Physical activity and its relationship to diet and attitudes toward body image
by Frank Edward Blakely

A thesis submitted in partial fulfillment of the requirements for the degree of Masters of Science in Health and Human Development
Montana State University

Abstract:
This study examined two hypotheses, 1) individuals who are more physically active demonstrate healthier dietary patterns than those who are less physically active, and 2) individuals who are more physically active demonstrate a less favorable attitude toward the image of other people's bodies than those who are less physically active. Data were collected using a mail-in survey from a random sample conducted in three states (Idaho, Montana, and Wyoming). A total of six communities, two from each state, were surveyed with approximately 575 surveys sent to each community. The response rate was 56%. Regression analysis revealed that there was a significant difference ($p<.05$) in dietary habits between those in the maintenance stage of physical activity (physically active for six months or more) and those in precontemplation (not currently active, and with no intention of starting), contemplation (not currently active, but considering starting within the next six months), and preparation (not currently active, but taking steps to become active within the next 30 days). Those in maintenance had a healthier diet. Additionally, women, older people, those with at least some college education, and those that were employed had healthier diets. This suggests that physical activity maybe a gateway behavior, a behavior that if adopted could lead to the adoption of other healthy behaviors. Only one stage of physical activity, precontemplation, was significantly different from the maintenance stage when considering attitude toward the image of other people's bodies, but the correlation was weak. These findings suggest that it may be possible to influence people to increase their level of physical activity by helping them to improve their diet, or vice versa.

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APPROVAL

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Frank Edward Blakely

This thesis has been read by each member of the thesis committee and has been found to be satisfactory regarding content, English usage, format, citations, bibliographic style, and consistency, and is ready for submission to the College of Graduate Studies.

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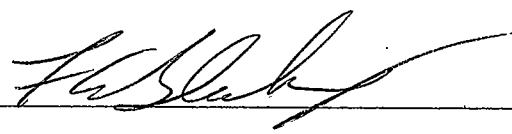
Signature 

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ABSTRACT

This study examined two hypotheses, 1) individuals who are more physically active demonstrate healthier dietary patterns than those who are less physically active, and 2) individuals who are more physically active demonstrate a less favorable attitude toward the image of other people's bodies than those who are less physically active. Data were collected using a mail-in survey from a random sample conducted in three states (Idaho, Montana, and Wyoming). A total of six communities, two from each state, were surveyed with approximately 575 surveys sent to each community. The response rate was 56%. Regression analysis revealed that there was a significant difference ($p<.05$) in dietary habits between those in the maintenance stage of physical activity (physically active for six months or more) and those in precontemplation (not currently active, and with no intention of starting), contemplation (not currently active, but considering starting within the next six months) , and preparation (not currently active, but taking steps to become active within the next 30 days). Those in maintenance had a healthier diet. Additionally, women, older people, those with at least some college education, and those that were employed had healthier diets. This suggests that physical activity maybe a gateway behavior, a behavior that if adopted could lead to the adoption of other healthy behaviors. Only one stage of physical activity, precontemplation, was significantly different from the maintenance stage when considering attitude toward the image of other people's bodies, but the correlation was weak. These findings suggest that it may be possible to influence people to increase their level of physical activity by helping them to improve their diet, or vice versa.

CHAPTER 1

INTRODUCTION

Much has been said about the health practices of Americans, most of it negative. Do Americans lead unhealthy lives? A cursory review in three topic areas, physical activity, food, and body image suggests that the answer is yes. For example, in 1997, 15% of the adult population of the United States engaged in regular physical activity (Office of Disease Prevention and Health Promotion (ODPHP), 2000) and 40% did not participate in any regular physical activity (ODPHP, 2000). Residents of Idaho, Montana, and Wyoming have high rates of inactivity. In Montana 25.2 % of the population reports no leisure-time physical activity, in Wyoming 21.1%, and in Idaho 20.4% (Centers for Disease Control and Prevention (CDC, 1999).

Over a 25-year period, Americans have increased their intake of sweeteners by 25%, to 154 pounds per capita (Putnam & Allshouse, 1999), decreased their overall milk consumption (Tippett & Cleveland, 1999), and few meet the recommended limits for fat and saturated fat intake (Tippett & Cleveland, 1999). Approximately 76% of adults report consuming fewer than five servings of fruits and vegetables per day as recommended by American Dietetic Association (CDC, 1999; Havas et al., 1994). In Montana and Idaho 76.2% of adults report consuming fewer than five servings of fruits and vegetables per day and in Wyoming the number is 78.8% (CDC, 1999).

These sedentary lifestyles and poor nutrition have contributed to obesity in the United States. In America, 33% of men and 36% of women are obese, as measured by body mass index (BMI) (CDC, 1997). In Montana and Wyoming 51.5% of adults are overweight and in Idaho the percentage is 53.1% (CDC, 1999).

These health findings paint a bleak picture of the health of Americans and the citizens of Idaho, Montana, and Wyoming in particular. Exacerbating these problems is the psychological experience that many suffer due to their size and shape (Crandall, 1994; Stunkard & Sobal, 1995). "Obese persons face a degree of social discrimination that is every bit as terrible as the medical sequelae of their fatness" (Yuker, Allison, & Faith, 1995).

Statement of the Problem

Based upon the information provided above, that is, that Americans tend to be sedentary, eat poorly, and are obese, two hypotheses were developed for this investigation. They are as follows:

H_a #1: Individuals who are more physically active demonstrate healthier dietary patterns than those who are less physically active.

H_a #2: Individuals who are more physically active demonstrate a less favorable attitude toward the image of other people's bodies than those who are less physically active.

Importance of the Problem

Increasing individual levels of physical activity and improving diet have long been challenging issues facing the health promotion community, which lends credence to the analysis of these two hypotheses. Previous research has examined the relationship between physical activity and other health behaviors (Costakis, Dunnagan, & Haynes, 1999; Kannel, 1967; U.S. Department of Health and Human Services (USDHHS), 1980; Wannamethee & Shaper, 1992) and in some cases a significant association existed (Blair et al., 1989; Shephard, 1989; Wankel & Sefton, 1994). The relationships that exist between physical activity and smoking, seat belt use, and stress management suggests the possibility that physical activity could be a gateway behavior. A gateway behavior is one that if adopted by an individual could enable them to adopt other healthy behaviors. It may be possible that by encouraging someone to become more active they may eventually seek to improve their diet, resulting in better nutrition.

I am not aware of any studies that have attempted to determine a relationship between an individual's level of physical activity and their attitude toward the image of other people's bodies. If there is an association, a new realm of possibilities will open for those involved in addressing obesity, physical activity, health promotion, and marketing (i.e., promoting products and services designed to help people stay healthy). Specifically, the environment that surrounds an individual as they attempt to develop a more physically active lifestyle could have significant impact on recruitment and adherence to that lifestyle. It may be that those who are less physically active are sedentary because of their perceptions of inferiority and alienation from those who are more active. This

perception may be caused by an environment created by the more physically active individuals viewing over fat newcomers as being lazy, stupid, or uncaring about their bodies. This atmosphere may affect the recruitment of sedentary individuals to a more active lifestyle due to the perceived unwelcome feeling when joining an exercise program. This may explain, in part, the poor recruitment and adherence to organized exercise programs (Carmody, Senner, & Manilow, 1980). If this is true, it may allow practitioners to create new ways to reduce the perceived barriers of the less physically active.

Definition of Terms

Body image (others) – the physical or emotional reaction of one person toward another based on the other person's body size or shape

Body image (self) – a person's mental image and evaluation of his or her physical appearance and the influence of these perceptions and attitudes on behavior (Rosen, 1995)

Body mass index (BMI) – determined by dividing an individual's weight by the square of their height, it is an indicator of a person's weight in relation to their height. A BMI of <18.5 is considered underweight, 18.5 – 24.9 normal, 25.0 – 29.9 overweight, and ≥30 obese (Whitney & Rolfes, 1999)

Fitness –	a set of outcomes or traits that relate to the ability to perform physical activity (Caspersen, Powell, & Christenson, 1985)
Gateway Behavior –	a behavior that, if adopted by an individual, enables them to adopt other healthy behaviors
Nutrition –	for the purposes of this study, demonstrating healthy dietary habits as determined by a composite score from the cross-sectional survey (see Chapter 3)
Physical activity –	any bodily movement produced by skeletal muscles that results in energy expenditure (Caspersen et al., 1985)
Stages of physical activity –	self-reported, individual could select from five options: 1) active for six months or more (maintenance), 2) active for six months or less (action), 3) not active now, but will start within 30 days (preparation), 4) not active now, but will start within six months (contemplation), and 5) not active now, and do not intend to start (precontemplation)

Delimitations

1. This study was limited to rural populations located in the states of Idaho, Montana, and Wyoming, specifically in the towns of American Falls and Preston, ID, Lewistown and Miles City, MT, and Powell and Torrington, WY. However, the respondents were the result of a random selection of adults, over the age of 18 years

old, living in these towns. Additionally, an over sample of Hispanics was selected for the towns with large Hispanic populations.

2. Measures used in this study were limited to the questions included in the survey (Appendix A).
3. Information on demographic characteristics was limited to those included in the survey (Appendix A).
4. The cross-sectional design of this study limited causal inference.

Limitations

1. The study was limited by the self-reported nature of the data.
2. The results are generalizable only to rural populations within the six towns surveyed.
3. There was a lack of racial diversity present in the study.
4. The September 11, 2001 attacks on the World Trade Center and Pentagon occurred the day after the introductory letter was sent to the subjects. The principal investigators decided that it would be unwise, and perceived as in poor taste, to mail the surveys during that week. Consequently, the survey packets were mailed approximately two weeks later. This delay in mailing may have affected the response rate. However, the response rate of 56% exceeded the research team's expectations.

CHAPTER 2

REVIEW OF LITERATURE

Much has been written about physical activity, food and nutrition, and body image, but very little has been written that considers all three variables simultaneously. These topics are under increased scrutiny as Americans attempt to discover ways to reduce mortality and morbidity.

In addition to explaining the background of this investigation, this chapter will also review the current literature as it relates to the applicable theories and models. Specifically, this chapter will discuss the Transtheoretical and Social Ecological Models, and physical activity, as a gateway behavior and as it relates to food and nutrition and body image.

Applicable Theories and Models

Transtheoretical Model

One theory that has found favor among many researchers for modifying or changing an individual's behavior is the Transtheoretical Model (TTM), or as it is sometimes known, the Stages of Change Model (Prochaska, 1979; Prochaska & DiClemente, 1982). Prochaska and DiClemente supposed that successful treatments were using the same concepts to create change in clients (Costakis, 1998; Prochaska & DiClemente, 1982). Their conclusions suggested five processes of change and the

concept of stages of change (Prochaska & DiClemente, 1982). Their analysis of 18 principal therapies was synthesized into the *Trans*theoretical Model (Prochaska & DiClemente, 1982). This model, originally developed to work with addictive behaviors, that is, smoking, suggests that an individual makes a change in lifestyle by progressing through a series of steps, or stages. This model has been expanded to include a variety of behaviors, including alcohol use, seat belt use, and exercise (Costakis et al., 1999; Marcus, Selby, Niaura, & Rossi, 1992; Unger, 1996). The basic premise is that change occurs on a continuum as opposed to a single event (Prochaska, Velicer, DiClemente, & Fava, 1988). The six stages are defined as:

Precontemplation – The person is not engaged in the appropriate health behavior and is not planning to change the behavior in the foreseeable future (Prochaska, DiClemente, & Norcross, 1992; Prochaska & Velicer, 1997a). In this stage an individual may enjoy a sedentary lifestyle and or have poor dietary habits because of convenience. They maybe in this stage because they do not know the consequences of their action (or inaction) or they do not realize the severity of their current behavior (Prochaska & Velicer, 1997a). Usually this is interpreted to mean that the individual will not start the behavior within the next six months and is characterized by the phrase "I won't" (Costakis, 1998; Reed, Velicer, Prochaska, Rossi, & Marcus, 1997).

Contemplation – In this stage the individual begins to consider a change in lifestyle, but has not taken any steps to initiate the change. The individual has become aware of "the problem" and is considering action to alter his or her lifestyle (Prochaska & Velicer, 1997a). During this stage an individual may realize that their sedentary lifestyle

is unhealthy, or that their diet is contributing to the poor results on a recent physical examination. Generally, this means that the person intends to take action within six months, but contemplators can remain in this stage for extended periods of time due to their ambivalence as they weigh the costs and benefits of changing the behavior (Prochaska & Velicer, 1997a). This is the "I might" stage (Reed et al., 1997).

Preparation – This occurs when the person intends to begin changing their behavior (i.e., they have initiated action to start the appropriate health behavior), usually within the next month (Prochaska & Velicer, 1997a). This is the "I will" stage (Reed et al., 1997). For example they may have signed up with a health club or bought personal athletic equipment. Although they have started movement toward changing their lifestyle, they have not achieved the requirements of the action stage (Costakis, 1998).

Action – This is the "I am" stage (Reed et al., 1997). Here the individual has changed their behavior. They have modified their environment, behavior, or experiences in order to initiate the appropriate behavior (Costakis, 1998; Prochaska et al., 1992). This stage occurs when the person has achieved the criterion measurement (e.g., started a regular physical activity program or adopted a more healthy diet). This phase is the most unstable stage and most prone to relapse (Prochaska & Marcus, 1994). Individuals remain in this stage, as long as they meet the criterion measurement, usually from zero to six months (Prochaska & Marcus, 1994).

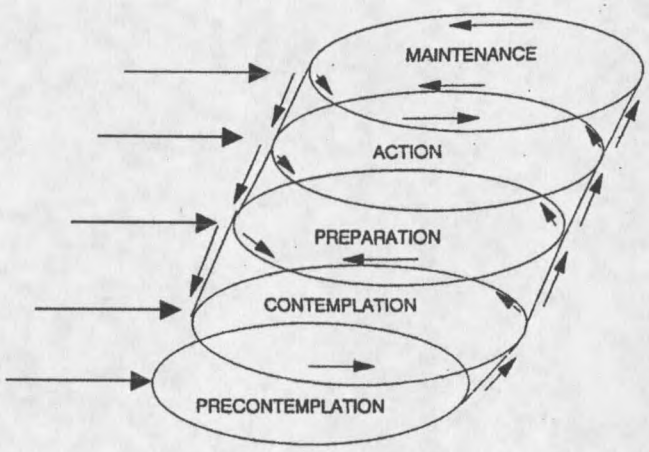
Maintenance – The "I have" stage describes a person who has met the criterion measurement, typically for at least six months (Reed et al., 1997). They are, however, still subject to relapse, but they do not apply change processes (see below) as often as

those in action (Prochaska & Velicer, 1997a). This stage would include the person who begins an exercise program, and consistently maintains their program over the next year. This period may last longer for some people than others, depending on the health behavior they are attempting to change (Costakis, 1998).

An interesting, and complicating facet of the TTM is that an individual can enter the model at any stage and then move in either direction (i.e., toward action and maintenance or back toward precontemplation) (Rehor, McNeill, Moon, & Brock, 1996). Generally, it is assumed that an individual progresses through change linearly, from not performing a behavior to performing it. As can be seen graphically in Figure 1, according to the TTM, this is not the case. A person could enter the model in preparation, or even in action and then either progress to action or maintenance, or digress to contemplation or precontemplation. Children often grow up in a home where healthy dietary habits are the norm (maintenance), but once on their own they may be attracted to more fast and junk food (contemplation or precontemplation) and completely forget the lessons learned at home. The dynamic and idiosyncratic process of progression through the stages complicates any intervention, as the practitioner must not only encourage change, but also assist in maintaining any progress that the individual has already made.

Processes of Change. In addition to the "stage" construct, the TTM also includes several other constructs that influence the application of this model in the health promotion environment. The first of these are the ten processes of change, which describe stage specific techniques that can be applied to move an individual through the

FIGURE 1. Transtheoretical Model of Behavior



(Rehor et al., 1996)

stages of change (Prochaska, Redding, & Evers, 1997; Prochaska & Velicer, 1997b). (See Table 1.) Of interest is how these processes are applied across the various stages. Depending on which stage an individual is in, they can apply, or accept, an intervention aimed at a particular process (Table 1 charts the processes of change and their relationship to the stages of change). For example, an individual in precontemplation would be susceptible to a "dramatic relief" intervention such as role-playing or a media campaign, either of which could evoke an emotional response (Prochaska & Velicer, 1997b). "Self-reevaluation" applied to one in contemplation might include value clarification, role modeling, or imagery techniques (Prochaska & Velicer, 1997b). Those in preparation would be receptive to the concepts of "self-liberation", such as advocacy programs, empowerment, and policy changes (Prochaska & Velicer, 1997b). Individuals

Table 1. The processes of change, a construct of the Transtheoretical Model, and examples of their application as part of an intervention toward people in the stages indicated.

Stage	Process	Definition
Precontemplation	Consciousness Raising	Greater consciousness about the causes, costs, and cures for a specific problem behavior.
	Dramatic Relief	Affective aspects of change, often involving intense emotional experiences related to the problem behavior.
	Environmental Reevaluation	Consideration and assessment by the individual of how the problem behavior affects their physical and social environment.
	Social Liberation	Realizing that the social norms are changing in the direction of supporting the healthy behavioral change.
Precontemplation & Contemplation	Self-Reevaluation	Emotional and cognitive reappraisal of values by the individual with respect to the problem behavior.
Preparation	Self-Liberation	The individual's belief and commitment to change the problem behavior.
Action & Maintenance	Contingency Management	Provides consequences for taking action in a particular direction.
	Helping Relationships	Trusting, accepting, and utilizing the support of caring others during attempts to change the problem behavior.
	Counterconditioning	Substitution of alternative behaviors for the problem behavior.
	Stimulus Control	Control of situations and other causes, which trigger the problem behavior and adding prompts that encourage the alternative behavior.

Adapted from (Prochaska & Velicer, 1997b; Samuelson, 1998)

in action and maintenance need interventions that will support them continuing the healthy lifestyle habits that they have adopted. "Helping relationships" would provide

this support through rapport building, counseling, and buddy systems (Prochaska & Velicer, 1997b).

Decisional Balance. A third construct of the TTM is that of decisional balance, that is, the positive and negative aspects of changing a behavior (Velicer, DiClemente, Prochaska, & Brandenburg, 1985). This construct considers how the individual perceives the benefits (pros) and costs (cons) of adopting a new behavior. Marcus, et al. (1994) found that individuals who perceived exercise as a benefit (e.g., feel better, feel healthier, more energy) demonstrated a greater readiness to change their behavior and adopt exercise. On the other hand, those who saw only the costs (e.g., soreness, tired, lack of time) were less likely to adopt exercise in their lives.

Prochaska and Velicer (1997) found that precontemplators identified more negative reasons (cons) for not adopting a behavior than positive (pros). The number of pros increased as the individual moved through contemplation to action, while the number of cons remained the same to contemplation and then lowered toward action. What this means from a practical standpoint is that an intervention designed for an individual in precontemplation must focus on increasing the number of pros, for example presenting all the reasons why an exercise program or healthy diet would be beneficial (Prochaska & Velicer, 1997b). To move the individual to action, the number of cons must decrease, that is the barriers to adopting an exercise program, or healthy diet, must be reduced.

Self-Efficacy. The fourth construct is that of self-efficacy. Self-efficacy, an individual's self-confidence to perform a behavior in a specific situation, is one of the

most studied aspects of the TTM (Prochaska & Velicer, 1997b; Rodgers, Courneya, & Bayduza, 2001). Self-efficacy measurements can show differences between stages, with those in latter stages demonstrating higher self-efficacy scores (Marcus et al., 1992). This means that in order for an individual to move from contemplation to preparation and action, they must feel confident in their ability to change, that is adopt the new lifestyle.

In a recent study, individuals were staged based on their readiness to increase their consumption of fruits and vegetables. The researchers found the greatest increase in self-efficacy expectations occurred between preparation and action. This indicates that individuals might benefit from an educational intervention designed to increase their level of self-efficacy (Brug, Glanz, & Kok, 1997). This finding added depth to the research of Marcus et al. (1992) who reported that individuals in each stage demonstrate different levels of self-efficacy.

Social Ecological Model

Dr. Daniel Stokols outlined the constructs for the Social Ecological Model, which attempted to address the interaction between individuals and groups and their environment. This model evolved from biology and has been applied in several disciplines such as sociology, psychology, and public health and provides a framework for understanding how people interact with their physical and sociocultural environment (Stokols, 1992). The model is composed of four primary constructs that include: 1) factors in the physical and social worlds affect the well-being of individuals, 2) any analysis of health must address the environment, 3) people can be studied at different levels, and 4) concepts obtained from systems theory are used to understand the

interaction between people and their surroundings. These constructs are explained in greater detail below.

The Physical and Social Worlds Affect the Well-Being of Individuals. Several factors present in the physical (e.g., geography, weather) and social environments (e.g., traditions, public policy) influence the well-being of individuals. Individual well-being is also affected by personal attributes, psychological temperament, and behavioral patterns. This means that the health promotion must take into account the interaction between environmental and personal factors (Stokols, 1987).

For example, an individual who works in an environment that does not support discretionary time may be hard pressed to find sufficient time to adopt a regular exercise program. Likewise, an individual would find it difficult to implement a healthier diet if his/her spouse did not support the action.

Health Analysis Must Address the Environment. Any analysis of health and/or health promotion must deal with the intricacies of the environment. Environment is defined as a collection of independent conditions (e.g., lighting, group size, or social climate). In other words, environments can be defined in terms of their physical or social components, actual or perceived traits, or their immediacy to the group or individual (Stokols, 1987).

Obese individuals may find the environment at health clubs to be cold or threatening. Simply encouraging them to join the club is not enough to overcome this intimidating environment. Individual times, special facilities, appropriate

instructors/staff, or unique programs may be required in order for these individual to feel comfortable enough to join.

People Can be Studied at Different Levels. Participants in an environment can be studied at a variety of levels, from individuals to large organizations or entire populations. This model uses multiple levels (e.g., surveys, observations, secondary data analysis) of analysis to assess the health and well-being of participants and groups. The assumption made is that health promotion programs can be improved by coordinating the efforts of individuals and groups at different levels. Encouraging individuals to select healthy lifestyle behaviors while helping corporate leaders to establish health-related policies supporting a community plan that implements healthy living standards would be an example of this coordination (Stokols, 1987).

Systems Theory is Used to Understand Interactions Between People and Environments. The social-ecological model includes several concepts from systems theory, these being interdependence, homeostasis, negative feedback, and deviation amplification (Stokols, 1992). These concepts are used to understand the interactions between people and their environments. Much like reciprocal determinism, these interactions are characterized by mutual influence, where the physical and social characteristics of a situation have an effect on the individual's health and, simultaneously, the individual modifies their environment through their actions (Baranowski, Perry, & Parcel, 1997; Stokols, 1992).

If an obese individual begins a fitness program, but notices that everyone is staring at him, he may perceive that they disapprove of his size. This may lead him to

curtail his exercise program, with a subsequent gain in weight, resulting in even more stares of perceived disapproval. Likewise, if an individual were to begin eating healthier, and receive encouragement from a spouse or significant other, that person is more likely to continue the behavior.

In the past, research on health behaviors has been separate from investigations into the environment, but these four constructs highlight the influence of the environment on any health promotion strategy (Stokols, 1987). It also means that when an intervention is planned, environmental implications must be identified, since they are likely to impact on either the individual or the larger group (Stokols, 1987).

Stokols (1992) also recognized the diversity of environmental situations and suggested that the relationships between conditions and health would be mixed and even conflicting. He realized that the potential health benefits of a physical environment might be for naught if the interpersonal relationships are dysfunctional. Likewise, a supportive interpersonal situation may allow members to cope with a less than desirable environmental circumstance (Stokols, 1987).

Physical Activity

Gateway Behavior

There have been several efforts made to determine if there is a link between physical activity and other health behaviors (Blair, Jacobs, & Powell, 1985; Costakis et al., 1999; Kannel, 1967; USDHHS, 1980; Wannamethee & Shaper, 1992). The goal of these labors was to determine if physical activity was a gateway to other healthy lifestyle

behaviors, and the results of some researchers have supported this hypothesis (Blair et al., 1985; Costakis, 1998; Shephard, 1989; Wankel & Sefton, 1994). For example, Costakis (1998) showed an association between physical activity and decreased cigarette use, increased seat belt use, and better stress management practices. However, no relationship was found between physical activity and alcohol consumption (Shephard, 1989). Shephard (1989) suggested that inadequate measurement techniques or masking, created by the close association of physical activity to the other behaviors being studied could be responsible for these mixed results. Although encouraging, it is apparent from the current literature that more research is needed to establish a causal link between physical activity and other health behaviors.

Food and Nutrition

Few studies have specifically examined the relationship of physical activity as a gateway behavior to the consumption of nutritious foods (Wilcox, King, Castro, & Bortz, 2000). One study did explore this concept. A sample of 350 adults over the age of 50 were assessed over a one-year period to determine if their dietary habits changed based upon their level of physical activity. One group received an exercise intervention while the other did not. The researchers concluded that while dietary changes did occur, there was no relationship between physical activity and dietary change, that is there was no association between an increased level of physical activity and a change in diet (Wilcox et al., 2000). However, additional research is needed to see if these findings are consistent using other means of physical activity and diverse settings (e.g., rural and frontier).

Body Image

The research concerning body image has been almost universally directed at how individuals perceive their own body, although some research has explored children's attitudes toward other people's bodies (Cash & Roy, 1999; Caskey & Felker, 1971). The children studies were designed to determine the cultural influences on children's attitudes toward body image. The investigators found that ectomorphic body shapes (i.e., slender) were interpreted as belonging to individuals who were seen as honest, happy, pretty, smart, kind, and helpful (Caskey & Felker, 1971). Those with endomorphic body shapes (i.e., fat) were seen as lazy, lonely, sloppy, ugly, mean, dirty, and stupid (Caskey & Felker, 1971).

While there were a multitude of studies stating that physical activity levels contribute to body weight management (American College of Sports Medicine, 1998; USDHHS, 1996), there were none that found a relationship between the perception of another person's body image and an individual's level of physical activity. This is surprising in that virtually all body image research recognizes the growing dissatisfaction that Americans have with their own body image (Cash & Henry, 1995; Cash, Winstead, & Janda, 1986; Feingold & Mazzella, 1998; Garner, 1997). It would seem a concern for exercise/weight researchers and practitioners that those who are satisfied with their body image would develop a condescending attitude toward those they consider fat. This negative attitude, due to the belief that body weight, a key component of image, is controllable, develops despite the strong evidence that body weight is biogenetically proscribed (DeJong & Kleck, 1986; Lewis, Cash, Jacobi, & Bubb-Lewis, 1997). This

"looking down" could manifest in the actions of those that are satisfied, resulting in shunning those who are not. The result could be an even greater sense of dissatisfaction by those who do not measure up to the cultural standard. Their greater sense of dissatisfaction could lead to even less physical activity in an effort to avoid the "looks" of others. However, additional research is needed to support this hypothesis.

Summary

In this study, the premise is that an individual's stage of physical activity may be an entry point for improving food and nutrition habits and developing positive attitudes about the image of other people's bodies. Valid and reliable algorithms exist for determining an individual's stage of physical activity (Reed et al., 1997). With a person's stage identified it may be possible to identify the best program or materials to provide them in order to change their dietary habits or to influence how they see and react to others.

Americans do not eat the recommended daily allowance of fruits and vegetables, dairy products, or fat (CDC, 1999; Tippett & Cleveland, 1999). If there is a link between an individual's stage of physical activity it would provide practitioners with a new and different way in which to motivate healthy lifestyle changes in those who currently do not eat healthy. By targeting messages based on the processes of change for physical activity it may be possible to influence people to adopt food and nutrition habits that more closely match the dietary recommendations.

A variety of models, theories, and marketing techniques have been used in an attempt to increase the level of physical activity among Americans. Most have met with failure, approximately 50% of individuals who join any kind of exercise program dropout during the first six months (Carmody et al., 1980; Dishman, 1988). While this is probably due to a diverse set of reasons, it may be possible to create more conducive environments for increasing physical activity if participants and non-participants recognize the implications of their roles in the environment. If the physically active understand that their attitudes affect the perceptions of the non-physically active they may be able to guard and even change their outlook toward the less physically active. Also, by analyzing an individual's stage of physical activity it may be possible to identify challenges and/or discriminatory actions and develop techniques for overcoming these issues. Likewise, there may be potential for managers of wellness facilities to develop niche programs that would provide a comfortable atmosphere in which the less physically active can begin their transition to greater physical activity.

CHAPTER 3

METHODOLOGY

Genesis Of The Investigation

This investigation was conducted under the auspices of the Wellness in the Rockies (WIN the Rockies) project. This U.S. Department of Agriculture funded project conducted both educational and research activities at the individual and community level. (Award number 0004499 through the Initiative for Future Agriculture and Food Systems (IFAFS) Competitive Grants Program.) (The guiding principals for this project are shown in Appendix B.) As a component of the WIN the Rockies project this study set out to determine if there was a relationship between an individual's level of physical activity and their dietary patterns, or between their level of physical activity and their attitude about the image of other people's bodies.

Data

Human Subjects Committee Approval

A request was submitted to the Montana State University Human Subjects Committee on June 29, 2001. The Committee was provided the purpose of the research as well as a detailed description of the investigation procedures. Participation was voluntary and the Committee approved the research design and procedures.

Sampling Framework And Subjects

The sampling framework was a random sample, provided by Genesys, conducted in three states (i.e., Idaho, Montana, and Wyoming). A total of six communities, two from each state, were surveyed with approximately 575 households per community. An additional 350 surveys were sent to three of the communities in order to over sample their Hispanic populations. Hispanics were over sampled in both communities in Idaho and one community in Wyoming to insure a representative Hispanic portion of the surveys were returned. The goal was to survey a minimum of 500 individuals in each community; the additional 75 surveys per community were designed to compensate for the incorrect addresses that were anticipated. The surveys were to be completed by an adult (18 years or older) who lived in the house and had the most recent birthday.

Instrumentation

The Survey. A 57-item questionnaire, consisting of four sections, was designed to gather information for this investigation (Appendix A). The four sections were: 1) food and nutrition, 2) physical activity, 3) body image, and 4) demographic and socioeconomic information.

For the purposes of this study, the questions used were developed, or adapted, by WIN the Rockies investigators in coordination with an advisory group of health and nutrition specialists and professors. A significant number of the questions (questions 1-4, 6, 7, and 12) were taken from the Behavioral Risk Factor Surveillance Survey (BRFSS). The BRFSS was established in 1984 by the Centers for Disease Control and Prevention

(CDC) (CDC, 2001). The purpose of the system was to gather health risk behavior data on a statewide, rather than nationwide, basis. The CDC designed a core of questions that states could use for comparison.

Two questions (questions 10 and 11) were adapted from the Food Behavior Checklist (Kristal et al., 1990). This checklist was developed to provide a simpler means for gathering dietary habit information than the 24-hour diet recall method. It contains 19 yes/or questions about the kinds of food eaten during the preceding day. Since these questions were modified from the original format the validity and reliability results of the original research cannot apply.

Another question (question 21) dealt with the respondent's stage of physical activity. This question was adapted from research conducted by Norman, et al. (1998) and Marcus, et al. (1992) (Cancer Prevention Research Center, 2002). This question was however, modified from the original, and measurements of validity and reliability of the original question cannot apply.

Questions 33 and 40 were from the Antifat Attitudes Test (Lewis et al., 1997). The Pearson *r* values for the Antifat Attitudes Test questions ranged from –0.02 to +0.19 (by gender and compared to five other instruments) providing proof of validity. Reliability values (α) were 0.87 and 0.91 (female and male, respectively).

The remaining questions (5, 8, 32, and 38) were developed for this study. The investigation team and advisory group reviewed these questions to ascertain face and content validity. Face validity is a judgment decision based upon the knowledge and expertise of the researchers, in other words does this question make sense (Neuman,

2000)? Content validity, a different form of face validity, attempts to determine if the full content of the definition is represented by the question.

The survey consisted of four 8-½ in. x 17 in. pieces of paper stapled together in booklet style to create eight 8-1/2 in. x 11 in. pages (Appendix A). The first page was a cover letter that explained several topics including the following: 1) how the data would be used, 2) that participation was voluntary, 3) who would have access to the data, and 4) what to do once the survey was completed.

Piloting. The purpose of the pilot was: 1) to determine if respondents understood the questions (i.e., terminology, directions, meaning, clarity), 2) evaluate the survey (i.e., length and readability), and 3) to assess the presentation of the survey (i.e., envelope, cover letter, incentive).

The survey was piloted over the course of two days among 20 residents of a rural Montana town with comparable socioeconomic characteristics to that of the survey communities. These characteristics included total population of less than 5,000, major sources of income (i.e., agriculture), and source of healthcare (i.e., availability and type of medical care).

Two methods were used during the piloting process, cognitive (or concurrent) and retrospective interviewing (Dillman, 2000). Both of theses methods were designed to verify that subjects understood and could answer the questions. The cognitive method entails asking respondents to answer each question out loud, in the presence of the interviewer. The goal was to determine how questions were being interpreted and whether the intent of each question was being conveyed.