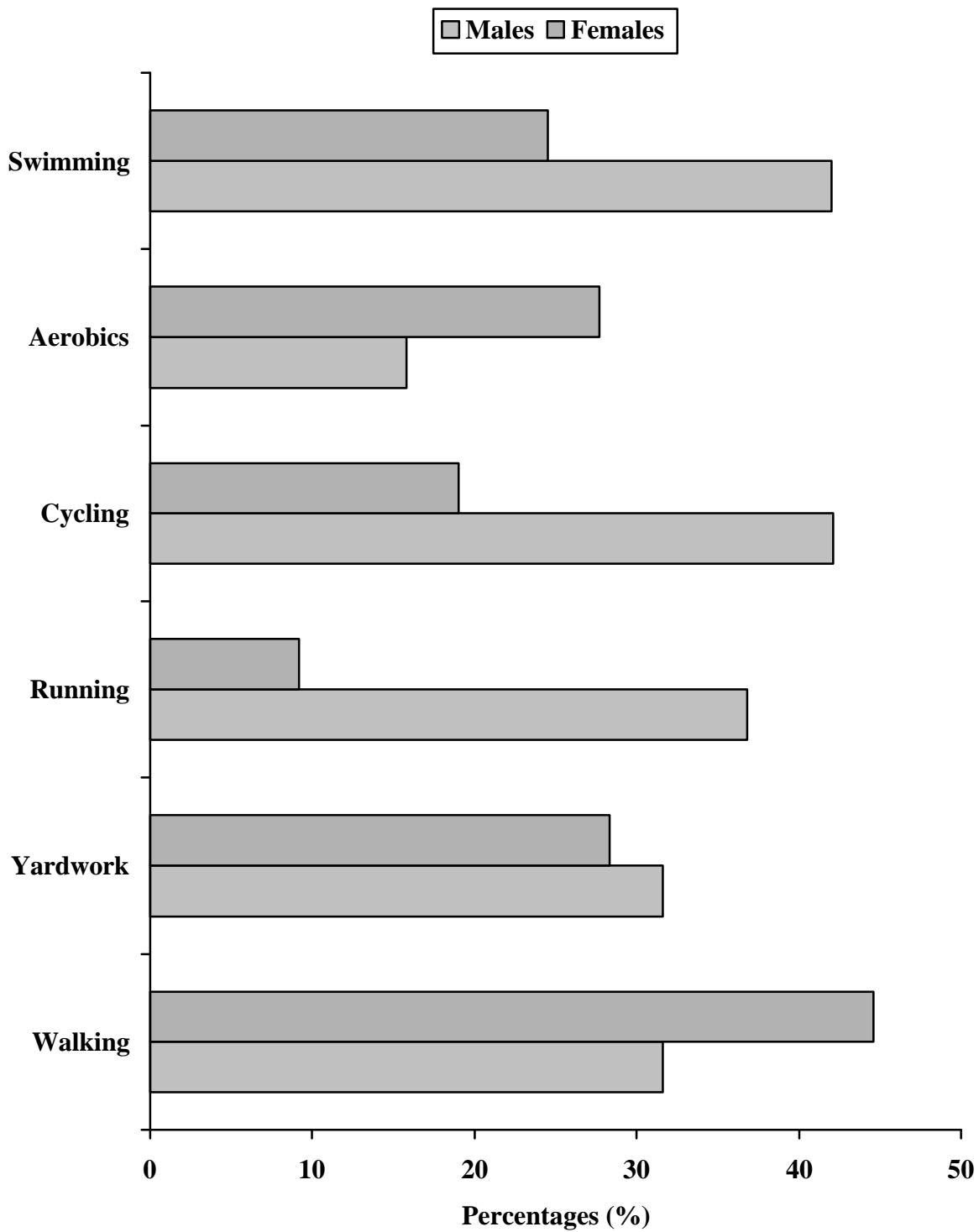


Figure 4. Activities selected by males and female clients as those they might do to increase their physical activity levels.

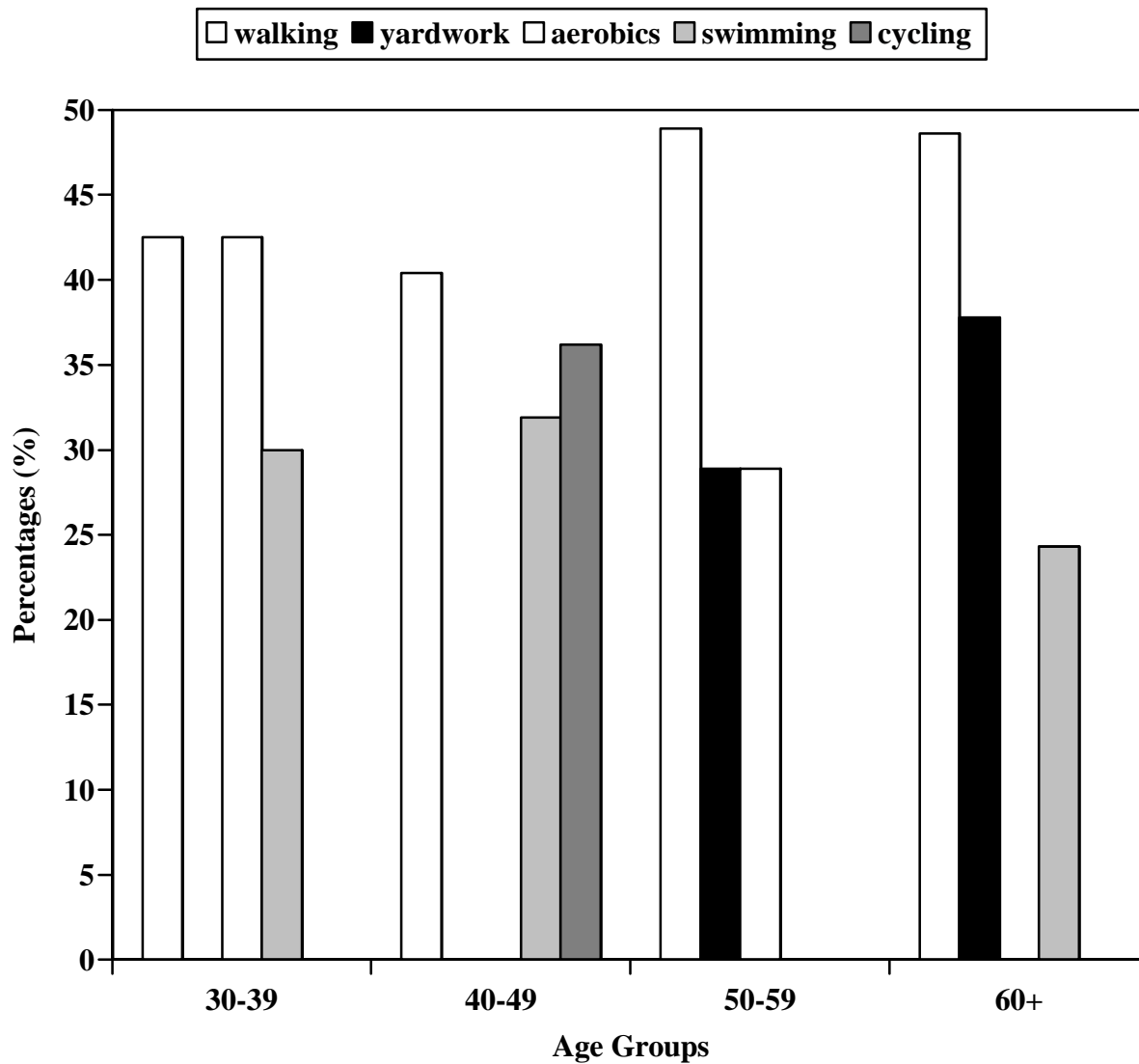


Figure 5. Activities selected by female clients as a means to increase levels of physical activity by age.

frequencies and percents among second and third choices for activity adoption, females aged 60 years and older selected yard work (37.8%) and swimming (24.3%) exercises. Likewise, for females identified in the age category of 50 to 59 years, yard work and swimming (28.9 %) were chosen as the next most popular activities desired to adopt. Females, aged 40–49 years, selected cycling (36.2%) and swimming (31.9%) as their second and third top activities to increase physical activity levels. As for the females, aged 30-39 years, the most frequently selected activities were walking and aerobics (42%). The next preferred activity was swimming (30%).

Self-Efficacy, Decisional Balance, Pro and Con Measures

Tables 10, 11, and 12 present the scores on self-efficacy, decisional balance, and pro and con measures for participants, grouped by stage of change. Analysis of variance (ANOVA) was used to determine relationships between stage of exercise change with self-efficacy and decisional balance measures. Tukey's post hoc comparison test was used to determine the significance between the separate stages of exercise change.

Self-Efficacy Measure. Scores on the five-item self-efficacy measure were significantly related to stage of change for all participants ($p < .0001$). Results from this study indicated that self-efficacy scores differentiated subjects at different stages of exercise change. When analyzing data among all respondents, subjects in the precontemplation stage had significantly lower self-efficacy scores than subjects in the action ($p < .002$) and maintenance ($p < .0001$) stages. Subjects in the contemplation stage also had significantly lower self-efficacy scores than subjects in the action ($p < .003$) and maintenance ($p < .0001$) stages. Results revealed that participants in the preparation stage had significantly lower levels of confidence to exercise than subjects in the maintenance ($p < .0001$) stage. Participants categorized in the action stage of exercise change had significantly higher self-efficacy scores than subjects in precontemplation ($p < .002$), contemplation ($p < .003$) and lower self-efficacy levels compared to the maintenance ($p < .009$) stage. Consequently, all subjects classified in the maintenance stage had the highest self-efficacy scores (see Figure 6).

Table 10. Comparison of Pro, Con, Decisional Balance, and Self-efficacy Scores Grouped by Stage of Exercise Change among all respondents (N=233).

	Precontemplation (n=19)	Contemplation (n=57)	Preparation (n=42)	Action (n=30)	Maintenance (n=85)
Measure	M ± SD	M±SD	M±SD	M±SD	M±SD
Pros	39.6 ±12.9	51.6 ±10.1	48.0±9.3	51.4±8.5	52.0±8.2
Cons	54.9± 10.0	52.3± 10.1	51.1±9.1	48.3±7.6	*47.4±10.7
Decisional Balance	-15.3±17.0	-0.6 ±12.5	-3.1±13.6	3.1±12.2	*4.6±14.5
Self- Efficacy	42.2± 10.8	*44.6 ± 7.8	46.2±8.3	51.36±7.6	*57.2±8.4

*= 1 response missing

Table 11. Comparison of Pro, Con, Decisional Balance, and Self-efficacy Scores Grouped by Stage of Change among Extension Agents (N=31).

	Precontemplation (n=1)	Contemplation (n=7)	Preparation (n=9)	Action (n=2)	Maintenance (n=12)
Measure	M	M±SD	M±SD	M±SD	M±SD
Pros	36.1	52.5±16.1	48.2±10.5	48.6±9.6	55.0±4.3
Cons	56.2	53.9± 11.7	51.3±7.9	54.2±2.3	44.13±6.77.3
Decisional Balance	-20.1	-1.4 ±14.9	-3.1±16.1	-5.6±6.8	10.9±6.5
Self- Efficacy	40.4	45.0 ± 7.8	47.0±6.9	47.2±0.0	60.6±7.8

Table 12. Comparison of Pro, Con, Decisional Balance, and Self-efficacy Scores Grouped by Stage of Exercise Change among FCS Clients (N=203).

	Precontemplation (n=18)	Contemplation (n=50)	Preparation (n=33)	Action (n=29)	Maintenance (n=73)
Measure	M ± SD	M±SD	M±SD	M±SD	M±SD
Pros	39.8 ±13.2	51.5 ±9.2	47.6±9.1	51.6±8.6	51.5±8.6
Cons	54.9± 17.4	52.0± 10.0	51.0±9.5	47.9±7.7	*47.4±11.2
Decisional Balance	-15.1±17.4	-0.5 ±12.3	-3.1±13.1	3.7±12.3	*4.6±15.2
Self- Efficacy	42.3± 11.1	*44.5 ± 7.8	46.0±8.7	51.7±7.8	*56.6±8.4

* = 1 response missing

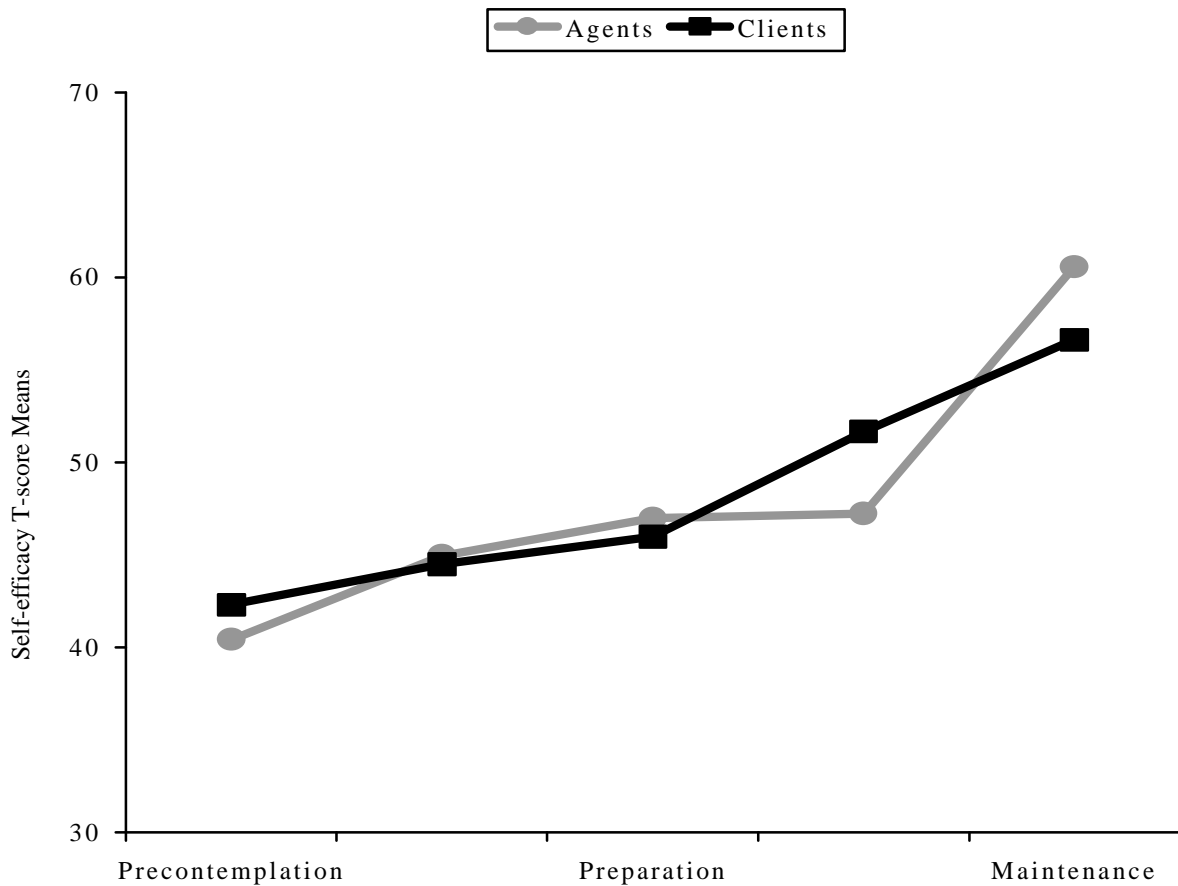


Figure 6. Comparison of exercise self-efficacy levels among participants based on stage of change. Self-efficacy was significantly related to stage of exercise change among all respondents ($p < .0001$), agents ($p < .0001$), & clients ($p < .0001$). Clients in the maintenance stage had significantly higher self-efficacy scores than clients in all stages ($p < .0001$) except action. Clients in the action stage had significantly higher scores than clients in precontemplation ($p < .003$) and contemplation ($p < .004$) stages. All Respondents in the maintenance stage had significantly higher scores than respondents in precontemplation ($p < .0001$), contemplation ($p < .0001$), preparation ($p < .0001$), and action ($p < .009$) stages. All respondents in the Action stage had significantly higher scores than respondents in precontemplation ($p < .002$) and contemplation ($p < .003$) stages.

Clients and Agents. Responses of clients on self-efficacy questions are shown in Table 13. Figure 6 represents the linear trend among stages of change and self-efficacy levels. Similar trends were also found between the self-efficacy score and stages of exercise change for the individualized group of clients and educators. A significant positive relationship was found between self-efficacy scores of agents and clients ($p < .0001$; $p < .0001$ respectively). Among both groups, self-efficacy significantly differentiated subjects in different stages of change, with precontemplators scoring the lowest and both agents of clients scoring the highest in the maintenance stage.

Decisional Balance Measure. Responses of Extension clientele on Decisional Balance measures for physical activity are shown in Table 14. One way analysis of variance was used to determine if the means for the decisional balance scores were related to stage of exercise change among all the participants of the study. Results revealed that the t-scores for decisional balance were significantly related to stage of exercise change ($p < .0001$). Tukey's post hoc tests were used to determine significant relationships for the decisional balance measure among all stages of exercise change. Subjects in the precontemplation stage had significantly lower decisional balance scores compared with subjects in all other stages (contemplation $p < .001$, preparation $p < .011$, action $p < .0001$ and maintenance $p < .0001$). Results also revealed that subjects categorized in the preparation stage had significantly lower scores than individuals in maintenance ($p < .027$). Likewise, respondents categorized in the maintenance stage had the highest decisional balance scores while participants identified in the precontemplation stage had the lowest decisional balance score. Similar results were revealed when agents and clients were analyzed separately and compared (see Figure 7).

Pro and Con Scales. Figure 8 and 9 illustrate the relationship of pros and cons scores for exercises to stages of exercise change. One-way analysis of variance was used to determine if a relationship existed between the stages of exercise change and the perceived pros and cons. Results revealed significant relationships for both the pro ($p < .0001$) and the con ($p < .006$) scales with each of the stages of exercise change. A Tukey's post hoc comparison test was used to determine the significant associations within each stage. For the pros measures, participants classified in the maintenance stage had the highest pro scores compared with all other stages.

Table 13. Exercise Self-Efficacy Responses among FCS Client (N=213).

How confident are you that you could exercise in each of the following situations?	Not confident No. (%)	Slightly Confident No. (%)	Moderately Confident No. (%)	Very Confident No. (%)	Extremely Confident No. (%)
¹ When I am tired.	61 (28.6)	51 (23.9)	61 (28.6)	26 (12.2)	9 (4.2)
¹ When I am in a bad mood.	27 (12.7)	334 (16)	60 (28.2)	54 (25.4)	33 (15.9)
¹ when I feel I do not have time.	72 (33.8)	51 (23.9)	60 (28.2)	14 (6.6)	11 (5.2)
² When I am on vacation.	44 (20.7)	42 (19.7)	48 (22.5)	46 (21.6)	26 (12.2)
³ When it is raining or snowing.	90 (42.3)	48 (22.5)	37 (17.4)	14 (6.6)	13 (6.1)

¹ = 5 responses missing

² = 7 responses missing

³ = 10 responses missing

Table 14. Decisional Balance Scores for Physical Activity of Extension FCS Clients (N = 213).

	Not Important	Slightly Important	Moderately Important	Very Important	Extremely Important
	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
¹ I would have more Energy for family & friends if I exercised regularly.	8 (3.8)	16 (7.5)	40 (18.8)	81 (38)	64 (30)
¹ Regular exercise would help me relieve tension.	6 (2.8)	14 (6.6)	27 (12.7)	86 (40.4)	76 (35.7)
⁴ I think I would be too tired to do my daily work after exercising.	98 (46)	34 (16)	45 (21.1)	18 (8.5)	11(5.2)
² I would feel more confident if I exercised regularly.	10 (4.7)	16 (7.5)	40 (18.8)	72 (33.8)	70 (32.9)
² I would sleep more soundly if I exercised regularly.	11 (5.2)	15 (7.0)	35 (16.4)	77(36.2)	70 (32.9)
¹ I would feel good about self if I kept my commitment to exercise regularly.	7 (3.3)	12 (5.6)	27 (12.7)	69 (32.4)	94 (44.1)
⁵ I would find it difficult to find an exercise activity that I enjoy that is not affected by bad weather.	77 (36.2%)	44 (20.7)	44 (22.1)	27 (12.7)	8 (3.8)
² I would like my body better if I exercised regularly.	6 (2.8)	13 (6.1)	40 (18.8)	81 (38)	68 (31.9)
¹ It would be easier for me to perform routine physical tasks if I exercised regularly.	9 (4.2)	16 (7.5)	41 (19.2)	81 (38)	62 (29.1)

Table 14. Decisional Balance Scores for Physical Activity of Extension FCS Clients (N = 213).

	Not Important	Slightly Important	Moderately Important	Very Important	Extremely Important
	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
² I would feel less stressed if I exercised regularly.	13 (6.1)	12 (5.6)	34(16)	72 (33.8)	76 (35.7)
⁵ I would feel uncomfortable and out of breath when I exercise because I get out of breath and my heart beats very fast.	1 (0.5)	90 (42.3)	48 (22.5)	37 (17.4)	13 (6.1)
² I would feel more comfortable with my body if I exercised regularly.	9 (4.2)	11 (5.2)	36(16.9)	81 (38)	71 (33.3)
³ Regular exercise take too much of my.	82 (38.5)	61 (28.6)	43 (20.2)	17 (8)	4 (1.9)
³ Regular exercise would help me have a more positive outlook on life.	13 (6.1)	21 (9.9)	37 (17.4)	71 (33.3)	65 (30.5)
² I would have less time for family and friends if exercised regularly.	99 (46.5)	50 (23.5)	39 (18.3)	15 (7)	5 (2.3)
³ At the end of the day, I am too exhausted to exercise.	53 (24.9)	61 (28.6)	45 (21.1)	31 (14.6)	17 (8.0)

¹ 4 responses missing

² 5 responses missing

³ 6 responses missing

⁴ 7 responses missing

⁵ 10 responses missing

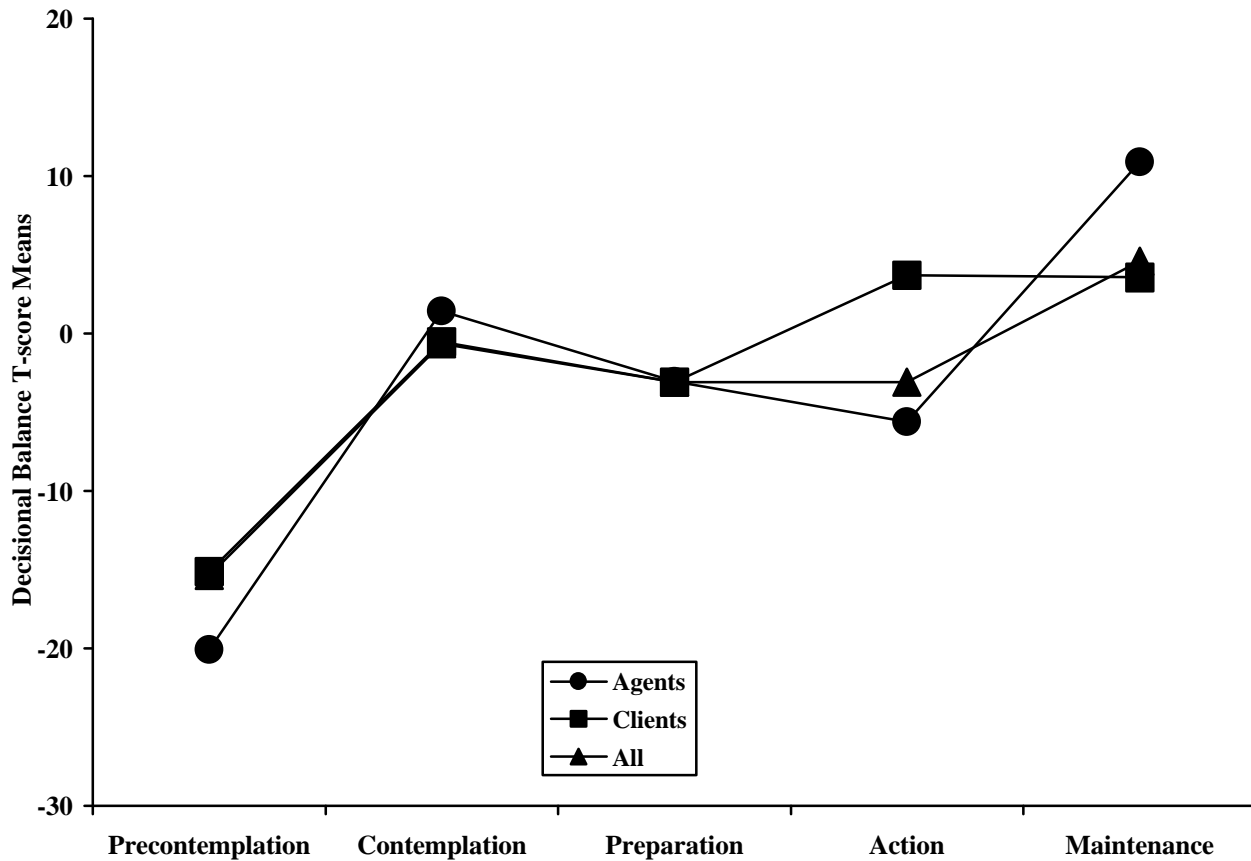


Figure 7. Comparisons of exercise decisional balance scores among participants for stage of change. A significant effect was found among decisional balance scores and stage of change among all respondents ($p < .0001$), clients ($p < .0001$), and agents ($p < .032$).

Clients in the precontemplation stage had significantly lower scores than clients in contemplation ($p < .001$), preparation ($p < .028$), action ($p < .0001$), and maintenance ($p < .0001$) stages. Respondents (“All”) in the precontemplation stage had significantly lower scores than respondents in precontemplation ($p < .001$), contemplation ($p < .011$), action ($p < .0001$), and maintenance ($p < .0001$) stages. Respondents (“All”) in maintenance had a significantly higher score than respondents in preparation ($p < .027$).

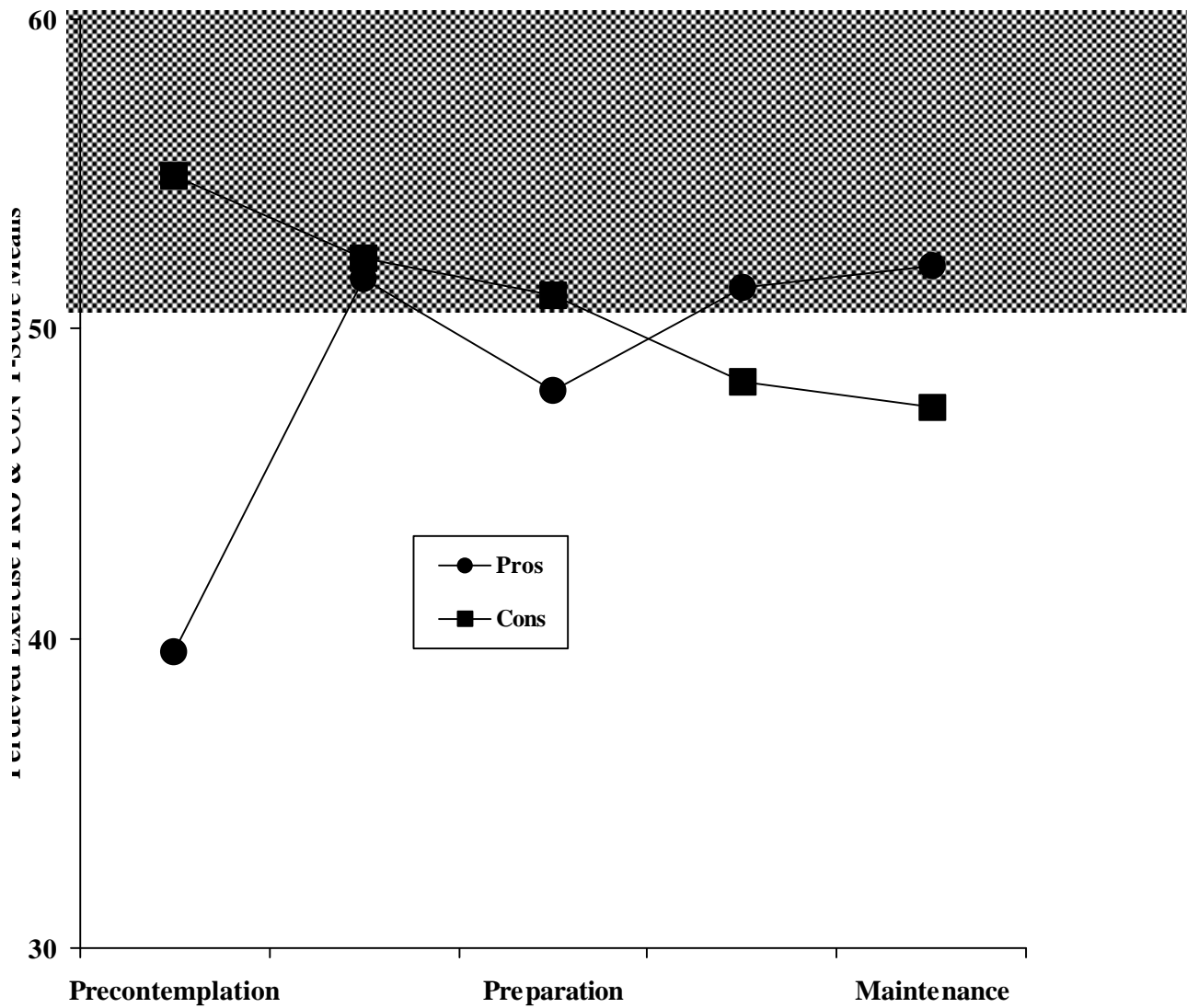


Figure 8. Comparison of Extension agents and FCS clients perceived exercise pros and cons by stage of change. Respondents in the precontemplation stage had significantly lower pro scores than subjects in contemplation ($p < .0001$), preparation ($p < .001$), action ($p < .0001$), and Maintenance ($p < .0001$) respondents in the maintenance stage had significantly lower con scores than respondents in the precontemplation ($p < .023$) and contemplation ($p < .03$) stages.

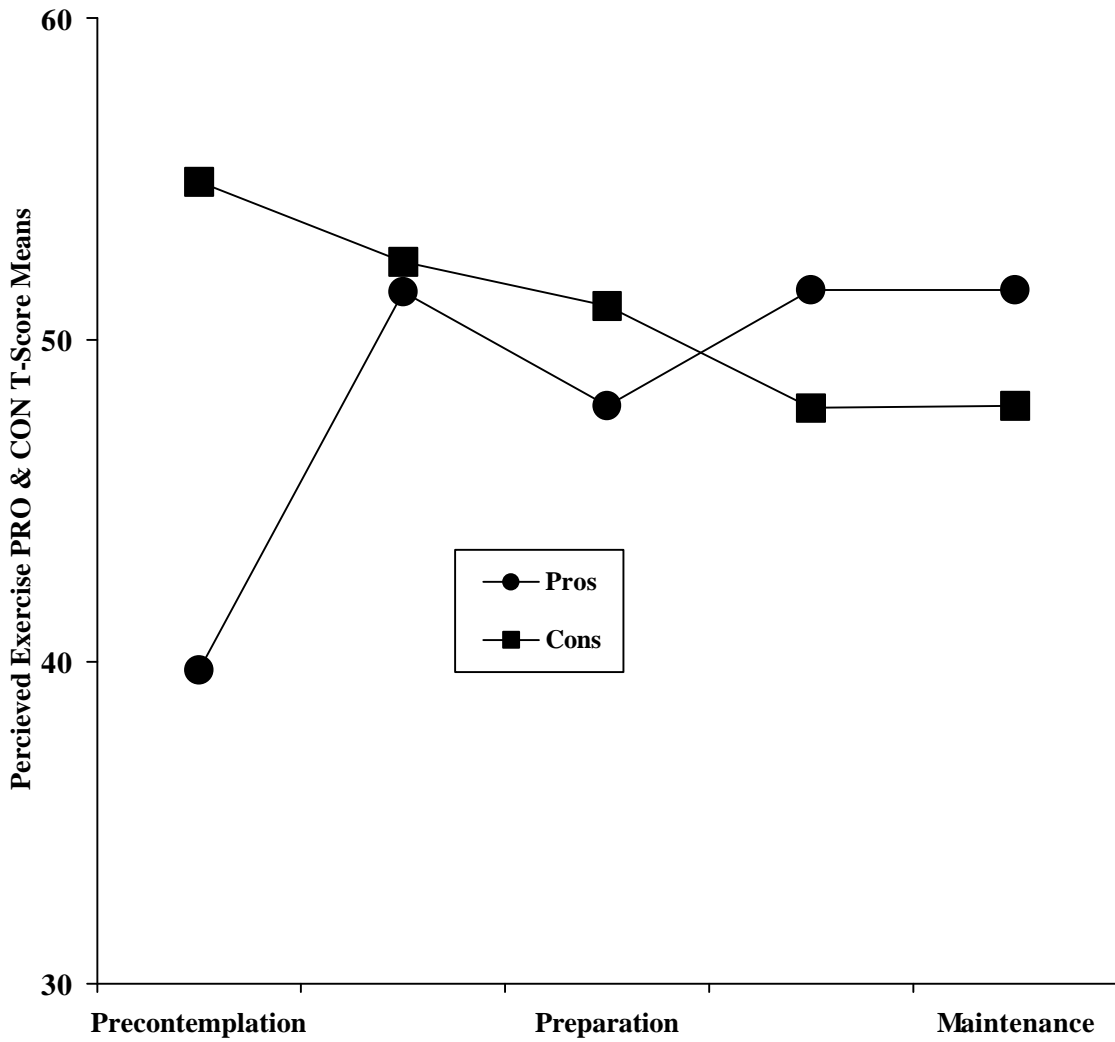


Figure 9. Comparison of the clients perceived exercise pros and cons by stage of change. A significant relationship was found between Pro ($p < .0001$) and Con ($p < .034$) scores with stage of exercise change.

Likewise, participants in the precontemplation stage had significantly lower pro scores when compared with all other stages (contemplation $p < .0001$; preparation $p < .010$; action $p < .0001$; maintenance $p < .0001$). However, analysis of variance tests indicated that participants in the maintenance stage had the highest pro scores. Tukey's post hoc comparison test indicated significant relationships between stages of change and perceived cons for exercise. Participants in the maintenance stage had significantly lower con scores than subjects in the precontemplation ($p < .023$) and contemplation ($p < .035$) stages.

DISCUSSION

Our response rate on the mailed survey of 38% could be viewed as acceptable. A mail response rate greater than 50% has been judged to be very good, yet this level is hard to achieve and is unusual.⁷² A high response rate such as 50% is likely to be achieved when more than two follow-up reminders are provided following the initial mailing.⁷³ In contrast, a response rate less than 30% is considered small and results cannot be given much credibility.⁷⁸ This low level is likely when no follow-up reminders are delivered either by mail or telephone.⁷³ However, it is common to achieve a low response rate when using mail surveys.⁷⁴ Thus, the clientele response rate of 38% in this study is satisfactory and is similar to other research in this area.^{19,56} However, the results may be biased due to possible higher response rates among clients who are interested and/or currently engaging in physical activity. Furthermore, the response rate may not adequately represent the entire FCS clientele in Virginia.

Reasons for the non-response among some FCS clients is not known and only assumptions can be made. Suggestions and comments provided by the participants implied confusion in responding to Part IV of the physical activity survey (see Appendix D, part IV). It is possible that clients did not respond due to this confusion. Some participants wrote the following comments on their survey form:

- "I think the headings should have been labeled differently—not in levels of importance but in levels of yes, no, and maybe."
- "Some of the questions I did not understand."
- "Your headers should be change to "disagree" and "agree". The current headers don't really match the appropriate answers. They are confusing."

- “I found the statements in this last section hard to match up with the five rankings-wording not clear.”
- “This form of listing the answers is slightly confusing.”
- “These items appear to be slanted toward a person who does not currently have a regular exercise program.”
- “I have found certain sections of this extremely difficult to answer and awkward to understand. It is not user friendly.”
- “The last 10 questions can not truly be ranked on the scale given. Each statement assumes you are currently dissatisfied with the way things are.”

In addition, the lack of interest in physical activity among FCS clientele might have been a contributing factor for low response rate. Reports indicate that only a small percentage of adults living in Virginia engage in regular physical activity.⁷⁰ Consequently, individuals may be inclined to disregard exercise surveys that they view as not pertaining to them.

Characteristics Among FCS Participants

Demographic characteristics among the clientele and educators indicated that the majority of participants were employed, white females. Only a small percentage of the population constituted males, minority groups, and unemployed individuals. Therefore, these results may not be representative of an entire population and should not be generalized to all FCS clientele in Virginia. The researchers could not locate data on the demographic variables for Virginia Extension FCS clientele. It is possible that the majority of FCS clients accessing Extension services are employed females and our results may be representative, but further research is needed to determine this.

Results of this study suggest that physical activity programs for FCS clientele should be designed to meet the needs of working females. Delivery of programs might be more appealing if they are flexible, at convenient times, and easily incorporated into busy schedules. To encourage participation, educational programs could suggest simple ways to incorporate small amounts of physical activity throughout the day. Examples include convincing workers to use the stairs instead of the elevator and to park further away from their office or destination. Over half of the clients did not have children living at home, suggesting that childcare does not need to

be provided as it is not a barrier for commitment to physical activity programs. In addition, the majority of participants were married. Thus, designing programs that focus on family-centered physical activity may increase interest among the targeted population. Married workers that do have childcare responsibilities may not have time to attend classes and, therefore, alternative methods need to be considered. Examples include providing childcare services during designated physical activity time or educating these clients on how to incorporate family activities into their daily lifestyles, such as family walks and bike rides in the park.

Stages of Exercise Change

Of primary interest in this study was the way individuals are distributed along the continuum between the precontemplation and maintenance stage of exercise change. Results revealed that the distribution of FCS agents and FCS clients were similar at each of the stages. Approximately 31% of the all the participants were not engaging in physical activity (precontemplation and contemplation stages). Despite the limitations of a cross sectional sample using self-report data, the present findings were not extremely different from those of other studies. Our results are consistent with results from the 1996 Behavioral Risk Factor Surveillance Survey, which indicate that 30% of Virginia adults are not regularly physically active.⁷⁰

Furthermore, almost half of the respondents are not at all participating in physical activity or doing so only occasionally (precontemplation, contemplation, and preparation). Surprisingly, our results indicate that 47% of all respondents are regularly active (action and maintenance). This percentage is slightly higher than that found in other studies. According to the 1995 Behavioral Risk Factor Surveillance system, only 34% of Virginian adults were regularly active.⁷⁰ However, it is likely that clients in the precontemplation stage would not be as likely to respond to a survey on physical activity, which may account for the proportionately low number of respondents in this stage.

Agents. Surprisingly, results revealed that less than half of the agents are regularly active. Leaders are the role models and they need to motivate and help encourage participants to engage in physical activity. It appears important that agents be physically active (action and maintenance stage) to effectively instruct FCS clients and encourage them to become physical

activity, since leaders who enjoy and are committed to what they are teaching may be more effective in influencing others. Not all agents agreed to participate in this study and, therefore, our sample may not represent the entire FCS agent population in Virginia. The agents that were involved were not asked to give their name or identify their employment area and, therefore, it is not known which of the agents are engaging in physical activity on a regular basis. Nutrition and Wellness agents are likely to be the ones responsible for conducting physical activity educational programs. It is hoped that those Nutrition and Wellness FCS agents, who are not currently active, will begin participating in physical activity programs themselves and in providing information for FCS clients. Almost 50% of the agents were in the preparation and action stage. The preparation stage is the stage in which individuals are motivated and want to become physically active, but are not yet engaging in physical activity on a regular basis. Thus, it may be beneficial to initially target Nutrition and Wellness agents with interventions to encourage them to adopt and maintain regular physical activity. The agents would need to engage in regular physical activity, to become more credible in their recommendation of increased physical activity among clientele.

Clients. Approximately half (47%) of the participating clients were regularly engaging in physical activity (action and maintenance) and half (47%) were occasionally or not at all active. The prevalence of inactivity from this study is slightly less than Virginia statewide statistics (66%) on physical inactivity prevalence.⁷⁰ It is possible that the clients who are interested and/or engaging in physical activity, responded to our survey; whereas, clients who are not concerned and/or do not engage in physical activity may have disregarded the survey. This would explain the low number of clients identified in the precontemplation stage (8.5%; not interested in engaging in exercise). Thus these results may not represent individuals in the precontemplation stage and should not be generalized to the entire Extension FCS population.

Because different beliefs and actions are associated within each stage of exercise change, it is essential to identify the stages that individuals are in so physical activity messages can be tailored according to their exercise stage.⁴⁷ This may help to increase participation in and maintenance of exercise programs. According to Marcus et al.,⁴⁷ the following characteristics should be kept in mind:

- The **precontemplator** is unlikely to follow up on recommendations and likely to drop out of exercise programs. At this stage, individuals may not be aware of the risks associated with being sedentary. Precontemplators are more likely to benefit from a discussion of the harmful implications of inactivity, rather than being immediately being expected to join an exercise program.
- **Contemplators** perceive the reasons for remaining inactive as outweighing the benefits of exercise. These individuals will benefit most from a discussion of the benefits associated with physical activity and problem solving to reduce perceived barriers to exercise adoption.
- Individuals identified in the **preparation** stage are irregularly active and, therefore, will benefit most from advice and counseling on establishing a regular physical activity program. In addition, helping these individuals eliminate perceived barriers, and building confidence are important.
- Individuals who are in the **action** stage should be encouraged to incorporate several forms of exercise into their routine to decrease boredom. Providing these individuals with social support has been shown to be one of the most important contributors in maintaining activity.
- For individuals in the **maintenance** stage, it is essential to help them remain motivated and to provide continual positive comments to help sustain their confidence.

Stage of Exercise Change and Demographic Variables

Interestingly, stage of exercise change was related only to the amount of education clientele had. Clientele in the more advanced stages of exercise change appeared to have the highest levels of education. However, results from other studies have revealed associations between stage of exercise change with age, gender, race and the presence of children living at home.⁸¹ Results from this study indicate that there are no associations between demographic variables and identified stage of exercise change, other than the positive association between level of education and stage of exercise change.

Self-efficacy and Decisional Balance Measures

One of the main purposes of this study was to investigate the differences in decisional balance, pro and con measures and self-efficacy scores among the five stages of exercise change among the participating FCS agents and clientele.

Self-Efficacy. As hypothesized, the self-efficacy scores (confidence levels) of the participants varied at each stage of change for exercise adoption. Individuals identified in the earliest stages of exercise change (precontemplation and contemplation) had low confidence in their ability to engage in physical activity when they were tired, on vacation, or had time constraints. On the other hand, the participants identified in the action and maintenance stage of exercised change, expressed high levels of confidence to engage in physical activity during specific situations, and thus, can be viewed as having high self-efficacy for physical activity. These results are consistent with Bandura's¹⁸ self-efficacy theory, which states that an individual's level of confidence to engage in a specific behavior, is significantly related to actual behavior. In addition, self-efficacy scores differentiated subjects at different stages, with a positive linear relationship between self-efficacy and advanced stage of change, which is in agreement with other research.^{10,14,50} These researchers hypothesized that as stage of change advances confidence levels in the ability to engage in physical activity during specific situations also increases.

Results from this study also revealed that scores on the self-efficacy measure were significantly related to stage of change. There were significant parallels in confidence levels at each stage of exercise change. This finding supports the work conducted by Marcus et al.¹⁴ who found that precontemplators and contemplators had the lowest scores and those in maintenance had the highest scores for self-efficacy.

Decisional Balance. Findings from this study suggest that there is stage specificity for perceived pros (incentives) and cons (barriers) to physical activity. Individual's perceptions that physical activity would help them reduce stress, feel healthier, and increase energy level were positively related to the higher stages of change (action and maintenance). On the contrary,

individuals' perceived barriers that they are too tired or feel exercise makes them uncomfortable were negatively associated with higher stages of change for physical activity.

The results achieved from this study regarding the pro and con measures are also consistent with other research.^{48,50,81} The pro scores for individuals were the highest among the participants in the maintenance stage, while individuals categorized in the precontemplation stage had the lowest pro scores. Similar outcomes were found with the con scale. Individuals had the highest con scores in the precontemplation stage when compared to the individuals in action and maintenance stage. A linear trend was found with the con scores decreasing with subjects who were in the higher stages of exercise change, and the pro scores being higher for those in the advanced stage of exercise change.

Furthermore, the results from the decisional balance scores indicated that participants who do not exercise regularly perceived the cons of physical activity to outweigh the benefits of physical activity adoption. Precontemplators and contemplators will have con scores that are higher than pro scores and their overall decisional balance score will be lower than scores from individuals in action and maintenance stages. Support for a modified decisional balance model by Velicer et al.^{20,42} was also illustrated. Their model indicates that, before individuals will change a behavior, their perceived benefits must outweigh the perceived barriers of the behavior. A linear trend was found among the decisional balance scores, with scores increasing with advancement in stage of exercise change. In other words, subjects categorized in the precontemplation and contemplation stage had lower decisional balance scores than individuals who were regularly participating in physical activity (action and maintenance stage).

These results indicate that it is best to increase the perceived benefits of exercise in the earlier stages of exercise change, while decreasing the perceived barriers of exercise. Clientele identified in the precontemplation and contemplation stages of exercise would benefit most from education on the advantages of physical activity intervention geared to those who have never exercised. For example, emphasizing the benefits, such as feeling better, gaining more energy, sleeping better, and relieving stress levels may encourage clientele to become physically active. Because this group perceived many barriers in the adoption of exercise, educational material should identify ways to eliminate the cons of exercise. For example, many clients indicated they are too tired at the end of the day to exercise. Thus, suggestions should be made on how to conveniently incorporate activity during the day or morning hours. Another perceived barrier

was that exercise takes away time from family and friends. Suggestions for activities that friends and family can do together may help eliminate this con.

Preferred Educational Channels

The purpose for assessing educational channel preferences in this survey was to determine the delivery method that might be most effective and practical for improving physical activity behavior among FCS clientele. Surprisingly, results indicated that the desired educational sources among agents and clients were similar. Regardless of group, age, and gender, the top two choices of participants for receiving education information were brochures and newsletters. These results are appealing because the design and delivery of brochures and newsletters is a highly used method within Cooperative Extension. This method is commonly used because of its low cost, convenience, and simplicity of implementation.

Most Popular Physical Activities Currently Practicing

In addition to identifying important target groups for physical activity, it also important to determined the most frequently performed, leisure time physical activities among clients. As expected the type of physical activity varied to a small extent with age. Of significance was, that regardless of age or gender, the most popular activity in which clients were currently engaging was walking. Yard work was the second most-preferred activity among respondents. None of the remaining activities were selected by more than 15% of the respondents.

Physical Activity Frequency According to Gender and Age Group. The top activities in which males and females were frequently engaging were walking and yard work; however, differences were found for the next most popular activities. Males were also participating in cycling, weight training, and running activities more than females. All other activities were selected by less than 14% of the male clientele. However, only 18 male clients participated in this study, therefore, generalizing this information to the entire population for males may be biased and not representative.

As for females, they reported participation in aerobics classes, and to a lesser extent weight training, as their third and fourth most frequently performed activities. Likewise, all other activity choices were selected by less than 13% of the female sample.

Due to the negligible number of male clients, results from this study focus on females' preferences of activities among each age group. Subjects between the ages of 30 and 49 years were currently engaging in more weight training activities than subjects over the age of 50 years. Females, aged 60 years and older, selected aerobics classes as the third most popular activity in which they were currently engaging. With these results, programs can be designed to incorporate the specified leisure time activities that are preferred by clientele in the various age groups.

Physical Activities Most Likely to be Adopted by FCS Clients to Increase Physical Activity

Among participants in this study, walking was selected as the most popular activity that they would be likely to do, followed by yard work. In other words, those not currently engaging in activity selected walking as their preference as an activity to increase physical activity level. The next most popular activities were selected by approximately 25% of all respondents. These activities included aerobic classes, swimming, cycling and yoga/stretching activities. None of the remaining activities were selected by more than 20% of the respondents. Differences were found among age groups and gender, thus, programs need to be designed to attract clientele of the targeted gender and age.

Differences among Gender and Age Groups. Regardless of age or gender, walking was the most popular activity selected as a means for increasing physical activity or an activity clients believe they would enjoy. However, differences were found between the next most popular activities for both gender and age. Data suggest that more males than females prefer to increase their physical performance levels by swimming, cycling and running; whereas, more females would like to increase their activity levels with yard work and aerobics classes.

When determining differences among age groups for female clients, results revealed that females, aged 30 to 39, selected aerobics and swimming as the most popular activities. Females, aged 40 to 49, selected swimming and cycling more frequently than any other age group. Females, aged 50 to 59, selected yard work and aerobic as activities they would be most likely to

do. Lastly, females, aged 60 years and older, selected yard work and aerobics more frequently than the younger age group. Therefore, for women aged 60 years and older, it would not be effective to provide information and programs on aerobics and swimming. This population might find cycling and yard work more appealing. Swimming and aerobics classes may be more appealing to clients at lower ages. Only 18 men participated in this study, therefore, analyzing activity preferences among age groups for males was not performed.

Limitations

Limitations of the study included the fact that a convenience sample of agents was used rather than a random sample. Thus, the sample of clients could not be randomly chosen from all areas of the state. Another limitation was the self-reporting of physical activity levels. A major concern with self reported data is that physical activity levels might not reflect long-term lifestyle practices. However, self-report physical activity questionnaires remain the method of choice for this type of assessment, based on low cost, limited time requirement, and reduced likelihood of influencing behavior.²³

Another limitation of this study was that subjects were composed of a convenience sample of mostly educated, white females, which under-represented less educated, low-income individuals, males and minorities. Thus, data on prevalence of portions of the sample in different stages of exercise change can be generalized to all FCS clientele. However, our results provide important findings that contribute to an understanding of this group for which it is important to provide physical activity programming.

This study did not involve collection of objective data on actual exercise behavior. However, the present results do provide evidence that respondents' stage of exercise change is positively associated with beliefs about favorable and unfavorable features of exercise, as well as confidence levels in exercise participation (pro, con, self efficacy measures).

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

SUMMARY

The purpose of this study was to examine stages of exercise change, confidence levels, perceived incentives and barriers to physical activity and to gain insight on the educational and physical activity preferences of Virginia Cooperative Extension (VCE) Family and Consumer Sciences (FCS) clientele and agents. Results from this study can be used to develop more effective educational publications and programming on physical activity for the promotion of optimal health.

This study used the stages of exercise change model to evaluate physical activity levels among participants. Results revealed that less than half of the agents are regularly participating in physical activity. Results were similar for FCS clients. Half of the clients are sedentary or only occasionally engaging in physical activity, while less than half of the clients are engaging in regular physical activity. Furthermore, when combining results from FCS agents and clients, almost half of the participants are not regularly physically active. One third of the sample are completely sedentary (precontemplation and contemplation stages) are participating only occasionally in physical activity (preparation stage), while slightly less than half are physically active on a regular basis (action and maintenance stages).

From results of this study, it appears that individuals at various stages of exercise change have different degrees of exercise self-efficacy. Respondents with high self-efficacy were noted to engage in physical activity on a regular basis (action and maintenance), while individuals with low self-efficacy were occasionally or not at all engaging in physical activity (preparation, contemplation, and precontemplation). It appears that, as stage of exercise change advances, confidence levels in the ability to engage in physical activity during specific situations also increases.

Results indicate that participants with low decisional balance and pro scores, and high con scores are less likely to be physically active (i.e. tend to be in precontemplation, contemplation, and preparation stages). On the other hand, participants in the action and maintenance stages had the highest decisional balance and pro scores, and the lowest con scores

for physical activity. Evidently, as stage of exercise change advances from precontemplation to maintenance, an individual's perceived benefits surpass the barriers for adopting and maintaining a physically active lifestyle.

In an effort to provide a basis for developing appealing physical activity educational methods, researchers in this study identified the types of educational channels that people prefer for initiating and maintaining physical activity. Based on results, it appears that information targeting FCS participants may best be distributed through brochures and newsletters that are mailed directly to individuals.

In addition, researchers of this study gained knowledge on physical activities people are willing to adopt and maintain, which can be useful in the development of physical activity interventions that are appealing to FCS clients and agents. Results suggest that walking and yard work are the most frequently endorsed activities by all participants. Walking was also the most frequently selected activity among participants who are not physically active or who wish to increase their activity levels.

CONCLUSIONS

In conclusion, the results from this study support the application of the stages of exercise change, self-efficacy and decisional balance models to exercise adoption. Although there are limitations to this study, results represent an effective utilization of three theoretical models to increase understanding of exercise behavior. Introducing these models to guide the work of agents with FCS clientele may help in the development of successful interventions and educational publications.

Extension exercise and health promotion interventions and educational materials are likely to have a greater impact if they are tailored to the attributes and preferences of agents and clients. This study documents that FCS agents and clients have different confidence levels, incentives, and barriers to become physically active. Therefore, Extension programming promoting physical activity among agents and clients should consider these differences and design interventions and materials accordingly, if they are to be successful in encouraging participants to adopt a physically active lifestyle.

Results suggest that approximately half of the FCS agents and clients are not regularly active. It appears that both agents and clients have low confidence in their ability to engage in

physical activity and believe that the barriers to adopt physical activity exceed the benefits. Physical activity publications and interventions tailored to clients who are occasionally or are not at all active need to focus on enhancing self-efficacy and provide incentives for participation while eliminating negative attitudes and perceived barriers. For example, individuals recognized in the early stages of exercise change (precontemplation and contemplation) might benefit most from motivational information designed to increase the appeal of physical activity and to enhance self-efficacy. In addition, continual motivation and support should be provided to clients who are already engaging in physical activity to help maintain or increase their physical activity levels and to reduce the risk of dropping out of exercise programs.

Health and nutrition professionals, who work with the general public, need training and guidance for determining priorities in educational programs. Interventions need to be centered on promoting activities that individuals enjoy and that are compatible with their life-style as well as the surrounding environment. For an intervention to be successful, educational information concerning physical activity should be appealing and hold the target audience's interest. Such information needs to be delivered through appropriate channels that clients will best utilize. Evidently, FCS clients would best benefit by receiving brochures and newsletters by mail that contain physical activity and health promotion information tailored to needs and preferences. Clients in the earlier stages of exercise change (precontemplation, contemplation, and preparation) need to be motivated to advance in their stage of readiness to become active and to be more willing to adopt a physical activity program. In addition, participants that are regularly active, (action and maintenance) need encouragement to continue to lead a physically active lifestyle.

Furthermore, results from this study suggest that walking may be an activity FCS agents and clients are willing to initially adopt and maintain as they move toward action and maintenance stages of exercise change. Evidence that moderate levels of physical activity, like intermittent walking, for 30 minutes on a daily basis provides the health benefits associated with physical activity. Clearly, physical activity interventions to encourage participation should focus on walking and include the use of tailored brochures and newsletters that emphasize the numerous advantages of a physically active lifestyle.

Knowledge of participants' pro and con beliefs, self-efficacy levels, demographic characteristics, and preferences for education channels and activities will enhance the ability of

leaders to design effective health promotion and physical activity publications and programs.⁴⁸ The provision by Virginia Cooperative Extension of physical activity programs can help achieve the state's fitness objective of increasing the level of physical activity and enhancing the quality of life among Virginia's adult population.

RECOMMENDATIONS FOR FUTURE RESEARCH

When using mail surveys as an assessment tool in the future, providing at least two follow-up reminders may increase response rate. Realizing that people are less likely to respond the first time they receive a questionnaire, a second and third reminder is needed to ensure participation of a larger number of participants. In addition, over sampling the target population by greater than 50% may also increase the chances of achieving a desired response rate, thus providing more reliable results.

There is a need to develop and use physical activity publications for FCS clients. More research studies need to be conducted to determine if the use of preferred choices of educational channels will help individuals increase their activity levels and, thus, help them advance in their stage of exercise change. This should include research on effectiveness of print material as brochures and newsletters that are mailed directly to clients. The interaction between delivery channel and participant characteristics should be addressed, as well as issues related to the amount of intervention that would be most effective.

Physical activity interventions also need to be implemented to determine if individuals will maintain their participation in regular physical activity and to evaluate effectiveness of interventions individualized to specific stages. In other words, will these physical activity programs attract clients and further help them progress in the exercise stages of change?

Since participants categorized in the precontemplation stage of exercise change only composed a small percentage of the study sample, an increased effort is needed to survey individuals that are completely sedentary and dislike physical activity. Likewise, more diverse groups such as minorities, males, younger age groups and low income individuals need to be surveyed to avoid any bias and to determine their preferences for physical activity, confidence levels, stage of change, and preferred educational channels. This will also allow a broader generalization of finding to the FCS clientele population.

Furthermore, the provision of physical activity interventions for FCS agents needs to be addressed. Training and incentive programs targeted to encourage FCS agents to adopt and maintain physical activity on a daily basis are essential. This will help determine the types of training from which agents will gain the most benefit and which will be most likely to help them educate their clients. Use of incentive in interventions may help agents conduct appealing programs that will attract their FCS clients to engage in physical activity programs.

The development and evaluation of physical activity education programs should be a continual process to ensure that changing needs and interests of the target audience are being addressed. Insight into the attitudes, preferences, needs and stage of exercise change of FCS clients and agents gained from this study can be used to develop effective publications and programs to serve this population. Furthermore, additional assessment studies are needed to build on the current understanding of physical activity attitudes and practices of adults in Virginia.

REFERENCES CITED

1. U.S. Department of Health and Human Services. Physical activity and health: A report of the Surgeon General. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention; 1996.
2. Pate RR, Pratt M, Blair SN, Haskell WL, Macera CA, Bouchard C, Buchner D, Ettinger W, Heath GW, King AC, Kriska A, Leon AS, Marcus BH, Pollock ML, Rippe JM, Sallis J, Wilmore JH. Physical activity and public health: a recommendation from the Centers for Disease Control and Prevention and the American College of Sports Medicine. *JAMA*. 1995;273:402-407.
3. Blair SN, Powel KE, Bazzarre TL, Early JL, Epstein LH, Lawrence GW, Harris SS, Haskell WL, King AC, Koplan J, Marcus BH, Paffenbarger RS Jr., Yeager KK. Physical Inactivity V. *Circulation*. 1993; 88:1402-1405.
4. Franis KT. Status of the year 2000 health goals for physical activity and fitness. *Phys Ther*. 1999; 79:404-14.
5. Hp2000 U.S. Department of Health and Human Services. Healthy People 2000- National Health Promotion and Disease Prevention Objectives. Washington DC: U.S. Government Printing Office, 1990; DHHS publication NO. (PHS) 91-50212.
6. Dunn A, Garcia ME, Marcus BH, Kampert JB, Kolhl HW, Blair SN. Six month physical activity and fitness changes in project active, a randomized trial. *Med Sci Sports Exerc*. 1998;30:1076-1083.
7. Jones DA, Ainsworth BE, Croft JB, Macera CA, Lloyd EE, Yusuf HR. Moderate leisure-time physical activity: who is meeting the public health recommendations? A national cross-sectional study. *Arch Fam Med*. 1998; 7:285-9.

8. Morrow JR., Jackson AW, Bazzarre TL, Milan D, Blair SN. A one- year follow-up to physical activity and health. A report of the Surgeon General. *Am J Prev Med.* 1999; 17:24-3
9. Marcus BH, Bock BC, Pinto BM, Forsyth LH, Roberts LH, Traficante RM. Efficacy of an individualized motivationally tailored physical activity intervention. *Ann Beh Med.* 1998;20:174-180
10. Sallis JF, Haskell WL, Fortmann SP, Vranizan KM, Taylor CB, Solomon DS. Predictors of adoption and maintenance of physical activity in a community sample. *Prev Med.* 1986; 15:331-334.
11. King AC, Blair SN, Bild DE, Dishman RK, Dubbert PM, Marcus BH, Idrige NB, Paffenbarger RS Jr., Powel KE, Yeager KK. Determinants of physical activity and intervention in adults. *Med Sci Sports Exerc.* 1992; 24:S221-S236.
12. Dishman RK. *Advances in Exercise and Adherence.* Champaign, IL: Human Kinetics Books, 1994.
13. Bishop JG, Aldana SG. *Step up to Wellness. A staged based approach.* Needham Heights, MA: Allyn and Bacon; 1999.
14. Marcus BH, Selby VC, Niaura RS, Rossi JS. Self-efficacy and the stages of exercise behavior change. *RQES.* 1992; 63: 60-66.
15. Dishman RK. *Exercise Adherence.* Champaign, IL: Human Kinetics Books, 1988.
16. Marcus BH, Owen N, Forsyth LH, Cavill NA, Fridinger F. Physical activity interventions using mass media, print media, and information technology. *Am J Prev Med.* 1998;15:362-378.

17. Prochaska JO, DiClemente CC. Stages and processes of self-change of smoking: toward an integrative model of change. *J Consulting Clinical Psychol.* 1983;51:390-395.
18. Bandura A. Self-efficacy: toward a unifying theory of behavioral change. *Psychol Rev.* 1977; 84:191-215.
19. Marcus BH, Owen N. Motivational readiness, self-efficacy and decision-making for exercise. *J Appl Soc Psychol.* 1992; 22: 3-16.
20. Velicer WF, DiClemente CC, Prochaska J, Brandenburg N. A decisional balance measure for assessing and predicting smoking status. *J Personality Social Psychol.* 1985; 48:1279-1289.
21. Calfas KJ, Long BJ, Sallis JF, Wooten WJ, Pratt M, Patrick K. A controlled trial of physician counseling to promote the adoption of physical activity. *Prev Med.* 1996;25:255-233.
22. Marcus BH, Emmons KM, Simkin-Silverman L, Linnan LA, Taylor ER, Bock BC, Roberts MB, Rossi JS, Abrams DB. Evaluation of motivationally tailored versus self help physical activity intervention at the workplace. *Am J Health Promot.* 1998; 12:246-253.
23. Cardinal BJ. Behavioral and biometric comparisons of the preparation, action, and maintenance stages for exercise. *Research, Theory, and Practice.* 1995; 11: 36-43.
24. Peterson TR, Steven MS, Aldana G. Improving exercise behavior: an application of the stages of change model in a worksite setting. *Am J Health Promot.* 1999; 13:229-232.
25. Calfas KJ, Long BJ, Sallis JF, Wooten WJ, Pratt M, Patrick K. A controlled trial of physician counseling to promote the adoption of physical activity. *Prev Med.* 1996;25:255-233.

26. Marcus BH, Emmons KM, Simkin-Silverman L. Evaluation of stage matched versus standard self help physical activity interventions at the workplace. Marcus BH, Forsyth LH. How are we doing with physical activity? *Am J Health Promot.* 1999;14: 118-124
27. Booth ML, Owen N, Bauman A, Gore CJ. Physical activity preferences, preferred sources of assistance and perceived barriers to increased activity among physically inactive Australians. *Pre Med.* 1997; 26:131-137.
28. Virginia Cooperative Extension. Knowledge for the Commonwealth. Extension mission, vision, history and legislation. Available at: <http://www.ext.vt.edu/about.vce/miss.html>. Accessed October 1999.
29. What is CSREES. Available at: <http://www.reeusda.gov/1700/about/csrees2.htm>. Accessed June 2000.
30. 1999 Educational program descriptions. VCE planning and reporting. Nutrition education and health promotion. Available at: <http://www.ext.vt.edu/vce/eis/pow/1999/epDescriptionjns/epDesc51.html>. Accessed October 1999.
31. Reibe D. change for the better: understanding the process of change to help ease clients into a healthy lifestyle. *American Fitness.* 1997;15:61-64.
32. Kujala UM, Kaprio J, Sara S, and Koakenvuo M. Relationships of leisure-time physical activity and mortality: the Finnish twin cohort. *JAMA.* 1998; 279:440-444.
33. Grundy SM, Blackburn G, Higgins M, Lauer R, Perri MG, Ryan D. Roundtable Consensus Statement: physical activity in the prevention and treatment of obesity and its co morbidities. *Medicine and Science in Sports and Exercise.* American College of Sports Medicine, Indianapolis, IN. roundtable February 4-7,1999. S502-S508.

34. Anderson RE, Crespo CJ, Bartlett SJ, Cheskin LJ, Pratt M. Relationship of physical activity and television watching with body weight and level of fatness among children. *JAMA*. 1998;279:38-942.
35. Wong ML, Koh D, Lee MH. Assess workers' needs and preferences first before planning a physical fitness program: findings from a polytechnic institute in Singapore. *Occup Med*. 1998; 48:37-44.
36. Health Department Health Data and Statistics. Available at: http://www.dupagehealth.org/health_data/healthypeople.html. DuPage County. Accessed April 2000.
37. Healthy People 2000/2010. Available at: <http://web.healthypeople/Document/HTLM/Volume1/physical.htm>. Accessed April 2000.
38. Sallis JF, Hovell MF. Determinants of exercise behavior. In *Exercise and Sport Sciences Review*. Baltimore, MD: Williams and Wilkins; 1990.
39. Healthy People 2010. Healthy people 2010-Conference Edition—22 physical activity and fitness. Available at: <http://web.health.gov/healthypeople/Document/HTML/Volume2/22Physical.htm>. Accessed April 2000.
40. Carnegie Council on Adolescent Development. A matter of time: risk and opportunity in the out of school hours. *Recommendations for strengthening community programs for youth*. New York, NY: Carnegie Corporation of New York; 1994
41. Cole G, Hammond S, Lionard B, Fridinger F. Using stages of behavioral change constructs to measure the short-term effects of a worksite based intervention to increase moderate physical activity. *Psychological Reports*. 1998;82:615-618.

42. Janis IL, Mann L. *Decision making: a psychological analysis of conflict, choice, and commitment*. New York: Collier Macmillan, 1977.
43. Marcus BH, Simkin LR. The stages of exercise behavior. *J Sports Med Phys Fitness*. 1993; 33: 83-88.
44. Cardinal BJ, Sachs ML. Effectw of mail mediated, stage matched exercise strategies on female adults' leisure time exercise behavior. *J Sports Med Phys Fitness*. 1996;36:100-107.
45. Costakis CE, Dunnagan T, Haynes G. The relationship between the stages of exercise adoption and other behaviors. *Am J Health Promot*. 1999; 14:22-30.
46. Dishman RK, Buckworth J. increasing physical activity: a quantitative synthesis. *Med Sci Sports Exercise*. 1996;706-715.
47. Marcus BH, Forsyth LH, Stone EJ, Dubbert PM, McKenzie TL, Dunn AL, Blair SN. Physical activity behavior change: issues in adoption and maintenance. *Health Psychol*. 2000; 19: 32-41.
48. Marcus BH, Rakowski W, Rossi JS. Assessing motivational readiness and decision making for exercise. *Health Psychol*. 1992; 11: 257-261.
49. Prochaska JO, Velicer WF. The transtheoretical model of health behavior change. *Am J Health Promot*. 1997;12:38-48.
50. Herrick AB, Stone WJ, Mettler MM. Stages of change, decisional balance, and self-efficacy across four health behaviors in a worksite environment. *Am J Health Promot*. 1997; 12:49-56.

51. Wyse J, Mercer T, Ashford B, Buxton K, Gleeson N. Evidence for the validity and utility of the stages of exercise behavior change scale in young adults.

52. Burn GE, Naylor P, Page A. Assessment of stages of change for exercise within a worksite lifestyle-screening program. *Am J Health Promot.* 1999; 13:143-145.

53. Barke CR, Nicholas DR. physical activity in older adults: The stages of change. *J Appl Gerontology.* 1990;9:216-223.

54. Blair S. *How to assess exercise habits in physical fitness.* Behavior Health: A Handbook of Health Enhancement and Disease Prevention, Matarazzo J, Weiss S, Herd J, Miller N. New York: Wiley, 1984.

55. Cardinal BJ. Construct validity of stages of change for exercise behavior. *Am J Health Promot.* 1997;12:68-74.

56. Jaffee L, Lutter MA, Rexton, Hawkes C, Bucaccio P. Incentives and Barriers to Physical Activity for Working Women. *Am J Health Promot.* 1999;13:215-218.

57. Marcus BH, Eaton CA, Rossi JS, Harlow LL. Self-efficacy, decision-making, and stages of change: an integrative model of physical exercise. *J Appl Soc Psychol.* 1994; 24: 489-508.

58. Marcus BH, Banspach SW, Lefebvre RL, Rossi JS, Carleton RA, Abrams DB. Using the stages of change model to increase the adoption of physical activity among community participants. *Am J Health Promot.* 1992;6:424-429.

59. Cardinal BJ, Sachs ML. Prospective analysis of stage of exercise movement following mail delivered self instructional exercise packets. *Am J Health Promot.* 1995;9:430-432.

60. Marcus BH, Goldstein MG, Jette A, Simkin-Silverman L, Pinto , Millan F. Training physicians to conduct physical activity counseling. *Prev Med.* BM1997;26:382-388.
61. Summary of travel trends:1995. Nationwide personal transportation survey. Available at: <http://www.cta.ornl.gov/npts/1995/>. Accessed May 2000.
62. National bicycling and walking study: transportation choices for a changing America. Publication FFH10A PD 94-023. Washington, DC: US Department of Transportation. Federal highway Administration. 1994.
63. Jarvis KL, Friedman RH, Heeren T, Cullinane PM. Older women and physical activity: using the telephone to walk. *Women's Health Issues.* 1997;7:24-29.
64. Pinto BM, Marcus BH, Clark MM. Promoting physical activity in women: the new challenges. *Am J Prev Med.* 1996; 12:395-400.
65. Dunn AL, Marcus BM, Kampert JB, Garcia ME, Kohl HW, Blair SN. Reduction in Cardiovascular Disease Risk Factors: 6-month results form Project Active. *Preven Med.* 1997; 26:883-892.
66. American College of Sports Medicine. The recommended quantity and quality of exercise for developing and maintaining cardiorespiratory and muscular fitness in healthy adults. *Med Sci Spors Exerc.* 1990; 22:265-74.
67. Sedgwick AW, Brotherhood JR, Harris-Davidson A, Taplin RE, Thomas DW. Long term effects o physical training program on risk factors for coronary heart disease I otherwise sedentary men. *BMJ.* 1980; 281:7-10.
68. VCE Facts and Extension System Information. Available at: <Http://www.ext.vt.edu/about.vce/miss.html>. Accessed February 1998.

69. Director's Communique. Directors Report- VCE/VESA Conference Monday, May 8, 2000. Available at <http://www.ext.vt.edu/vce/comunique/vesa00.html>. Accessed July 2000.

70. Healthy Virginia Communities, A Report on Year 2000 Health Status and Risk Reduction Indicators for the Commonwealth of VA and Health Districts. Available at: <http://www.vdh.state.va.us/commish/healthy/index.htm>. Accessed April 2000.

71. Paxon CM. Increasing survey response rates; practical instructions from the total design method. *Cornell Hotel and Restaurant Administration Quarterly*. 1995;36:66-74.

72. Pressley MM. *Mail survey response: a critically annotated bibliography*. Faber and Co. Greensboro, NC. 1976.

73. Dillman DA. *Mail and Telephone Surveys: The Total Design Method*. New York: John Wiley and Sons, 1978.

74. Smith TW. Trends in non-response rates. *Int J Public Opinion Research*. 1995; 7: 157-171.

75. Yammarino FJ, Skinner SJ, Chiders TL. Understanding mail survey response behavior. *Public Opinion Quarterly* 1991; 55:6143-639.

76. Dillman DA, Sinclair MD, Clark JR. Effects of questionnaire length, respondent-friendly design, and a difficult question on response rates for occupant-addressed census mail surveys. *Public Opinion Quarterly*. 1993; 57:289-304.

77. Edmonston J. Why response rates are declining. *Business Marketing*. 1997;82:12-14.

78. Thomas JR, Nelson JK. *Research Methods in Physical Activity*. 3rd Ed. Champaign IL: Human Kinetics, 1996.
79. Eyler AA, Mayer J, Rafii R, Housemann R, Brownson RC, King AC. Key informant surveys as a tool to implement and devaluate physical activity interventions in the community. *Health Education Research*. 1999;14:289-298.
80. Application for Approval of Research Involving Human Subjects. Blacksburg, VA: Research and Graduate Studies. VPI&SU; 1995.
81. Marcus BH, Pinto BM, Simkin LR, Audrain JE, Taylor ER. Application of theoretical models to exercise behavior among employee women. *Am J Health Promot*. 1994;9:49-55.
82. Taylor W, Baranowski T, Young D. Physical activity interventions in low-income ethnic minority and populations with disability. *Am J Prev Med*. 1998;15:334-343.

APPENDIX A

FCS Client Informed Consent Form

APPENDIX A

VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

Informed Consent form for Participants of Investigative Projects

Title of Project: A Survey of Physical Activity – Related Attitudes and Perceived Needs and Interests of Extension Family and Consumer Sciences Educators and Clientele in Virginia

Investigators: Tara S. Stimpson and Dr. Ruby H. Cox

I. Purpose of Research

You are invited to take part in a study about needs and interest in physical activity among individuals who have previously participated in one or more Extension Family and Consumer Sciences (FCS) educational programs. The purpose of this study is to gain insight on current practices and opinions of FCS clientele to design educational brochures and programs on physical activity for health promotion. Approximately 585 FCS clientele will be randomly selected to participate in this study.

II. Procedures

You will be asked to complete an anonymous questionnaire, about physical activity. The questions will assess your motivation, readiness, barriers, and incentives to participate in moderate physical activity. In addition, questions will be asked to determine how you would prefer to receive physical activity education and the types of physical activity programs you would like to have provided. You will be asked to answer the questions as accurately and honestly as possible. The questionnaire will take less than 20 minutes to complete. Nothing further will be required.

III. Risks

There are no perceivable risks associated with participating in this study.

IV. Benefits of this Project

Results of this study will provide valuable information for designing a physical activity and wellness education program for clientele of the Family and Consumer Sciences (FCS) programs administered by Virginia Cooperative Extension. Advantages to you may include the availability of a physical activity program to benefit your health. Also, Extension physical

activity programs may benefit society by increasing physical activity participation and reducing participants' risks for developing chronic diseases. No promise or guarantee of benefits is being made to encourage your participation in this study.

V. Extent of Anonymity and Confidentiality

All responses are anonymous, and you will not be asked to provide your name. All results will be kept strictly confidential. At no time will the researchers release individual information to anyone other than individuals working in the study, without your written consent.

VI. Compensation

No compensation will be provided for participation in the study.

VII. Freedom to Withdraw

You are free to withdraw from this study at any time and for any reason without penalty. If you do not feel comfortable answering any particular question, you may decline to answer that question.

VIII. Approval of Research

This research project has been approved, as required, by the Institutional Review Board for Research Involving Human Subjects at Virginia Polytechnic Institute and State University and by the Department of Human Nutrition, Foods and Exercise.

IX. Subject's Responsibilities

I voluntarily agree to participate in this study. I have the following responsibilities:

- I will answer the questions as accurately and honestly as possible.
- If I do not understand a question or directions, I will call the provided telephone numbers for help.

X. Subject's Permission

I have read and understand the Informed Consent and conditions of this study. I have had all my questions answered. I hereby acknowledge the above and give my voluntary consent for participation in this study.

If I participate, I may withdraw at any time without penalty. I agree to abide by the rules of this study.

Signature

Date

Should I have any questions about this research or its conduct, I may contact:

Tara Stimpson
Investigator, Virginia Tech

(540) 961-0910
Phone

Ruby H. Cox, PhD
Associate Professor-HNFE
102 Wallace Annex
Blacksburg, VA 24061-0228

(540) 231-7156
Phone

APPENDIX B
FCS Agent Informed Consent Form

APPENDIX B

VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

Informed Consent for Participants of Investigative Projects

Title of Project: A Survey of Physical Activity – Related Attitudes and Perceived Needs and Interests of Extension Family and Consumer Sciences Educators and Clientele in Virginia

Investigators: Tara S. Stimpson and Dr. Ruby H. Cox

I. Purpose of Research

You are invited to participate in a study concerning current practices, perceived needs and attitudes regarding regular physical activity for health among Family and Consumer Sciences (FCS) clientele and agents. The purpose of the study is to gain information on practices and attitudes of both Extension educators and “potential” participants in physical activity programs, so that appealing publications and programming on physical activity can be designed for use by Extension Agents. A total of 30 Extension agents will participate in this study.

II. Procedures

Each study participant will be asked to complete a questionnaire, answering physical activity related questions. The questions in the survey will assess your motivation readiness, confidence levels, and perceived barriers and incentives to engage in moderate levels of physical activity. In addition, questions will be asked to determine how you believe clients would prefer to receive physical activity education and the types of physical activity programs you believe they would enjoy. The participant is expected to answer the questions as accurately and honestly as possible. The questionnaire will take less than 20 minutes to complete. Nothing further will be required.

III. Risks

There are no perceivable risks associated with participating in this survey.

IV. Benefits of this Project

This study will provide valuable information for designing a physical activity and wellness education program for clientele of the Family and Consumer Sciences (FCS) programs administered by the Cooperative Extension Service. Advantages may include the offering of Extension physical activity programs that will possibly benefit the society by increasing physical activity participation and reducing participants' risk for developing a chronic disease. No promise or guarantee of benefits is being made to encourage your participation in this study.

V. Extent of Anonymity and Confidentiality

All responses are anonymous; you will not be asked to provide your name. All results will be kept strictly confidential. At no time will the researchers release the results of the study to anyone other than individuals working on the study without your written consent.

VI. Compensation

No compensation will be provided for participation in the study.

VII. Freedom to Withdraw

At any time, you are free to withdraw from the study for any reason without penalty. If you do not feel comfortable answering any particular question, then you may decline to answer that question.

VIII. Approval of Research

This research project has been approved, as required, by the Institutional Review Board for Research Involving Human Subjects at Virginia Polytechnic Institute and State University and by the Department of Human Nutrition, Foods and Exercise.

IX. Subject's Responsibilities

I voluntarily agree to participate in this study. I have the following responsibilities:

- I will answer the questions as accurately and honestly as possible.
- If I do not understand a question or directions, I will call the provided telephone numbers for help.

X. Subject's Permission

I have read and understand the Informed Consent and conditions of this project. I have had all my questions answered. I hereby acknowledge the above and give my voluntary consent for participation in this project.

If I participate, I may withdraw at any time without penalty. I agree to abide by the rules of this project.

Signature

Date

Should I have any questions about this research or its conduct, I may contact:

Tara Stimpson
Investigator, Virginia Tech

(540) 961-0910
Phone

Ruby H. Cox, PhD
Associate Professor-HNFE
102 Wallace Annex
Blacksburg, VA 24061-0228

(540) 231-7156
Phone

APPENDIX C
Cover Letter

March, 2000

Dear Extension Participant:

You have been selected from a mailing list of Extension Program Participants to be invited to participate in a Physical Activity Study. The study is being conducted to gather information for use in designing educational programs, events, and publications on physical activity and health. These educational programs and publications will be offered to the public in the future by the Virginia Cooperative Extension (VCE).

As a part of this study, a survey is being conducted by Dr. Ruby H. Cox and other VCE Extension specialists at Virginia Tech and Virginia State. A master's degree student, Tara Stimpson, is assisting with the conduction of the study and will be using the overall results for her thesis. All individual information will be kept confidential and you are not being asked to provide your name on the survey form.

Your participation in this study is dependent on your willingness to complete and return the enclosed Informed Consent and the enclosed 4-page questionnaire *Family & Consumer Sciences Physical Activity Survey*. This is all that will be asked of you. If you are willing to be a part of this study, please read and follow the attached instructions. A self-addressed, postage-prepaid envelope is enclosed for returning the Informed Consent and the Survey. If you do not wish to participate, just discard the enclosed materials.

Thank you in advance for your participation.

Sincerely yours,

Ruby H. Cox, PhD, RD
Associate Professor-HNFE
Extension Nutrition Specialist
Toll-free Phone: 1-888-814-7627

APPENDIX D
Physical Activity Questionnaire

**Virginia Cooperative Extension
Family & Consumer Sciences (FCS) Physical Activity Survey**

Part I: Demographic Information:

1. Location of the nearest Extension office to you. (Please list the Town or City) _____		
2. Age: (Please check one) <input type="checkbox"/> 18-29 <input type="checkbox"/> 30-39 <input type="checkbox"/> 40-49 <input type="checkbox"/> 50-59 <input type="checkbox"/> 60+	3. Marital status: Check the category you identify with <input type="checkbox"/> Single (never married, divorced, separated, or widowed) <input type="checkbox"/> Married	5. Total Household Income: (Please check one) <input type="checkbox"/> < \$10,000 <input type="checkbox"/> \$10,000-19,999 <input type="checkbox"/> \$20,000-34,999 <input type="checkbox"/> \$35,000-49,999 <input type="checkbox"/> \$50,000+
4. Sex: Female <input type="checkbox"/> Male <input type="checkbox"/>		
6. Please place a check mark by your top 3 choices on how you would like to receive health promotion and physical activity information. (Please do not check more than 3) <input type="checkbox"/> Group class in your community <input type="checkbox"/> Newspaper articles <input type="checkbox"/> Group class at the Extension office <input type="checkbox"/> Television programs <input type="checkbox"/> Group class at your worksite <input type="checkbox"/> Other (Please write in: _____) <input type="checkbox"/> Brochures mailed to you <input type="checkbox"/> Radio programs <input type="checkbox"/> Home visit <input type="checkbox"/> Internet <input type="checkbox"/> Newsletters		7. Do you have children, under the age of 18 , living at home? Yes <input type="checkbox"/> No <input type="checkbox"/>
9. Work status: (Please check one) <input type="checkbox"/> I am NOT employed outside the home. <input type="checkbox"/> I am employed part time (less than 35 hours a week) <input type="checkbox"/> I am employed fulltime outside the home (35 hours or more a week) <input type="checkbox"/> I operate a home based business		8. How many children, under the age of 18 , living at home? (Please check one) <input type="checkbox"/> No children at home <input type="checkbox"/> 1 Child <input type="checkbox"/> 2 Children <input type="checkbox"/> 3 Children <input type="checkbox"/> 4 Children <input type="checkbox"/> 5 Children <input type="checkbox"/> More than 5 children
10. Education Completed: (Please check one) <input type="checkbox"/> I have NOT received a high school diploma or a GED. <input type="checkbox"/> I have a high school degree or a GED <input type="checkbox"/> I have a two-year associate degree. <input type="checkbox"/> I have education training beyond high school, but I DO NOT have a college degree. <input type="checkbox"/> I have received at least one, four-year college degree (BS, MS, MA, EdD, PhD)		11. Do you have children, under the age of 10 , living at home? Yes <input type="checkbox"/> No <input type="checkbox"/>
12. Do you have any physical disabilities that limit your ability to participate in physical activity? Yes <input type="checkbox"/> No <input type="checkbox"/>	13. Race (Check the race that you most identify with): <input type="checkbox"/> White (non-Hispanic) <input type="checkbox"/> Black (non-Hispanic) <input type="checkbox"/> Am Indian/Alaskan Native <input type="checkbox"/> Hispanic <input type="checkbox"/> Asian or Pacific Islander <input type="checkbox"/> Mixed: Check two above	14. Place of Residence: (Please check one) <input type="checkbox"/> Farm <input type="checkbox"/> Towns under 10,000 & rural non farm <input type="checkbox"/> Towns & Cities 10,000 to 50,000 <input type="checkbox"/> Suburbs of Cities over 50,000 <input type="checkbox"/> Central Cities over 50,000

<p>15. What types of activities are you currently participating in to specifically increase you physical activity level? Please check all that apply.</p> <p> <input type="checkbox"/> Running, jogging <input type="checkbox"/> Yoga, stretching exercises <input type="checkbox"/> Stairmaster <input type="checkbox"/> Intramurals/ team sports <input type="checkbox"/> Walking <input type="checkbox"/> Follow exercise video <input type="checkbox"/> Treadmill <input type="checkbox"/> Weight lifting/wt. machine <input type="checkbox"/> Aerobics, dancing <input type="checkbox"/> Swimming <input type="checkbox"/> Elliptical mover <input type="checkbox"/> Kick boxing <input type="checkbox"/> Cycling <input type="checkbox"/> Roller-blading/skating <input type="checkbox"/> Hiking <input type="checkbox"/> Gardening/yard work <input type="checkbox"/> Other (Please list activity) _____ <input type="checkbox"/> None </p>	<p>16. What activities would you be most likely to do if you decided to become more physically active?</p> <p> <input type="checkbox"/> Running, jogging <input type="checkbox"/> Yoga, stretching exercises <input type="checkbox"/> Stairmaster <input type="checkbox"/> Intramurals/ team sports <input type="checkbox"/> Walking <input type="checkbox"/> Follow exercise video <input type="checkbox"/> Treadmill <input type="checkbox"/> Weight lifting/wt. machine <input type="checkbox"/> Aerobics, dancing <input type="checkbox"/> Swimming <input type="checkbox"/> Elliptical mover <input type="checkbox"/> Kick boxing <input type="checkbox"/> Cycling <input type="checkbox"/> Roller-blading/skating <input type="checkbox"/> Hiking <input type="checkbox"/> Gardening/yard work <input type="checkbox"/> Other (Please list activity) _____ <input type="checkbox"/> Don't plan to do any of the above. </p>
---	---

Important Note: For purposes of this survey, “physical activity” and “exercise” are used interchangeably. Both are defined as bodily movement produced by large muscle groups, resulting in energy expenditure. “Regular-vigorous” physical activity/exercise is defined as 20 minutes for at least 3 times per week at high-intensity (e.g. running, aerobic dance, rope jumping, and stair-climbing). “Regular-sustained” physical activity/exercise is defined as 30 minutes per day for at least 5 times per week at moderate intensity, which can be either a single session or in multiple bouts of 8-10 minutes each (e.g. walking, gardening, house-cleaning, leaf-raking, and playing actively with children).

PART II: EXERCISE STAGES OF CHANGE

This is a survey on your attitudes and interest about physical activity. As you read each question, think about the recent past. This is not a test. There are no wrong answers. For these questions, think about how you usually do things.

For each statement, please put a check (✓) in one of the boxes to the right that best matches what you have done or think you will do.	YES	NO
1. I currently exercise.		
2. I intend to exercise in the next 6 months.		
3. I currently exercise regularly.		
4. I have exercised regularly for the past 6 months.		
5. I have exercised regularly in the past for a period of at least 3 months.		

PART III EXERCISE SELF-EFFICACY

Please put a check (✓) in <u>one</u> of the boxes to the right of each item that best matches how you feel.	(1)	(2)	(3)	(4)	(5)
How confident are you that you could exercise in each of the following situations...	Not at all Confident	Slightly Confident	Moderately Confident	Very Confident	Extremely Confident
1. When I am tired.					
2. When I am in a bad mood.					
3. When I feel I do not have time.					
4. When I am on vacation.					
5. When it is raining or snowing.					

PART IV: EXERCISE DECISIONAL BALANCE

Please put a check (✓) in <u>one</u> of the boxes to the right of each item, that best matches your opinion.	(1) Not at all Important	(2) Slightly Important	(3) Moderately Important	(4) Very Important	(5) Extremely Important
1. I would have more energy for my family and friends if I exercised regularly.					
2. Regular exercise would help me relieve tension.					
3. I think I would be too tired to do my daily work after exercising.					
4. I would feel more confident if I exercised regularly.					
5. I would sleep more soundly if I exercised regularly.					
6. I would feel good about myself if I kept my commitment to exercise regularly.					
7. I would find it difficult to find an exercise activity that I enjoy that is not affected by bad weather.					
8. I would like my body better if I exercised regularly.					
9. It would be easier for me to perform routine physical tasks if I exercised regularly.					

Please put a check (✓) in <u>one</u> of the boxes to the right of each item that best matches how you feel.	(1) Not at all Important	(2) Slightly Important	(3) Moderately Important	(4) Very Important	(5) Extremely Important
10. I would feel less stressed if I exercised regularly.					
11. I feel uncomfortable when I exercise because I get out of breath and my heart beats very fast.					
12. I would feel more comfortable with my body if I exercised regularly.					
13. Regular exercise would take too much of my time.					
14. Regular exercise would help me have a more positive outlook on life.					
15. I would have less time for my family and friends if I exercised regularly.					
16. At the end of the day, I am too exhausted to exercise.					

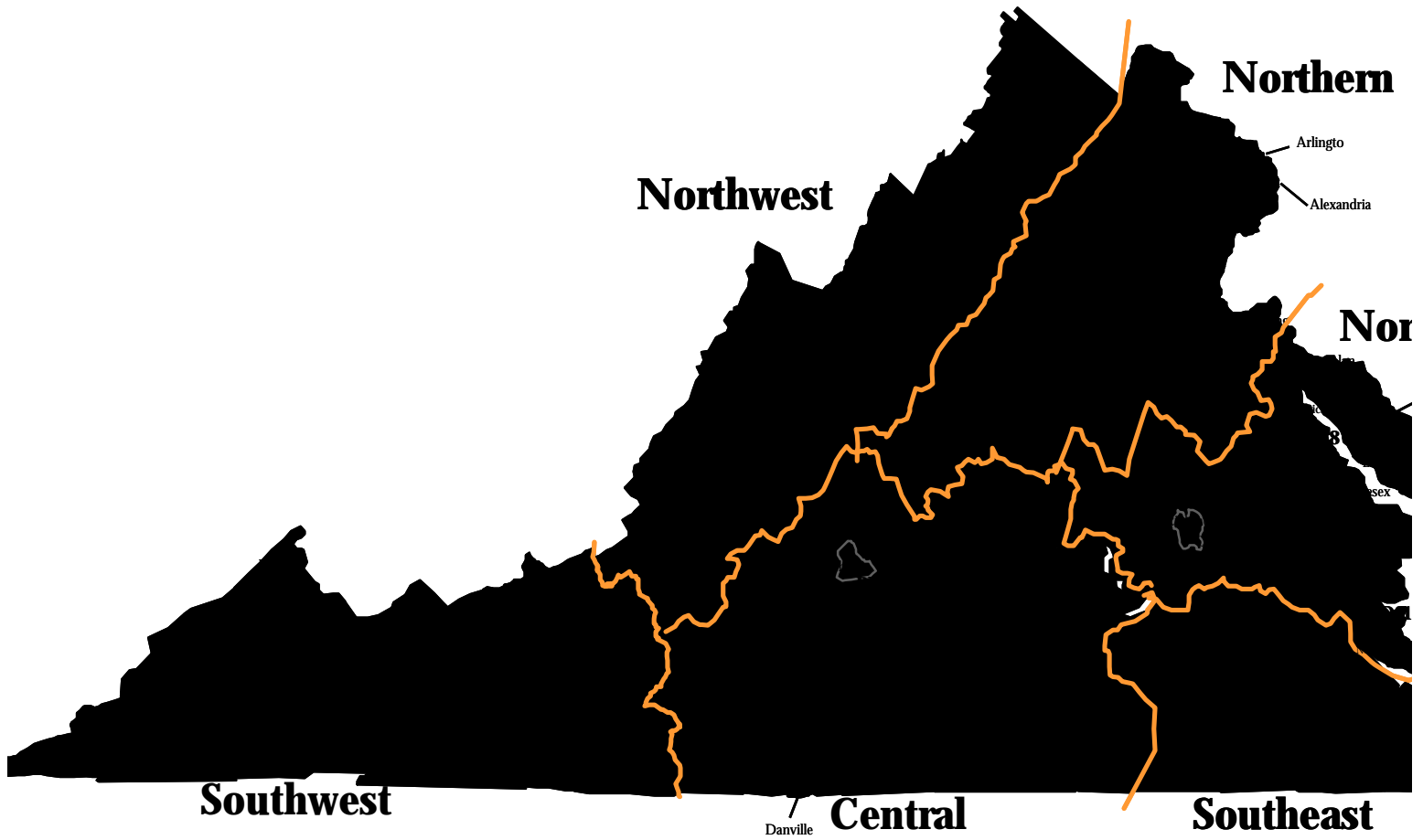
Please list any comments you want to make about this survey form:

Thank you for completing this survey. Please place the completed form and your signed Informed Consent Form in the return, large white envelope that was included in the mailing. Just seal and drop in the mail, as no postage is needed.

If you have misplaced the return envelope, please mail to:
 EFNEP/FSNEP Office, 101 Wallace Annex (0228), Blacksburg, Virginia 24061

APPENDIX F
Extension Planning Districts

Virginia Cooperative Extension



Produced by EIS - April 17, 1996
BLS/MS
Last modified 7/28/00

VITA

Tara Spruce Stimpson was born on February 28, 1975 in Hahn Air Force Base, Germany. She received a Bachelor of Science degree in Exercise Science from Auburn University in 1997. Ms Stimpson will receive her Master of Science degree in Human Nutrition, Foods and Exercise from Virginia Tech in August 2000. Following achievement of her Master's degree, Ms Stimpson will attend the University of Alabama at Birmingham for a Dietetic Internship. Her future plans include completing the internship in May 2000 and then pursuing a career as a registered and licensed dietician with special emphasis in community nutrition.