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Intervention for increasing exercise adherence

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AN INTERVENTION FOR INCREASING EXERCISE ADHERENCE

By

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This study investigated the effects of an intervention on exercise adherence as measured by subjects' frequency, duration, and perceived intensity levels. Previous research has demonstrated three variables that correlate with higher levels of exercise adherence: self-motivation, an internal locus of control and self-efficacy. The current intervention was developed from the concepts of stress-inoculation and relapse-prevention. Both incorporate techniques with the purpose of influencing motivation, efficacy, and locus of control. A 6-week aerobics and walking class was conducted for two groups (n=12 per group) of college females with no previous formal exercise experience or prior failure at maintaining an exercise regimen. T-test analysis revealed that the two groups were matched according to age, perceived level of social support, and average weight relative to height and age. T-tests also revealed that the group receiving the intervention exercised at a greater perceived intensity than the control group, both in class and overall, but not more often. Duration was not expected to be greater for the intervention group because the length of class was equal across the two groups. No significant differences between groups were found for self-generated exercise or fitness levels according to changes from the first to last day of class in resting heart rate and on a timed run. Results of a questionnaire that examined the impact of confounding variables on adherence rates are discussed. In general, it was concluded that a larger sample, a 6-month exercise class, and presentation of the intervention in its entirety before starting the class would have allowed for a more thorough investigation of the hypothesis. Due to the limitations of the study and partial support of the hypothesis, further research using the current intervention is warranted.
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An intervention for increasing exercise adherence

The nuclear/technological period, which started after WWII, has brought labor saving devices requiring less energy expenditure, crowding, stress, and environmental hazards such as pollution. These profound and rapid changes in living conditions have greatly affected the health of the population. In fact, the major causes of mortality today are quite different than those of the preagricultural, agricultural, and industrial periods, and include multifactorial lifestyle diseases (Blair, 1988) such as cancer, cardiovascular diseases, hypertension and obesity. This period developed rapidly, if one considers that humans have inhabited the earth for almost 200,000 years. We are just not evolutionarily prepared for a sedentary existence with excess food supplies. To control these major health problems it seems obvious that the focus should not be on treating diseases, which are only symptoms, but on treating the root causes - unhealthy living habits. With this in mind, and assuming that quality of life is influenced by living habits, the importance of exercise becomes paramount.

Exercise effects

A number of studies have focused on the direct effects of exercise on physical and mental health. Many believe that
exercising helps one to live longer and feel better. Unfortunately, it is not that simple. And yet, the list of probable benefits is broad and includes prevention of several of the leading causes of disease and mortality in the United States.

For example, regular physical activity has been shown to produce a number of physiological and psychological changes beneficial to cardiovascular health. Powell (1988) made reference to several reviews, all of which conclude that an inverse relationship exists between the level of physical activity and the incidence of coronary heart disease (CHD).

Current evidence suggests that regular physical activity is associated with a small but significant decrease in hypertension, or chronically elevated blood pressure, which often leads to stroke, kidney failure, and heart failure (Dubbert, 1987; Martin & Dubbert, 1985; Siskovick, LaPorte, & Newman, 1985). There is also evidence to suggest that some hypertensives, those previously noncompliant with their pharmacological regimen, were able to adhere quite well to an exercise program. This is perhaps due to their desire to do whatever was necessary to minimize drug side-effects, as well as to their sick-role dependency on medications (Martin & Dubbert, 1985).

The problem of obesity highly correlates with CHD, hypertension, diabetes, gall bladder stones, osteoarthritis,
pregnancy complications, endometrial cancer, and psychological distress (Powell, 1988). Dubbert (1987) cites several studies that demonstrate the effectiveness of incorporating exercise into weight reduction programs.

Currently, mixed results have been found for the effects of exercise on other risk factors relating to CHD, such as cholesterol levels and Type A behavior. The effects of exercise on osteoporosis, acute respiratory disease, and low back pain are also poorly understood. Further empirical evidence is required in these areas.

Whether exercise provides any psychological benefits has been an area of major debate and a focus of exercise science. Intuitively it has much appeal, particularly when the principle of mind-body unity is taken into consideration. Cureton (1963), based on a series of investigations, stated that, "it is certainly suggestive that personality deterioration and physical deterioration parallel one another, and it follows that improvement of physical fitness should minimize both types of deterioration".

Morgan and O'Connor (1988) examined earlier reviews dealing with exercise and mental health and found that they yield a number of consistent generalizations. First, there has been a unanimous conclusion that physical fitness and mental health are positively related: the higher the fitness
level the more desirable the level of mental health. Second, the relationship between the two is not causal, but is only an association. Third, it is impossible to conclude that exercise leads to a modification in mental health because studies dealing with this hypothesis have so far been shadowed by methodological difficulties.

Due to this lack of empirical evidence, a consensus panel of the Office of Prevention at NIMH developed statements concerning what we know about the influence of exercise on mental health (Morgan & Goldston, 1987, p. 156):

1. Physical fitness is positively associated with mental health and well-being.

2. Exercise is associated with the reduction of stress emotions, such as state anxiety.

3. Anxiety and depression are common symptoms of failure to cope with mental stress, and exercise has been associated with a decreased level of mild to moderate depression and anxiety.

4. Long-term exercise is usually associated with reductions in traits such as neuroticism and anxiety.

5. Severe depression usually requires professional treatment, which may include medication, electroconvulsive therapy, and/or psychotherapy, with exercise as an adjunct.

6. Appropriate exercise results in reductions in various stress indices such as neuromuscular tension, resting heart rate, and some stress hormones (more specific information concerning the relationship of exercise and stress can be found in DeBenedette, 1988).

7. Current clinical opinion holds that exercise has beneficial emotional effects across all ages and in both sexes.
Exercise Adherence

8. Physically healthy people who require psychotropic medication may safely exercise when exercise and medications are titrated under close medical supervision.

One can exercise for physical benefits and/or for psychological well-being, or for other reasons. An understanding of the motives involved in exercising can help reveal why certain individuals are adhering to exercise. Pargman (1980) has attempted such an explanation by defining different running types, A-D versus C-D.

The A-D type, addiction-dependence type, is on one end of a continuum. These types describe their motive for exercise in terms of the perceived exhilaration and euphoria that exercise provides. They have no pragmatic reason, they "just have to." If they cannot, withdrawal symptoms result. Glasser (1976) considers the addiction to be a positive one and ascribes a chemical, rather than a mental, basis to the addiction. A natural release of enkephalin occurs in the brain during exertion and, Glasser claims, becomes addictive when one exercises "a minimum of four days a week for 45 minutes, for at least a year."

The C-D type, commitment-dedication type, is located on the other end of the continuum from the A-D type. Motives for exercising are pragmatic, intellectual, and usually meet very basic needs (e.g., preventing obesity, controlling blood pressure, or releasing stress). Euphoria is not involved and they often do not look forward to the exercise.
The C-D type's withdrawal from not exercising, if present, comes in the form of psychological guilt, rather than biochemical addiction.

**Adherence Rates**

These findings concerning the effects of exercise on physical and mental health indicate that exercise is not related to longevity (i.e., prolonging life) but to prevention of premature death and to a higher level of mental health and well-being. In spite of the potentially beneficial effects, remarkably few people exercise regularly enough to experience any truly lasting improvements in health. According to Stephens, Jacobs, and White (1985) about 40% of Americans do not exercise during leisure time, another 40% are active at levels probably too low and infrequent for fitness and health gains, while just 20% exercise regularly and intensely enough to meet current guidelines for fitness and reduce risk for several chronic diseases and premature death.

This is surprising considering the "fitness boom" and the general increased awareness of the importance of exercise within the last ten to fifteen years. Fitness seems to have gone into business with a rise in availability of exercise programs and facilities. For example, many corporations have installed work-out facilities at the work...
site. And yet, of those employees with available exercise facilities, roughly 20 to 40% will use them, and only one-third to one-half of those will exercise on a regular basis at vigorous intensities (Dishman, 1988). It has been estimated that corporate wellness programs typically recruit no more than 15 to 20 percent of employees, and of these 50 percent or more drop out within six months (Cox, 1984). In a typical supervised exercise setting, such as an aerobics class offered in the community, approximately half of those beginning the program will fail to maintain it; 50% of the participants will drop out of the program within 6 months to one year (Dishman, 1988; Sachs, M. 1982; Ward & Morgan, 1984).

Due to the strong association between exercise and health and taking into account the sedentary lifestyle in the population, lack of exercise is a very significant health problem in the United States. It is obvious that the need for an effective means of increasing the percentage of people that exercise regularly is critical.

Review of exercise adherence research

Much of the research conducted on the problem of exercise adherence has attempted to identify dropout characteristics. Although a specific personality profile of the typical nonadherer has not been found, several important factors do
seem to characterize the exercise dropout. These include poor self-motivation, no active spouse support, an inconvenient exercise facility and individual, high-intensity exercise with little or no social support or reinforcement during or after the exercise period (Dishman, 1982). The majority of these studies have been conducted on male-dominated CHD prevention and treatment programs and therefore factors that characterize female exercise patterns are unknown. Inappropriate exercises and leadership, such as an authoritarian coach, also appear to be powerful determinants of dropping out, although no research on these two factors has yet been conducted. The ramifications of these studies point toward a multiply determined explanation of adherence.

It is interesting to note that the dropout rate observed for exercise programs is about equal to the dropout rate for other behavior-changing programs such as smoking, weight loss, and alcohol consumption (Dishman, 1988). Glasser (1976) attributes this similarity to the pain involved in changing behaviors. Before one becomes positively addicted to exercise, as Glasser feels all exercisers will eventually do, it is not a pleasant activity; before one is no longer negatively addicted to alcohol, food, cigarettes, etc., the withdrawal symptoms are unpleasant. The pain involved in the process of changing is, to many, not worth the reward in the end.
A large part of exercise adherence research has focused on adherence objectives similar to those emphasized by other behavior-change programs. More specifically, research has measured the effectiveness of a wide range of behavioral procedures which are conducive to increasing rates of adherence to exercise programs. An excellent review of behavioral management techniques and exercise promotion can be found in Knapp (1988).

From a behavioral viewpoint, behaviors endure because they are cued and reinforced by aspects of the environment. It follows that, in order to successfully modify one's habits, environmental changes are necessary to support the desired behavior and to weaken competing behaviors. Knapp describes behavioral antecedents, characteristics of the behavior itself and behavioral consequences proven to demonstrate success in elevating exercise adherence rates.

Stimulus control refers to the ability of external stimuli to cue behaviors. Several effective means of manipulating the environment exist for prompting people to exercise. Setting specific and achievable goals, recording one's behavioral achievements (self-monitoring), performing a low-frequency activity prior to working out and exercising at the same time and place each day have all been found to serve a cuing function (Nelson, Haynes, Spong, Jarrett, & McKnight, 1983), especially if they are paired with other
behavioral techniques. Posting reminder signs can also be effective, as well as preparing for exercising the night before and finding another person to provide reminders (Brownell, Stunkard, & Albaum, 1980; Lipsker, 1983). Finally, a written contract to attend an exercise program was used by Oldridge and Jones (1981) to improve adherence among cardiac patients.

Little research evidence exists on characteristics of the exercise setting that influence adherence. According to Dishman (1982), the most convincing data have implicated convenience or accessibility of the exercise setting as a major influence on adherence. The easier it is to get to an exercise program, the more likely it is that participants will attend. Having, or at least perceiving, a choice of activities, and exerting at an intensity level within one's tolerance for physical stress, may also be important factors.

A more recent area of research in exercise adherence addresses the cognitions involved with aerobic exercise. Martin, Dubbert, Katell, and Thompson (1984), as one of their interventions, trained exercise participants in cognitive dissociation strategies. A distractive technique was used in which exercisers focused on the external environment rather than bodily sensations or the exercise itself. Internal dissociation strategies include counting,
imagery and kinesthetic awareness. Kinesthesia has the advantage of warning an exerciser when their exertion level becomes too painful. All dissociation strategies have been found to be effective in reducing perceived discomfort during exercise and to be associated with enhanced maintenance of exercise after the termination of a fitness class. In addition, cognitive restructuring, to eliminate maladaptive self-talk, has been found to increase adherence (Atkins et al., 1984).

Manipulating the delivery of reinforcers following participation has been the most popular method of attempting to increase adherence, particularly through social reinforcement and lottery procedures. Martin et al. (1984) and Dubbert (1987) discuss several studies documenting the effectiveness of lotteries, in which a high rate of compliance allows participants to either earn points to buy back personal items or increase their probability of winning a prize. Generally, the lotteries have been found to increase short-term compliance and adherence, unless the exercise is already heavily reinforced. There is also little evidence that the exercise behavior generalizes beyond the formal training program.

The role of social reinforcement, which may include verbal feedback, encouragement or praise has also been studied. Martin et al. (1984) found that personalized feedback and
praise by the instructor was as powerful a reinforcer as a weekly lottery. In addition, personalized, immediate feedback, rather than group feedback, was associated with better class attendance and better maintenance of exercise after three months.

Social support is similar to social reinforcement and refers to the favorable attitude toward an individual's exercise program of significant others, such as a spouse, friends or other exercise participants. Many citations by Dubbert (1987) and Knapp (1988) support the conclusion that social support is associated with increased adherence.

Interpretation of Adherence Research

It would appear that application of these facilitation strategies would promote higher levels of adherence to an exercise program. Unfortunately, most of these interventions seem to effect the initiation of, and short term adherence to, exercise but not to the adoption of a lifelong commitment to exercise (Dishman 1982, 1988). Collectively, behavioral and cognitive-behavioral techniques will increase the frequency of exercise by 10% to 25%, mainly in the first 3 to 10 weeks. The few follow-up studies suggest that, within 6 months to one year after the intervention is removed, the effects of intervention are largely lost.

Behavioral and cognitive-behavioral research also fails
to address the underlying causes for successful adherence. What are the mechanisms involved in acquiring exercise as a lifestyle habit? Ward and Morgan (1984) discuss how different psychological and biological factors influence adherence over the course of a 32-week exercise program (e.g. body weight, percent body fat, and self-motivation). In addition, although people often begin exercising to improve their health, those that adhere place more importance on factors such as goal attainment, choice of activities, or previous program experience (Sonstroem, 1988). It has also been suggested that those beginning to exercise rely more heavily upon external reinforcers (behavioral techniques), whereas long term, regular exercisers seem to have higher levels of self-motivation and to reinforce themselves internally.

The findings suggesting that the factors involved in acquiring exercise as a lifestyle habit change over time imply, most importantly, that long term adherence should be viewed and studied as a process, rather than an all-or-none phenomena. This further suggests that adherence cannot be predicted from pre-screening measures or controlled solely by behavioral or cognitive-behavioral techniques. "Delineating how change occurs is required of a process model...and this involves the use of repeated measures to examine changes in structure and magnitude of these associations..."
over an intervention period” (Sonstroem, 1988).

This process of adopting exercise as a habit involves making decisions to either continue exercising or to quit. If adherence were an all-or-none event, then the only decision required would be to start exercising. However, it is obvious that, beyond this first decision is the need for unending decisions in the face of changing motives, conflicts and stress. For example, someone may decide to start exercising because they know it will be good for them. But, after getting sore muscles, not losing weight and realizing that less time is spent with significant others, the decision to continue exercising, week after week, will be more challenging. The conditions affecting the decision-making process are incorporated into Janis and Mann's (1977) conflict theory and will be described more fully following a discussion of the current psychological models of physical activity.

Psychological Models

Existing models of physical activity address attitudes, beliefs, self-perceptions, motivations and other influences as they mediate exercise intentions and actual behavior (Baum, 1984; Sonstroem, 1988). Several of these do more to describe the actual initiation into exercise than to explain and predict long-term adherence. For example, the psycholo-
Theoretical model for physical activity participation (Sonstroem, 1988) posits that being attracted to exercise and believing oneself capable of success influence participation. Although these two components are highly important for initiation of an exercise regimen, they alone cannot provide sufficient motivation for long-term adherence. The Health Belief Model (Rosenstock, 1966; Becker and Maiman, 1975), which also highlights criteria important for initiating exercising, postulates that the likelihood of engaging in physical activity is a function of a perceived threat from not engaging and a perceived benefit from engaging in the exercise. The threat is a function of the perceived susceptibility of becoming ill and of the perceived seriousness of the illness. The benefit is the probability that the threat will be reduced if an exercise program is begun, weighing the healthy behavior against the cost of exercising. The emphasis in the Health Belief Model on avoiding illness may be only one motivator for performing health-related behaviors, such as exercise, and fails to account for other factors that serve as motivators. In addition to attraction, belief in success and motivational orientation, several other "self-variables" account for an individual's generalized behavior. These variables can also be applied more specifically to exercise behavior in an attempt to develop an adequate model for long-term adherence.
Social learning theory by Rotter (1954) accounts for human behavior in complex situations, including health behaviors like exercising. This theory describes the potential of a specific behavior to be a function of the expectation that behavior will lead to a particular reinforcement, and the value of that reinforcement. Therefore, the likelihood of whether one exercises may depend on what he/she expects from exercising (such as toned muscles, weight loss, or social interaction) and how important achieving these goals are to the individual.

One's expectations, generalized across a variety of situations, are largely influenced by their locus of control (Rotter, 1966). "Internal controllers", or those with an internal locus of control, believe they are capable of determining the direction and course of their lives through choice, ability and effort. On the other hand, "external controllers" believe that their lives and destinies are controlled by external factors like fate, luck or chance. Individuals usually fall somewhere in between these two extremes. It would be expected that those tending toward an internal locus of control would be more likely to sustain positive health behaviors. Sonstroem (1988), in his discussion on locus of control, cites several studies demonstrating the positive effects of internality on smoking cessation, weight control and level of physical fitness.
Carlson and Petti (1989) found specifically that internally oriented individuals are more apt to engage in activities having higher metabolic requirements than externally oriented individuals.

Sonstroem (1988) also regards locus of control as only one of many factors influencing health behaviors. Locus of control is a measure of generalized expectancies, not expectancies for specific situations, and it is perhaps for this reason that beliefs about control have been shown to be of limited value in predicting long-term behaviors like exercise adherence (Kaplan & Atkins, 1984; Morgan, 1977). It has also been found, however, that individuals who have an internal locus of control, and have either high health and fitness scores or positive feelings toward exercise, tend to exercise longer and more frequently than those who have an external locus of control, and have either low health and fitness scores or less favorable views of exercise behavior (Dishman & Gettman, 1980; Sonstroem & Walker, 1973).

Compared with generalized expectancies and locus of control, the notion of self-efficacy appears to be a more powerful mediator of change in exercise behavior (Kaplan & Atkins, 1984). Self-efficacy can be defined as an individual's expectation concerning their capacity to cope with an unpredictable, stressful situation (Bandura, 1977). It
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refers more to a judgement of competency in specific situations than self-esteem and locus of control, which generalize across a wide variety of situations. An expectation of success is equated with a higher level of efficacy and positively affects both initiation and persistence of coping behavior. An expectation of failure, however, leads to an avoidance of threatening situations which exceed perceived availability of coping skills. Simply, people are more apt to get involved in activities when they judge themselves capable of handling situations that would otherwise be intimidating.

The behavioral, cognitive and emotional effects of self-efficacy influence choice of activities, effort expended, positive or negative self-appraisals (confidence versus doubt), perceived difficulty of the task and level of arousal that either impairs or improves performance (Bandura, 1982). Condictote & Lichtenstein (1981) assessed self-efficacy levels of subjects in a smoking cessation program following a slip and found that the highly self-efficacious subjects reinstated control, whereas the less self-efficacious ones relapsed completely. In terms of increasing adherence to physical exercise, the importance of a high level of self-efficacy becomes clear. From this, it would appear that someone with low self-efficacy would have difficulties continuing an exercise program, especially
after an exercise period was skipped.

Self-motivation, another "self-variable" found to be a significant determinant of exercise adherence, is the tendency to persist in a particular behavior, regardless of external reinforcement or situational influence. Self-motivation is therefore dependent on an ability to self-reinforce and delay gratification. Dishman (1982, pg. 242, 256), in his review of compliance in health-related exercise, cites several studies that support the reliability of self-motivation as a correlate to exercise adherence, and its ability to predict eventual adherers and dropouts. For example, Dishman and Gettman (1980) used self-motivation, when combined with percent body fat and body weight in a psychobiologic prediction model, to accurately classify 80% of adherers and dropouts and to account for 50% of the variance in adherence behavior.

Wankel, Yardley and Graham (1982) focus on the influence of self-motivation as a function of time. They found that low self-motivated subjects tended to drop out of a four-week program at a faster rate than did both high and low self-motivated subjects receiving an adherence intervention. In addition, although high self-motivated subjects did not differ from the low self-motivated subjects during the first three weeks of an exercise program, at the fourth week the low self-motivated group lost an additional 50% to drop out.
These findings highlight the importance of intervention which is geared toward maintaining an appropriate level of self-motivation throughout the process of adherence.

From this discussion, it is apparent that an intervention with the purpose of increasing exercise adherence rates would be significantly more successful if it positively affected self-efficacy and self-motivation, as well as emphasized the use of an internal locus of control. Based on the assumption that adherence is a process where participatory decisions are made continually, I propose that an intervention strategy which uses these variables to aid the subject in decision-making will lead to higher levels of adherence. One such intervention strategy can be developed based on the concept of stress inoculation. A discussion of this coping-skills therapy, its application to anxiety, pain and anger, and its relation and application to increasing rates of exercise adherence follows.

Inoculation

Originally proposed as an approach to problems associated with anxiety, and later to anger and pain, stress inoculation aims to develop an individual's competence to respond to stressful events. Stress inoculation reduces disturbing emotions so that appropriate decisions and behaviors can endure. By providing the opportunity to deal successfully
with mildly stressful stimuli, there is a tendency to later deal more effectively with a similar, more intense, stressor. Metaphorically, it is the behavioral analogue of biological immunization.

The stress inoculation technique (Meichenbaum, 1977; Baum, Taylor, & Singer, 1984) involves three phases. The first phase entails providing realistic descriptive information about problems or obstacles to be expected in a given situation, especially those vague and ambiguous events which are likely to be misinterpreted. Realistic information regarding exercise adherence includes the unpleasantness of physical exertion, sore muscles, increase in appetite with little immediate weight loss, as well as time demands.

Janis (1958), in his studies of stress in surgical patients, describes realistic, descriptive information as preparatory in nature, because it forces the patient to think about what may be experienced. Mentally rehearsing the potential dangers gradually develops effective inner defenses or psychological tolerances to use when external dangers materialize. In this regard, there is an increased ability to anticipate correctly and be emotionally prepared for problems.

Simply having knowledge of impending stressors or threats is not enough to react or manage effectively if those
threats should arise. The second phase of stress inoculation involves teaching a variety of cognitive and behavioral strategies as a means of coping with the stress experience. This includes suggestions about how to prevent or reduce the impact of potentially threatening events, as well as general reassurances that foster self-confidence about coping adequately with obstacles or setbacks (Baum et al., 1984). Having specific coping skills at hand, to be employed at each of the various stages of the coping process, can build a sense of active control, enabling the client to ward off feelings of helplessness and to maintain emotional control in the presence of fear-provoking stimuli (Janis, 1958).

The third phase of the stress inoculation technique entails rehearsing the learned coping strategies under stressful conditions similar to those that may realistically occur. Given the opportunity to experiment and succeed in coping with mildly stressful events builds a higher level of self-efficacy and increases the likelihood of coping effectively under more severe conditions.

Janis (1958) was the first to apply an inoculation-type procedure to show that cognitive interventions for the distress of surgery lead to better adjustment during surgery, shorter hospital stays and reduction in the amount of medication required. Langer, Janis, & Wolfer (1975)
demonstrated that a cognitive intervention consisting of reappraisal, calming self-talk, and selective attention effectively reduced both pre- and postoperative stress. Turk (1976) and Horan, Hacket, Buchanan, Stone, and Demchik-Stone (1977) successfully used stress-inoculation procedures to increase subjects' pain tolerance.

Novaco (1979) applied the stress inoculation approach to anger management. The information phase increased awareness of the properties of external events that elicit anger, as well as the cognitive and affective processes that accompany the anger. Effective coping required skills that were incompatible with anger and increased competence in interpersonal communication and problem-solving. These skills were practiced with imagery and in role play. This approach has been successfully employed by a wide variety of individuals that must deal with anger, such as law enforcement officers (Novaco, 1977) and the institutionalized criminally insane (Atrops, 1978).

**Inoculation and Decision-Making**

A major purpose of stress inoculation is to prevent reversals of decisions in the face of challenges. Both preparatory information and coping skills provide a means of managing the stressful experience and making appropriate decisions, thereby making it possible to remain relatively
unshaken by setbacks that challenge the decision. Without inoculation, decisions will be based upon incomplete or inaccurate information and will be generated in reaction to preexisting emotional states.

Janis and Mann (1977) have developed a conflict model of decision making that focuses on how the psychological stress of decisional conflict influences the ways in which people go about making choices. The model describes five basic patterns of coping with realistic threats:

1. Unconflicted adherence. The decision maker complacently decides to continue whatever he or she has been doing, which may involve discounting information about risk of losses.

2. Unconflicted change. The decision maker uncritically adopts whichever new course of action is most salient or most strongly recommended.

3. Defensive avoidance. Escaping the conflict by procrastinating, shifting responsibility, or constructing wishful rationalizations to bolster the least objectionable alternative, remaining selectively inattentive to corrective information.

4. Hypervigilance. Frantically searching for a way out of the dilemma and impulsively seizing upon a hastily contrived solution that seems to promise immediate relief. The full range of consequences of the choice are overlooked as a result of emotional excitement, perseverance, and cognitive constriction (manifested by reduction in immediate memory span and simplistic thinking). In its most extreme form, hypervigilance is known as "panic".

5. Vigilance. Searching for relevant information, assimilating information in an unbiased manner, carefully appraising alternatives and their consequences before making a choice, and making detailed contingency plans that might be required if known risks were to materialize. (Janis & Mann, 1977, pp. 509-510)

The first four patterns of coping are generally unadap-
tive and are associated with both extremely low or extremely high levels of stress. Only vigilant coping leads to quality decisions, in part because it is associated with intermediate levels of stress. In addition, Janis and Mann (1977) discuss three necessary conditions for a vigilant pattern to occur: (1) an awareness of serious risks associated with whichever alternative is chosen; (2) a hope of finding a better alternative; and (3) a belief that there is adequate time to search and deliberate before a decision is required. A defective pattern of coping can be expected if these conditions are not met.

An important assumption of the conflict theory, and one that applies to exercise adherence, is that a decision maker is much more likely to maintain an adaptive behavior when making a difficult decision if their dominant coping pattern is vigilance. Stress inoculation is consistent with this theory in that it can provide the resources needed to utilize vigilance. Specifically, the types of information provided by the stress inoculation technique correspond to two of the three essential conditions for promoting a vigilant coping pattern. Inoculation increases awareness of problems to be expected and fosters hope of solving those problems (Baum et al., 1984).

It can be hypothesized that an inoculation technique developed specifically for participants in an exercise
program would promote a vigilant coping pattern, thereby influencing the decision-making process required to continue exercising. As the process of adherence takes place, and vigilance influences the participant to continue exercising, a subject's success will maintain self-motivation and lead to higher levels of self-efficacy. An internal locus of control will also be emphasized, due to the nature of the coping skills.

Relapse Prevention

A model of the phenomena of relapse, and the derived strategies for relapse prevention (RP) (Marlatt & Gordon, 1985), are of interest here because of their potential application to exercise adherence. Marlatt, et al. (1985) uses the term relapse to describe a failed attempt at abstaining from a bad habit or addiction (i.e. drugs, cigarettes, gambling, overeating). His model posits that self-efficacy, expectancies of failure as the outcome and attribution of causality are interactive determinants of relapse. These cognitive factors may cause one lapse to either lead to a total relapse, or to be experienced as part of the process of learning to abstain.

An assumption of the relapse model is that exposure to situations ("high-risk situations") likely to trigger
relapse is inevitable. If an individual is expecting to abstain (or adhere) from willpower alone, then a lapse will be attributed to a lack of willpower and loss of control (i.e., an internal attribute) rather than to a lack of adequate coping responses (i.e., an external attribute). This internal attribution of causality leads to what Marlatt calls the abstinence violation effect (AVE): guilt and conflict (i.e. "I want to exercise but I don't think I can do it!"), decreased self-efficacy and a feeling of inability to regain control. The end result is apt to be a total relapse. On the other hand, an individual can be prepared to respond to high risk situations with adequate coping responses and subsequently perceive a lapse as a lack of ability to cope and a lesson of how to better avoid a lapse in the future. Having an external attribution of causality does not affect one's self-efficacy and, therefore, maintains a sense of power over the behavior.

It is important to distinguish between attribution of causality and locus of control. The former refers to a process of inferred causality that an individual engages in to explain the reason that a lapse has occurred. The reason can be internally or externally attributed; that is, to a lack of willpower or to coping resources not yet learned. Locus of control can also be internal or external, but alludes to one's belief in whom or what controls the
direction of their life; that is, either choice and ability or luck and chance.

Stress inoculation training is the coping skills approach to stress management that is most consistent with the RP approach (Marlatt et al., 1985). A brief review of RP will demonstrate their similarities. Relapse prevention begins with education about the process of relapse, emphasizing inevitable difficulties and successes. The next step involves identification, definition, and prediction of high-risk situations through self-monitoring. Following this is an improvement of coping responses, reinforcing positive outcome expectancies, prevention of, and coping for, urges to lapse (e.g. cognitive restructuring) and instruction to minimize the adverse impact of a lapse.

RP appears to be a subset of stress inoculation training that specializes as a coping skills approach to stress management in relation to habit change and relapse. As mentioned previously, the dropout rate for behavior change programs with a goal of excluding bad habits is about equal to those with a goal of incorporating good habits (Dishman, 1988). Since some of the same variables are involved in both types of behavior change (i.e. expectations, self-efficacy and self-motivation), it follows that the specific strategies effective in preventing relapse into bad habits may prevent noncompliance with good habits. It is for this
reason that I will be applying several RP techniques as part of the inoculation of exercise participants.

Before it is possible to test the basic relapse model on exercise relapse and adherence, a modification of the model is necessary. Obviously, there are differences between developing an exercise habit versus eliminating an addictive behavior. For example, detrimental effects characteristic of a negative addiction, such as unemployment and relationship problems, cause a motive for change unseen in nonexercisers. Glasser (1976) says that quitting a negative addiction would force the person to face a painful life that was being avoided through the addiction in the first place; whereas, developing a positive addiction to exercise is an effective way to deal with a painful life. Moreover, since it is not necessary to exercise daily, skipping a day is not as critical as smoking or drinking again for the first time. It is beyond the scope of this paper to completely define these differences. The intention here is only to apply those RP techniques that influence the variables common to both types of behavior change.

Only two studies (King & Frederiksen, 1984; Martin et al., 1984) have attempted to test portions of relapse prevention strategies for effectiveness in improving exercise adherence. In the Martin et al. (1984) study, relapse prevention subjects were taught the realistic
probability of adherence slips, made aware of apparently irrelevant decisions that may lead to a lapse and how to avoid a total relapse. They also received instruction on using cognitive dissociation strategies. Unfortunately, adherence rates were low because the instructors did not follow standardized procedures and a significant proportion of subjects resisted efforts to move the class to an indoor track.

King and Frederiksen (1984) taught their relapse prevention subjects about high-risk situations probable of leading to a lapse and reactions to a lapse that are most likely to lead to a total relapse. The subjects were instructed in cognitive strategies for modifying defeatist thoughts and for promptly rescheduling missed exercise. These interventions were administered during a single session, and although frequency of exercise was measured, duration and intensity of exercise were not. Subjects given relapse training and instructed to run alone did significantly more exercise than controls during the 5-week jogging period and at the 3-month follow-up, whereas those given relapse training but instructed to jog with other team members did no better than controls.

These results, though limited in terms of the strategies used, do show that adherence can be affected by learning coping skills. The present study aims to provide subjects
with an extensive intervention of coping strategies in hopes of increasing frequency, duration and intensity of exercise. An inoculation procedure, presented to participants in a six-week exercise class, will incorporate techniques emphasizing an internal locus of control, enhancing self-efficacy and maintaining self-motivation. The positive effects of each of these three variables on exercise adherence rates has been previously demonstrated. It is hypothesized that subjects receiving an inoculation intervention, in comparison to subjects not receiving inoculation, will exercise less intensely, frequently, and for shorter durations.

Adherence will be defined by the frequency, duration and intensity of exercise over a six-week period. The level of exercise should produce the desired physiological and/or psychological benefits without exposing the subject to excessive risk of injury. In accordance with this prescription, the American College of Sports Medicine (1980) recommends that adults exercise 3 to 5 times per week, 15 to 60 minutes per session, at 50% to 85% of their maximum functional capacity. This is particularly important since maximum treatment gains are often obtained at lower exercise intensities (Haynes, 1984), and adherence is likely to be better at lower intensities, especially at the beginning of an exercise program (Epstein et al., 1984). Excessive
frequency (greater than 5 days/week) or duration (greater than 45 minutes/session) of training offer the participant little additional gain in aerobic capacity, yet the incidence of orthopedic injury increases substantially (Franklin, 1986).
Method

Subjects and Adherence Setting: Two 6-week exercise classes were conducted involving college-age females from the University of Montana. Subjects included Psychology 110 students who participated for partial fulfillment of their research requirements. To ensure that adherence could be attributed to internal motivation, and not to any external motives, attendance between the first and last day of the class was not required of Psychology 110 students for them to receive their research credits.

The study included healthy norisk individuals with either no previous formal exercise experience or prior failure at maintaining an exercise regimen (in accordance with guidelines established by the American College of Sports Medicine, 1980; i.e., 3 times/week, for 20 minutes, at a perceived intensity rate of "moderately light"). Proximity of an exercise facility to participants has been found to be related to adherence (Morgan, 1977; Dishman, 1982); hence, exercise classes were held on the university campus, close to where subjects were expected to be during the week. Locations included a large dance-instruction room and a gym, both with shower facilities.

Procedure: Both the intervention group and the control
group classes were conducted during spring quarter, from 8-9am and from 9-10am. The 6-week period was completed before student's finals week since many students often leave school during that time. Subjects met in class three times per week the first four weeks and twice a week the last two weeks. Each extra day of the last two weeks was left for subjects to practice exercising alone. Each class lasted 55 minutes with the first ten minutes allotted for the intervention or control procedures.

It has been estimated (Stevens, et. al. 1985), of those that exercise regularly, that the greatest percentage participate in walking, swimming, and calisthenics. Perhaps it is easier to stick with these activities because they are inexpensive, can be performed close to home, and are flexible in scheduling. For these purposes, the form of exercise in the current study included supervised walking and aerobic exercise instruction shown from a variety of audio-visual tapes on a 24" television screen (see Appendix A).

Prior to participation in the study, subjects signed an informed consent document stating that they were in good health. If unsure, they were instructed to obtain permission from a doctor. Subjects were also informed that they were free to withdraw from the study at any time.

Subjects were told on the first day of the class that the
The experimenter was interested in seeing how training procedures would affect participants' level of adherence. Subjects were also informed that records would be kept on exercise participation, that their level of fitness would be measured by comparing their performance on a timed exercise the first and last day, and that their resting heart rates would be documented.

Subjects in the intervention group received 1) five days of information regarding positive effects of exercise, practical information, causes of lowered motivation and will-power, and inconveniences; 2) 8 days of coping skills training that considers reactions to skipping that may lead to dropping out, self-monitoring, identifying high-risk situations, self-talk, cognitive restructuring, and expectations; 3) direct practice of these coping techniques through a requirement of exercising on one's own (i.e., one day each in the 5th and 6th weeks, rather than meeting formally for class); and 4) one day discussing adherence following completion of the exercise class. For a complete review of the inoculation intervention, refer to Appendix B.

The order of inoculation procedures given in the intervention may effect adherence rates but are not addressed in the present study. Research has shown that the motivations for initiating exercise programs are different from the long-term motivations for continuing an exercise program.
program. The intervention in the current study begins, while subjects are already motivated to begin exercising, with information oriented toward increasing attraction to exercise and strengthening beliefs of success capability (Sonstroem, 1988). Because motivation begins to decrease by the third week (Wankel & Graham, 1982) information is presented on causes for lowered motivation in the third week of the class, followed by coping skills to prevent a decrease in motivation. It is speculated that a 10-minute intervention consisting of an entire inoculation package (i.e. information, coping skills, and practice of skills) given each exercise session would present some information and techniques prematurely.

Subjects in the control group were shown video tapes of adventurous places to travel (see Appendix C), encompassing the same length of time (10 minutes per session) as the inoculation intervention. This was to ensure that all subjects received equal amounts of time with the experimenter.

**Dependent Measures:** Dependent measures to compare the two groups were recorded during exercise time by the experimenter that administered the intervention. The following dependent measures were assessed on each subject:
Exercise Adherence

1. **Intensity of exercise** - using the Perceived Exertion Chart (Sharkey, 1979), subjects gave self-reports following each exercise session of the physical effort they perceived to have expended, ranging from very, very light to very, very hard, on a scale of 7 to 19.

2. **Frequency** - attendance measure of class participation, with a maximum of three times per week.

3. **Duration** - length of continuous exercise. Duration was expected to remain constant across exercise sessions due to the structure of the setting, unless subjects left the class early or stopped exercising because of exhaustion. Duration was expected to fluctuate during the two days that subjects exercised outside of class in the fifth and sixth week.

To measure changes in fitness levels from the beginning to the end of class, resting heart rates and a timed three-quarter mile run were recorded for all subjects the first and last day of class. Those subjects that failed to complete the class were contacted at the end of the 6-week period and asked to volunteer for a fitness level test. No prediction could be made as to whether the groups would meet the minimal requirements for gaining physical benefits. It was postulated, however, that if the intervention group demonstrated significantly higher levels of adherence over the control group, then it would also show greater...
improvement in fitness levels.

Following the completion of the class, subjects filled out an informal, anonymous questionnaire (see Appendix D). Opinions were asked, with use of Likert-like scales and open-ended questions, regarding the type of exercise used, the time and location of class, the intervention or adventuresome tapes, and instructor qualities. Their reasons for discontinuing or continuing the class were also asked.

A six-month follow-up on subjects' adherence was conducted. Specifically, each subject was asked: 1) Are you exercising more now than before the class?; 2) What is your current level of exercise (average times/week, duration and intensity of each exercise period)?; 3) Has your attitude about exercise changed and if so, how?; and 4) Do you enjoy exercise more now than before the class?
Results

Subject participation from the Psychology 110-pool was limited. The start of the exercise class was delayed one week in order to allow subjects to be solicited through advertisements posted around campus and in the university newspaper. A total of 24 subjects were available at the time it was mandatory for the class to begin in order to be completed before finals week.

The time at which each group met was randomly chosen: control group (n=12) at 8-9am and the intervention group (n=12) at 9-10am. Subjects could not be randomly placed in groups due to class schedule conflicts and thus, subjects chose either the 8-9am or 9-10am exercise class. To ensure that the groups were matched, two-tailed t-tests were performed on subject-variables according to age, t(21) = -.30, p=.76, level of perceived social support t(16) = .63, p=.53, and presence of obesity (i.e., 30% overweight according to Hanes Survey, 1980, which measured average weights of U.S. citizens according to height and age), t(21) = -.49, p=.66. It was determined that the groups be matched on these three variables, as they have been shown to effect adherence. The means and standard deviations for age, perceived social support, and weight are presented in Table 1.
The three dependent measures of adherence recorded for each subject across the 6-week exercise class were averaged for the intervention group and for the control group: mean attendance per person (frequency), mean length of exercise time (duration) per class/per person, and mean perceived exertion (intensity) per person. Two-tailed t-tests were conducted on these measures to test the hypothesis that the intervention group would exercise significantly more often, longer and harder than a control group. The intervention had no significant effects on either frequency, t(21) = -0.92, p = .37, or duration, t(19) = -1.60, p = .13, but did have an increased effect on intensity level t(19) = -2.30, p = .033.

Several subjects informed the researcher that they could not make class on particular days due to appointments, special meetings, etc. Thus, each subject was asked to report their adherence for those days they did not come to

Table 1.
Means (M) and standard deviations (S) for age, perceived level of social support and weight according to each group.

<table>
<thead>
<tr>
<th>Groups</th>
<th>Age</th>
<th>Social Support</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control:</td>
<td>M 26.9</td>
<td>7.58</td>
<td>-4.2</td>
</tr>
<tr>
<td></td>
<td>S 10.2</td>
<td>1.38</td>
<td>24.6</td>
</tr>
<tr>
<td>Intervention:</td>
<td>M 28.2</td>
<td>8.09</td>
<td>0.07</td>
</tr>
<tr>
<td></td>
<td>S 9.98</td>
<td>2.30</td>
<td>24.9</td>
</tr>
</tbody>
</table>
Table 2.

<table>
<thead>
<tr>
<th></th>
<th>CONTROL</th>
<th>INTERVENTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>DATA</td>
<td>in-class overall</td>
<td>in-class overall</td>
</tr>
<tr>
<td>F</td>
<td>M</td>
<td>S</td>
</tr>
<tr>
<td></td>
<td>7.50</td>
<td>4.62</td>
</tr>
<tr>
<td></td>
<td>8.50</td>
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<td>9.42</td>
<td>5.57</td>
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<td></td>
<td>10.33</td>
<td>6.34</td>
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<td>D</td>
<td>M</td>
<td>S</td>
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<td></td>
<td>44.39</td>
<td>1.05</td>
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<td></td>
<td>44.08</td>
<td>2.38</td>
</tr>
<tr>
<td></td>
<td>45.09</td>
<td>0.99</td>
</tr>
<tr>
<td></td>
<td>45.36</td>
<td>2.40</td>
</tr>
<tr>
<td>I</td>
<td>M</td>
<td>S</td>
</tr>
<tr>
<td></td>
<td>11.76</td>
<td>0.84</td>
</tr>
<tr>
<td></td>
<td>11.76</td>
<td>0.84</td>
</tr>
<tr>
<td></td>
<td>12.64</td>
<td>0.96</td>
</tr>
<tr>
<td></td>
<td>12.61</td>
<td>0.95</td>
</tr>
</tbody>
</table>

Means (M) and standard deviations (S) for frequency (F), duration (D), and intensity (I).

Exercise Adherence

class. Considering the small number of subjects in the study, it was decided that the reported data should be averaged with in-class data and used as an overall measure of adherence, in addition to the in-class-only measure. Again, significant effects were found for perceived level of intensity, $t(19) = -2.21$, $p = .04$, and no effects were found for either frequency, $t(21) = -.75$, $p = .46$, or duration, $t(19) = -1.27$, $p = .22$. The means and standard
deviations for the three dependent measures, according to in-class data and overall data, are presented in Table 2.

Measures of adherence were recorded for the two days when subjects were required to exercise alone. The purpose was to compare the differences in adherence between the groups for effects of the intervention on self-generated exercise. Two-tailed t-tests on the mean frequency, $t(21) = -.44$, $p=.67$, mean duration, $t(20) = -.73$, $p=.47$, and mean intensity, $t(21) = -.60$, $p=.55$, demonstrated no significant effects.

Table 3.
Mean change (M) and standard deviation (S) from pre- to post-measure on resting heart rate (RHR) and timed run.

<table>
<thead>
<tr>
<th>Groups</th>
<th>RHR</th>
<th>Timed Run</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control:</td>
<td>M 4.67</td>
<td>-12.25</td>
</tr>
<tr>
<td></td>
<td>S 17.76</td>
<td>33.10</td>
</tr>
<tr>
<td>Intervention:</td>
<td>M 5.08</td>
<td>-33.42</td>
</tr>
<tr>
<td></td>
<td>S 16.06</td>
<td>45.49</td>
</tr>
</tbody>
</table>

Using resting heart rate and a timed three-quarter mile run as pre- and post-measures of fitness level, the two groups were compared to test the hypothesis that, if the intervention group adhered significantly more than the control group, then their fitness levels would more greatly

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improve. (Means and standard deviations of this data are presented in table 3.) A repeated measures ANOVA, examining the interaction between the two groups and time of measure, demonstrated no differential change in resting heart rate, $F(1,22) = 0.0$, $p = .95$, or the timed three-quarter mile run, $F(1,22) = 1.70$, $p = .206$.

The questionnaire results concerning instructor qualities indicated that the instructor was equally fair, friendly, praising, and helpful to both groups. The intervention group did rate her as more motivating and knowledgeable about exercise than the control group rated her. This difference is to be expected, considering the content of the intervention taught by the exercise instructor.

Both groups, rating on the questionnaire, also equally liked/disliked the type of exercise used (i.e., walking and aerobic tapes). Of the intervention group, everyone liked walking and 85% liked aerobic tapes as forms of exercise; of the control group, everyone liked walking and 75% liked aerobic tapes. No subjects listed "form of exercise" as a reason for dropping out of the class. Twelve subjects in response to "What did you like least about the class?" answered that it was too early in the morning or that there was not enough time to shower before other classes and work. Seven subjects listed "Inconvenient time" as their reason
Exercise Adherence

for dropping the class. In rating the adventuresome tapes, the control group found them to be "Interesting" (.80), "Distracting from usual thoughts" (.80), and "Relaxing" (.70). The intervention group found the intervention to be "Useful" (.83), to "Help continue exercising" (.58), and "Was taught in a way that could be understood" (.90); 80% said they applied what they learned in the intervention to their own behavior in exercising.

It was discovered, in attempting to contact subjects for the 6-month follow-up, that only eight control subjects and six intervention subjects remain living in the vicinity. With only 58% of the total number of subjects available for contact, the results are considered anecdotal. Results of the follow-up are presented in Appendix E.
Discussion

The results of the present study provide partial support for the effectiveness of an inoculation/relapse prevention intervention on new exerciser's adherence rates. Specifically, the group receiving the intervention exercised at a significantly higher level of perceived intensity than the control group. This held true based on in-class performance and overall performance. No significant differences between the groups resulted on measures of average frequency or average duration of exercise, according to in-class performance or overall performance. Thus, it appears that an intervention geared towards increasing self-motivation, self-efficacy, and shifting locus of control internally has the effect of getting new exercisers to exercise harder than they would have without the intervention; and yet, not to exercise more often or for a longer duration. It should be noted, however, that duration was not expected to be longer for the intervention group because the length of exercise was consistently 45 minutes for both groups. Subjects did not stop exercising early during the class, nor did their duration vary enough on the two days that they exercised alone to make significant differences.
The informal questionnaire completed by all 24 subjects pointed towards possible confounding variables on the adherence rates obtained in the study.

The results concerning positive instructor qualities across the groups suggest that the instructor did not have a negative effect on adherence rates. These qualities, being equal across the groups, may additionally suggest that, although the instructor was not blind to which group received the intervention, the groups were not treated differently. The self-report questionnaire used, however, insufficiently measures instructor influences. To control for biases, the exercise instructor could remain blind by having another person administer the intervention and control procedures.

That both groups equally like/disliked the type of exercise used suggests that adherence rates were not unequally attributable to opinions regarding form of exercise. However, because a percentage disliked the aerobic tapes, form of exercise could have been a contributing factor to drop out.

Previous studies have suggested that the form of exercise (e.g., a form of exercise which is too easy or too difficult, uncomfortable, or embarrassing) can have a negative effect on motivation to continue exercising. In further
studies of this kind, it is imperative to specify to prospective subjects the exact form of exercise. Moreover, the form of exercise should include ways of tailoring the exercise to the particular needs of the subject. For example, if relaxed walking does not produce desired results, hand weights and other techniques to increase exertion level should be available. Specification and tailoring will not only aid subjects in their decision to join the exercise class, but will prevent dropout due to dissatisfaction of exercise.

The positive evaluations of both the adventuresome tapes and the intervention, at the very least, imply that neither were major contributors to decreasing adherence rates. If subjects had found them "Boring" or "A waste of time" they may have decided to exercise through some other means.

An interesting finding from the questionnaire pertained to the inconvenient time of the class. This highlights the importance of exercise convenience on adherence and implies that a motivational intervention may not outweigh convenience factors. In the present study, the inconvenient time may be the contributing factor to the low frequency rate.

Limitations

Several limitations in the present study hindered adequate
testing of the hypothesis. The first of these limitations was the small number of subjects. Given any participatory event, especially when voluntary, there will be at least a minimal number that discontinue for valid reasons other than loss of motivation. For example, several subjects in both groups discontinued because of class and job schedule changes and health reasons. A larger n could account for this type of discontinuance, where a small n could not.

To increase the sample size, if using college students as subjects, solicitation needs to begin during the preceding quarter when students are arranging their course schedules. The author noticed that several aerobic classes offered by the university had a minimum of 30 students enrolled. Initially, it was hoped that 25-30 subjects per group could be acquired through the Psychology 110 population, but use of this population requires solicitation to begin after the quarter has begun. It appears that most students interested in exercising are already enrolled in an exercise course by the beginning of the quarter.

A second limitation existed in the design of the study. Subjects were taught the intervention over a series of fourteen 10-minute briefs as the exercise class proceeded. In effect, the intervention was not concluded until the end of the exercise class and thus, was not fully useful until that time. It follows that, because the intervention was
taught over the period of the class, adherence rates could not reliably reflect the effectiveness of the intervention.

It is reasoned that the timing of the intervention is a major contributing factor to the insignificant differences between the groups for frequency. It is interesting to note, however, that when subjects attended class and received the 10-minute intervention, it did have a significant effect on the intensity level of their exercise. Thus, because the intervention appears to effect motivation, self-efficacy, and internal locus of control, further research with this intervention is warranted. In future studies of this kind, the entire intervention should be taught before the exercise class begins to ensure that all subjects hear the intervention and to allow subjects immediate application of the techniques for improving adherence. The first ten minutes of each class could then be dedicated to discussion and examination of adherence and the difficulties encountered by each subject. Only with this method can the adherence rates be attributed to the effects of the intervention.

An additional problem with teaching the intervention over the 6-week class was that subjects who were late or who periodically missed class missed the intervention for that day. Later make-up of missed 10-minute interventions was difficult during class time, although handouts (e.g., the
matrix, list of rationalizations, etc.) were provided with a quick explanation. Specifically, no subject heard the entire intervention. One subject heard as much as 93% of the 10-minute interventions, 4 heard 79%, and the rest heard less than 50%.

Apparently, because no one heard the entire intervention, they were not able to apply the intervention's techniques on days they were required to exercise alone. The intervention group did not adhere significantly more than the control group on those days.

A third limitation concerns the length of time the exercise class was held. Earlier, it was discussed how 50% of participants in a supervised exercise setting will drop out of the program within six months to one year (Dishman, 1988; Sach, M., 1982; Ward & Morgan, 1984). If the present study had been six months long, it would have allowed more time for the intervention to have an effect, and the intervention group would have perhaps exercised significantly more often than the control group. With a six month class, more days could be allocated for subjects to practice exercising alone. Measures of duration for the intervention group could then be expected to be significantly longer than the control group. With a six week class, no such predictions could be made.

Additionally, a six month class would more likely lead to
positive changes in resting heart rate over a six week class. It is known that exercise must be maintained for a minimum period of time before a decrease in resting heart rate occurs. The amount of time required depends upon the individual. For new exercisers, as in the present study, it is safe to assume that six weeks is insufficient time for a change in resting heart rate to occur.

Unfortunately, use of college students as subjects in a six month class would bring difficulties because of vacations and inconsistent enrollments from quarter to quarter. For this reason, further study in this area may require use of participants from the community, rather than college students.

Fitness Levels

Drawing from past research, it was assumed that subjects needed to exercise at least three times per week, for 20 minutes, at a perceived exertion level of "moderately light" ("moderately light" = 12 on the Perceived Exertion Chart) to gain any physical benefits. Because both groups failed to meet the minimal requirement of exercising at least three times per week, it was not expected that they show any differential change on their levels of fitness, measured by resting heart rates and timed runs. Even if they met this minimal requirement, they would need to exercise longer than
six weeks, as discussed above. Statistical analysis revealed no differential change for fitness measures and time of measure for either group.

Factors in addition to meeting minimal exercise requirements can help contribute to improvements in fitness levels. It was discovered, in the current study, that subjects had difficulties reading their resting heart rates accurately. A more reliable measure, such as a finger pulse rate monitor, would greatly improve accuracy rates. At the very least, time must be allotted to teach proper reading skills. Additionally, heart rates must be recorded upon awakening in the morning. Recording in class after subjects have travelled to the exercise room from home, and have perhaps drank coffee or eaten, results in unreliable measures.

Many subjects in the study complained vocally about the timed run. It can be assumed that subjects who are averse to fitness measures such as this do not want to put forth their best effort. Thus, a timed run becomes an unreliable measure. Speculating, a timed run can be a highly competitive event, especially for new exercisers who know they lack physical fitness. Moreover, the external competition of a timed run may negatively effect the motivation of someone who is already internally competitive. It is important to find a procedure that helps to eliminate
any external competition. For example, subjects could be timed individually and without knowing their finishing time.

Summary

In conclusion, a larger sample size, a six-month exercise class, and presenting the intervention in its entirety before starting to exercise would have allowed for a more thorough investigation of the hypothesis. Because the intervention group exercised at a significantly higher level of perceived exertion, despite the limitations of the study, it follows that the intervention positively effects self-motivation, self-efficacy, and an internal locus of control. For these reason, use of the intervention in future research is warranted.
References


Appendix A

Aerobic Audio-Visual Tapes

Week 1: Kathy Smith's Body Basics, JCI Video Productions, 5308 Derry Ave., Agoura Hills, CA, 91301.

Week 2, 3: Debbie and Carlos Rosas' Non-Impact Aerobics, Bod Squad, Inc., Vestron Video, P.O. Box, 4000, Standford, CT, 06907.

Week 4 - 6: Jane Fonda's Low-Impact Aerobic Workout, RCA Video Productions.
Intervention

Day 1

(read and have subjects sign the informed consent form, conduct resting heart rate, time a 3/4 mile run)

Day 2

(Recreated from "The Journey from Tobacco Road to Freedom Mountain", Marlatt and Gordon, 1985, 212-215)

The process of becoming an exerciser is like a journey - it doesn't happen overnight, but takes many steps until you reach your destination. By making a decision to start exercising, you have taken the first important step of this journey that eventually leads to increased freedom, greater self-esteem, and a healthier, more energetic life. Making the commitment to start is the most important part of the journey. By making the commitment to leave a sedentary lifestyle behind, you have indicated the strength of your will to change, to become an exerciser. But by itself, it cannot automatically make you an exerciser. This exercise class is designed to help you make the journey, make the journey of change from a sedentary lifestyle to one of an exerciser; I will be like a guide that provides maps and points out dangers and pitfalls along the route.

The purpose here, in addition to providing you with the opportunity to exercise, is to equip you with the means of becoming a longterm exerciser; you have the will (by making the commitment to start exercising), I will offer the way to reach your goal. Many people who set out on this journey of exercising make the mistake of thinking that their will is all they need to reach their goal - that they will overcome all obstacles on the path through the sheer strength of their willpower. This makes about as much sense as an explorer who's psyched to set out across unknown territory but goes without a compass, map, or any gear. In most cases, these inexperienced travelers become lost along the way or find themselves unable to get more than a few steps from basecamp before turning back. They find that their will is not enough to get them through successfully and the trip escalates into a total failure.

A newborn exerciser may start out with a strong will and motivation, but after getting sore muscles, getting hungrier
but not losing any weight, realizing that the exercise is not the funnest activity to do and that it cuts into other aspects of her life, willpower and motivation don't seem to be enough to keep the exerciser going. This may be the reason that 50% of new exercisers drop out of exercise programs. You know the "big" fitness boom of the last 10-15 years? Statistics show that really only 20% of the American population exercise regularly and intensely enough to reap the benefits!

Some of you here may have attempted to exercise in the past but just couldn't keep with it, or maybe you're starting out for the first time - either way, you may be wondering if it's really possible to learn how to exercise forever. These doubts are normal and may actually become stronger by about the 3rd week of the class. I am hoping to reduce these doubts by accompanying you through the first 6 weeks of your journey and equipping you with the skills necessary to continue exercising after the class ends. Just keep in mind that this really is a journey with ups and downs and adventures along the way and that it IS possible to reach your destination, that is, becoming a long-term exerciser.

Specifically, I will guide you through:

1. the "how-to's" of exercising so it can be done safely and most effectively
2. coping strategies to deal with and avoid those situations that can lead to dropping out
3. the tricks our minds sometimes play on us when we have doubts along the way.
4. finally, I will help you to be prepared to deal with that chance that you may decide to quit.

Most people begin their journey motivated for success. They expect success, so that if they have any difficulty they think this proves they do not "have what it takes." Remember when you first learned a new skill such as riding a bicycle? Were you able to get your balance perfectly the first time? Most of us had to take a painful spill or two before getting the hang of it - but these were mistakes that we learned from. The same applies to becoming an exerciser. Although most of us hope we will make it through without any problems, any unrealistic expectation of total success may set us up for failure; we may be tempted to give up altogether if we, say, miss a week of exercise class. But we will learn to treat these as experiences to learn from that can help us to be more successful in the future.
I realize I just covered a lot of material, but I will be going over all this in more detail throughout the next 6 weeks. In fact, I will be spending the first 10 minutes at the beginning of each class helping you through your journey. We will be meeting three times a week for the first four weeks. Then, for the last two weeks, we will meet only two of the three days. On those days that we don't meet, it will be your chance to start practicing exercising on your own and using your new skills.

It is pretty exciting to reach a day when you KNOW that you'll always exercise (you can't live without it!). But the journey getting there can be exciting, as well. It is always interesting to see what types of challenges and rewards come along the way. Good luck!

Day 3

What do we mean by exercise and how much of it do we need to do?

First, we need to define exactly what we mean by exercise. Being "active" is not necessarily exercise, like:

1. waitressing an eight hour shift  
2. mowing the lawn (unless maybe it's all up hill)  
3. gardening  
4. cleaning house  
5. raising children (which is too bad or we'd have a lot of very in-shape child raisers!)

All of these types of activities can wear you out, but unfortunately, they aren't exercise because you stop and go throughout the activity. Exercise is an activity which requires the body to exert 50-85% of its maximum potential. This exertion needs to occur continuously for about 20-30 minutes, 3-5 times per week. Doing this will give you the benefits that I will talk about in a minute.

Any less (like mowing the lawn once a week) just won't. Interestingly, any more than this amount increases the risk for injury and doesn't make you any healthier. That would be like taking megadoses of vitamins to prevent a cold. So, really, to reap the bennies, you only need to take a brisk walk for 30 minutes, 3 times a week. Doesn't seem like all that much!

In this class, if you attend each time, you will be exercising often enough and long enough. The part that is up to you is how hard you exert yourself. If it's too hard,
you'll want to quit. If it's too easy, you won't feel better afterwards and it won't seem worth the trouble to continue. So, part of learning to exercise is finding that level of exertion that is right for you and will be likely to keep you exercising.

Positive effects of exercise

1. Proven to prevent the leading causes of death and disease in the U.S. today:
   a. cancer
   b. cardiovascular diseases (heart, coronary heart disease)
   c. hypertension (high blood pressure) which can lead to strokes, kidney failure, and heart failure
   d. obesity (losing weight is not the same as losing inches)

2. Most regular exercisers seem to do it more for the psychological benefits:
   a. helps deal with stress after you've gotten used to doing it (a good replacement for smoking cigarettes or overeating as a way to deal). It is important to keep in mind that stress is associated with muscle tension, headaches, and increased heart rate, which relate to physical problems
   b. decreases mild to moderate levels of depression and anxiety
   c. overall, increases feeling of well-being, self-esteem

3. Exercise also gives you more energy - believe it or not, when you come home from a long, hard day at school, exercising will replenish your energy better than a nap! Exercise also makes doing normal everyday activities easier: the housecleaning, climbing stairs, making it past 8PM.

Day 4

Practical Information: A summary

1. Clothes for non-contact sports
   a. layer clothes and wear breathable ones - bodies natural cooling device
   b. shorts that don't chafe (e.g., denim, polyester)
   c. job-bra
   d. shoes - prevents injuries / worth the cost
2. Temperature and humidity
   a. temps and/or humidity can make it more difficult to exercise (feel more tired). So, exercise in early morning or after sunset when it's cooler
   b. over 85 degrees, regardless of the shape you're in, exercise can lead to heat exhaustion, heat stroke (collapse and fever), and heat cramps, and dehydration - drink lots of extra water

3. Nutrition
   a. myths:
      1) protein builds muscle, thus, eat extra protein
      2) salt tablets are needed when exercising
   b. in general:
      1) watch your fat content (fried foods, bacon and sausage, ice cream, whole milk, creamy salad dressings, mayonnaise)
      2) try to eat lots of carbohydrates and fiber (fresh fruits and vegetables, whole grain breads, pasta)

4. Effortless exercise devices
   a. includes motor-driven bicycles, electrical stimulating devices, various types of mechanical vibrators, and rubberized sweat suits
   b. advertisers imply that fitness or weight loss can be achieved without vigorous exercise but there is no data to substantiate these claims
   c. some can be dangerous! rubberized sweat suits block the evaporation of sweat, depriving the body of its normal mechanism for cooling

5. Warm-ups and cool-downs
   a. Warm-up: prepares the body for the transition from rest to vigorous exercise, prevents injury, enhances performance capacity, includes stretching and low intensity exercise (usually the activity you are about do as exercise, just slower)
   b. Cool-down: gradual recovery from endurance phase, prevents headaches, nausea, muscle tightness and soreness! and includes stretching and low intensity exercise. Remember, it's important to decrease the unpleasantness so you're more apt to exercise.
Negative effects of exercise:

I'd like to discuss today some of the things new exercisers may not expect from exercising when they begin. They have often made a strong commitment to start and to continue exercising without realizing what it will take to do this.

1. Exercise is not always pleasant:
   Often when we first start out, we really want to and try to enjoy the exercise. But, soon we find out that it can be unpleasant – we're breathing hard, we're sweating, we get hot, our bodies are tired and want to stop. This is exercise! It may help to know that with consistency it becomes not-so-unpleasant and we actually get used to it! Remember how you hated taking a bath when you were little? Getting wet, the water temperature too cold or too hot, and soap gets in your eyes...and now we love baths!

2. Aftereffects of Exercise are not always pleasant:
   When someone has exercised for a while, it literally GIVES them more energy - physically and mentally. It works better than a nap. In addition, the person no longer gets sore muscles from working out. But, until that point is reached, we need to expect that the exercise may make us feel tired for a while afterwards. And, when we wake up the next morning, our muscles are going to feel sore! It's real common to want not to exercise when we're sore to give our bodies a rest and let the soreness go away. It's a fact, though, that the only way to make the soreness go away is to exercise some more!
   Soreness is actually a break-down of the muscle tissue. It has been damaged through the exercise. And, through continuing to exercise, getting your blood to flow, stretching and warming your muscles, this is the way the body repairs itself. The good news is that the muscle repairs itself to a stronger point than it was before you exercised it. And thus, we start to get in shape! Of course, if you don't exercise until the soreness goes away, the muscle repairs itself to the point it was before it was broken down.

3. Weight Loss is Delayed:
   Many of you may want to lose weight through exercising. Not to be discouraging, but you may not lose as much as you hoped or you may lose none at all, depending on your
current body weight. There are a few reasons:

a. exercise makes your appetite increase - increases metabolism

b. muscle weighs more than fat

c. most important, losing weight and losing inches are two different things - you may trim down without any weight loss!

4. Results Take Time:

This goes along with the weight loss, and it also applies to getting firm muscles, feeling more energetic, and seeing physiological results (decreased heart rate, etc.). Sometimes individuals compare themselves to everyone else in the class and feel the worst; that they aren't improving as fast. Just remember that every Body is different and is on its own time-schedule. What counts the most is that you are here, be proud of yourself for making the commitment and wanting to do this for yourself!

5. Inconvenience:

This is a large category and probably the most important. In several scientific studies, they found that, of those that dropped out -

a. over 40% gave as their reason for doing so that the program was located too far from their home, and

b. over 40% said the exercise interrupted their daily schedule. This includes having less time to spend with friends or family, less time for responsibilities, and conflict with other fun activities.

I guess there is really little to do about these inconveniences. Maybe if they didn't exist, everybody would exercise! But I have yet to find an activity that doesn't take time. There's a popular saying that goes "There is always time for what you make time for". If you don't find yourself making the time to exercise, maybe it's not that you don't have the time, but that exercising is not really as important a priority as you thought.

Review:

All of these things, that exercise and the aftereffects of exercise are not always pleasant, that you may not lose as much weight as you hoped, that results take time, and that, most importantly, exercise takes time and cuts into other aspects of your life... all of these, over time, can make you less motivated to exercise. First,
Exercise Adherence

you'll want to skip just one day (like, because you're too busy) and eventually, to stop exercising altogether.

Ways to keep the motivation up:
Now that you're aware of some of the types of things that can lessen your motivation, I'd like to talk about some things you can do that help to keep your motivation up, besides relying on a strong sense of will-power. We call these coping strategies.

1. Self-monitoring
   a. (pass out diagrams of self-monitoring chart which include: date and time of workout, intensity and duration of exercise, feelings before exercising, feelings after exercising, and how an urge to not exercise was coped with if there was an urge)
   b. Reasons for use: keep track of progress and improvements, see how the antecedents and consequences coincided with the exercise, become aware of your skills in coping with an urge to skip

Day 6

Expectations of exercising
One thing is true about humans: if we have expectations and they are not met, we react negatively, be it with anger, sadness, or loss of motivation. As far as becoming an exerciser, it's important that our positive expectations of exercising are realistic. If we have unrealistic expectations that cannot be met, then there's a much better chance that we'll quit.

Some unrealistic ones:
1. I'll lose 20 pounds
2. I'll have a trim, lean body
3. I'll be able to run 6 miles in a month
4. my resting heart rate will go down 20 beats/min.

Some realistic ones:
1. I'll feel a sense of accomplishment
2. my self-esteem will be enhanced
3. I'll feel healthier and have more energy
4. I'll have a better body-image

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Besides positive expectations, we also have negative expectations about exercising. These may include things like: exercising is hard, free time is more limited, and it'll always be difficult to keep exercising. These need to be realistic, as well. Someone may think that exercise will always be unenjoyable. But, in fact, those who have exercised for a while claim that they do enjoy it. It's also important to keep in mind that, if there's more negative expectations than positive, it'll be more likely that motivation will lessen over time.

Expectations of not exercising

So far we've talked about positive and negative expectations for exercising. Also important is your expectations of not exercising — that is, if you feel like skipping a day of exercising, what do you think will be some of the positive and negative consequences?

Let me give you some examples. One positive expectation of skipping might be to have the time to study for a test. Then again, negative expectations of skipping might be to feel guilty and frustrated, and to have no increase in fitness level.

Keep all this in mind. Next time we will be jotting down some of our expectations.

Day 7

Handout: decision matrix for smoking cessation (Marlatt & Gordon, 1985, 58.), blank decision matrix, pencils

This matrix, to be filled in by each of you, is a simple way to help you become more aware of your expectations for:
1. deciding to exercise
2. skipping a day of exercising when the desire arises

(read "smoking cessation decision matrix" as an example and tell Ss to fill out the blank decision matrix)

The point at which these expectations become most important is when you feel your motivation wavering and you feel like skipping. Why? Because at that time, there is a tendency to dwell on the positive expectations of skipping a day and the negative expectations of continuing to exercise. We tend to forget the positive reasons why we really wanted to exercise. In other words, the immediate gratification of skipping "just one day" is much stronger than the long-term effects of sticking with it. At that point, you can pull out your matrix and read it to remind yourself.
One last thing: our expectations will change over time and it may take a few weeks of exercising to realize an expectation. Either way, if you find that rereading the matrix when you want to skip a day of exercising does little to boost your motivation or help remind you of the positive reasons that you want to continue exercising, perhaps a few minutes can be spent revising it.

Day 8

Identifying High-Risk Situations and A.I.D.s

Let me first give you some examples of A.I.D.s, apparently irrelevant decisions. Think of someone who has a drinking problem and is trying not to drink. An apparently irrelevant decision he or she could make would be to walk home from work on a route that goes by a bar. Or someone who just quit smoking who sits in the smoking section in a restaurant. As you can see, an apparently irrelevant decision is one that appears innocent enough, but which tempts a person to do something they don't want to do. For us exercisers, that means a situation that may lead us not to exercise. Let's spend a few minutes here thinking of some apparently irrelevant decisions that might be made...

1. planning a meeting or activity right before the time to exercise that has a chance of running overtime
2. leaving your exercise clothes at home so that, when it's time to go to exercise class, you first have to go home (where there's lots of distractions)
3. planning to run after a big outing or party

These apparently irrelevant decisions are just one type of high-risk situation, which is any situation that poses a threat to your sense of motivation and will-power to exercise. Other high-risk situations include:

1. having negative emotions or feelings (being depressed, frustrated, or angry about something) so that you don't feel like exercising
2. celebrating an especially good day (getting a raise, passing a final) by not exercising
3. testing personal control (I'll just exercise on my own tomorrow instead of going to class)
4. having conflict with others (argument with a friend, pressure at work)
5. social pressure from friends that don't exercise (they try to convince you to exercise another time)
The important thing to remember is that these high-risk situations are inevitable. You can't expect to keep exercising from willpower alone! The trick is to be aware of those situations that can threaten your sense of motivation, expect them to occur, and know how to cope with them when they do occur.

Sometime before we meet next time, think of at least three high-risk situations you may face or irrelevant decisions you could make and what you can do to avoid them.

**Day 9**

**Review**

Have Ss discuss their high-risk situations and coping strategies.

**Behavioral coping strategies**

1. **anticipate and plan for high-risk situations:**
   a. Sunday night of each week, sit down and give a serious thought to what situations may come up during the week that could cause you not to exercise. Plan around these.
   
   b. plan ahead for holidays, parties, house guests, those times when your normal routine is disrupted, etc. (if you usually exercise M, W, F but there's something going on Friday, then plan to exercise Thursday.)

2. **internal self-dialogues**: one side is attracted to the urge of skipping exercise and the other side is attracted to remaining an exerciser. Make each side explicit by giving voice to them in the dialogue.

As I said last time, these high-risk situations are inevitable. You can't expect to keep exercising from willpower alone! Unless you are aware of those situations that can threaten your sense of motivation, expect them to occur, and know how to cope with them when they do occur, there's a good chance that continuing to exercise will get more and more difficult. If you can learn to recognize early on that you're leading yourself to a point of not exercising, the early signs can serve as warning signals, saying "use your coping strategies!"

MOST IMPORTANTLY, it is easiest to prevent skipping early on in the chain of events that lead to skipping. For example, let's say your exercise class is right after work. You just left for work and realized that you forgot your exercise clothes. It is the best strategy to immediately go back and get your clothes instead of, say,
Exercise Adherence

promising yourself that you'll get them after work.

Day 10
Handout: the following lists

Things to tell yourself when you want to skip:
1. If I skip this time, it'll be even easier to skip again and I don't want to do that. I really want to stick with it.
2. If I skip, I'll feel bad about myself and start to think that I can't stick with it.
3. Maybe I'll just go to class, and if it's that bad, I can always leave.
4. If I don't skip, I'll feel good about myself and maybe not feel as depressed (or angry, or stressed, etc.) as I do now.
5. This desire to skip is what Lisa said may happen - now is the time of the "journey" to use my coping skills and not rely totally on motivation.

Things to do when you want to skip:
1. Detach yourself from the urge - know that they are normal and that they will pass. Ride the wave, don't crash with it.
2. If you think of positive consequences of skipping, visualize the negative (with help from matrix)
3. Remember that positive benefits of exercise are less tangible compared to the lure of skipping just one day.
4. Make a deal with yourself: if I exercise, I can do ____. Or tell your friend immediately after feeling an urge to skip that you will pay them $100 if you don't go.
5. Review past successes.
6. Review decision matrix and revise, if necessary.
7. Delay making a decision to skip exercise for 20 minutes. This will give you time to pause, reflect and see the behavior as a choice. It also helps to prevent acting impulsively and the high-risk situation may be over.

Day 11
Handout: list of rationalizations

Rationalizations
1. Definition:
Think of a rationalization as an excuse. It's a
defensive thought that tricks us into believing that our decisions are acceptable. If we decide not to exercise, even though we've made the choice to be an exerciser, we are apt to feel guilty or feel as though we have no willpower. This reaction won't occur if we can somehow make it okay that we've decided not to exercise. How do we do this? We rationalize.

2. Examples:
   a. "It hasn't been proven that skipping one day of exercising is bad for your health."
   b. "I've gone so long without exercising, it's probably too late to do anything now."
   c. "It doesn't matter if I don't exercise because I don't have a weight problem anyway."
   d. "If I exercise too much, I may lose too much weight."
   e. "Exercising just seems to be an impossible thing to keep doing."
   f. "I just don't have the time to exercise."
   g. "So, not exercising may be a risk, big deal! So is most of life! I enjoy relaxing and having free time too much to give it up."
   h. "If almost everyone else skips a day, why shouldn't I?"
   i. "Skipping one day won't kill me, I'll just exercise on my own tomorrow."
   j. "I'm feeling really tired, and exercising will just make me more tired."
   k. "I've done so well so far, I deserve a day off."

Day 12

Reactions to skipping that may lead to dropping out:
What I'd like to talk about today is what happens when we do skip a day of exercising and what happens between that day and quitting completely. Remember, when we're really motivated to exercise we don't usually skip. So, when we do start skipping, we can assume that our motivation is weakening. That's OK!! What really matters is how we react to skipping, the things we tell ourselves and what we are assuming about our will-power.

Scenario:
It's 3PM, Friday, and your friend says that she and some of your other friends are going out to happy hour at 5PM and would love to have you join them. Your first thought is that you have exercise class at 5, but then a louder voice says that you really want to go with your friends. You decide to go to happy hour and tell
yourself that you will exercise the next day or something.

Now - we've talked about how this could be considered a high-risk situation. Let's assume that you realized it as such, and you decided not to attempt any coping strategies (like, telling your friend that you'd meet her and your other friends after exercising or that you'd think about it and let her know [letting the urge sit for 20 minutes before deciding]).

There's a inner conflict that develops. On one hand, you're motivated to exercise. On the other, you've just skipped to go drink with some friends. So, which is it? Do you want to exercise or not? If you look at your behavior, it would appear that you must not want to exercise. This kind of conflict very often causes you to feel guilty and to blame yourself for not having enough will-power or effort to stick to something that you really wanted to do.

Humans don't like to feel this sort of conflict and they usually do something to resolve it. So, if a scenario like this occurs often enough and creates this type of conflict, what might likely happen is that you'd decide you just don't have what it takes to keep exercising. At least by thinking this, and not trying to exercise anymore, you won't feel guilty for doing other things. The problem is, deep down your self-esteem has been damaged. In the future, you are discouraged to try to exercise again because you don't think you can be successful.

There is another reaction one can have after skipping exercise. Instead of blaming and criticizing yourself, instead of feeling worthless, you can think of the whole scenario as a learning experience for next time, that you just hadn't learned the right coping strategy to prevent skipping. Remember that this is all part of the journey that has both ups and downs. Think about the scenario - what led up to it, how were you feeling, what types of things were you telling yourself, what could you have done? These are all important questions to ask in order to learn for the next challenge.
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Day 13

Handout: the following lists

**Things to tell yourself after you have skipped:**
1. I made the commitment to become an exerciser and skipping one day doesn't change that.
2. I have exercised ___times and can just continue next ___.
3. Just because I didn't go to the class doesn't mean I am not motivated to exercise. I just need to learn from this and figure out how to avoid it in the future.
4. Skipping once doesn't mean I've lost all the effects from the exercise I've done so far.

**Things to tell yourself after you wanted to skip but didn't:**
1. I did it!
2. I went and I do feel better.
3. It wasn't that bad. Next time I'll know that it's just hard getting started but, once I do, it's not so bad continuing.
4. I'm feeling like I really can exercise forever!
5. I think I'll treat myself to a hot bath.

Day 14

Handout: the following list

**Coping strategies in case you've skipped exercising:**
1. Stop, look, and listen. The first thing to do after you've skipped is to stop what you are doing and thinking, and to look and listen to what is happening. Skipping is a warning signal indicating that you could be in danger. Think of skipping as a flat tire. The first thing for the driver to do is to pull over to a safe place at the side of the road in order to deal with the situation. If possible, choose a "rest stop" or other quiet place where you will not be disturbed or distracted. Then consult your matrix of expectations and list of things to say to yourself after you've skipped.

2. Keep calm. Your first reaction to skipping may be one of feeling guilty and blaming yourself for what has happened. This is a normal reaction and is to be expected. The important thing is to take notice that you are having these feelings and not allow yourself to give in to them or give up control. Simply assume the role of an objective observer and wait until the reaction passes. Just because you skipped once does
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not mean that you are a failure, that you have no willpower, or that you are a hopeless couch-potato. Look upon skipping as a single, independent event, something that can be avoided in the future. A slip is a mistake, an opportunity for learning, not a sign of total failure.

3. Renew your commitment. After skipping, the most difficult problem to deal with is your motivation. You may feel like giving up, saying to yourself, "What's the use—I've blown it already." Again, this is a normal reaction and it can be remedied by the following steps. Think back over the reasons why you decided to start exercising in the first place. Think of the long-range benefits to be gained from this change. Are they worth giving up just because you had a temporary setback? Remember that you are attempting to change your sedentary lifestyle in honor of yourself as a way of caring for yourself, your health, and your life. Look back at how far you have already come in the journey. Reflect optimistically on your past successes, instead of focusing pessimistically on your current setback. Renew your commitment. Your actions are under your control, and you are the master of your fate.

4. Review the situation leading up to skipping. Ask yourself the following questions: What events led up to skipping? Were there any early warning signals that preceded skipping? What was the nature of the high-risk situation that triggered the slip? Ask yourself about the setting, the time of day, the presence or absence of others, your mood at the time, the activities that were going on at the time. Each of these questions may yield valuable information for preventing skipping in the future.

**Next time:**
You will be required to exercise on your own. Please record how long and how hard (according to the chart we used in here) you exercised. Also, I will need to have the name of someone that can verify your report. This is a chance to apply what we have learned so far in this class.
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Day 15

Discussion:

discuss last time, when Ss were required to exercise on their own. How did they plan when to exercise? Did anyone have trouble? Did they feel like skipping? How did they cope?

Adherence Following the Exercise Class

Planning how you are going to continue exercising after this class ends before it is actually over helps you to stick with it, instead of just waiting to see how it goes.

1. join a health club or attend the wellness program here at the U.
2. exercise to T.V. in the morning
3. buy an exercise tape
4. plan in advance with a friend, maybe with someone you've met here (exchange phone #’s today)
5. continue coping strategies

With each of these ideas, think of the advantages and disadvantages. For example, with joining a club it will take a certain amount of money, but there is also access to several types of exercising and it's indoors for cold winter days. If you plan in advance with a friend, having that plan may get you to exercise because you can't "pull out" as easily, but you may also have to compromise on the time and place to exercise.

After thinking of the pros and cons, then make a decision and go with it! It may help to apply what you have learned in this class but, if you keep with it long enough, you'll probably find that you don't need to consciously apply coping strategies. You will automatically do it and, more importantly, deep down, you will just know that you will always exercise.

Next time:

You will be required to exercise on your own. Please record how long and how hard (according to the chart we used in here) you exercised. Also, I will need to have the name of someone that can verify your report. This is a chance to apply what we have learned so far in this class.

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Day 16

Discussion:

discuss last time, when Ss were required to exercise on their own. How did they plan when to exercise? Did anyone have trouble? Did they feel like skipping? How did they cope?

(conduct resting heart rate after subjects fill out questionnaire, time all subjects in 3/4 mile run)
Appendix C

Control Group's "Adventuresome" Tapes


Day 5, 6: Antarctica, Society Expeditions, 3131 Elliott Ave., Seattle, WA, 98121.

Day 7, 8: Natural States: Desert Vision, Marimar Productions.


Day 12, 13: Indonesia and South Pacific, Society Expeditions, 3131 Elliott Ave., Seattle, WA, 98121.

Day 14, 15: Glacier National Park, Holiday Video Library, Box 619, Whittier, CA, 90608.

Day 16: Natural States: Mountain Air, Marimar Productions.
Appendix D

Questionnaire

No Name Needed! Time of class (check one) 8:00 9:00

Please answer the following questions by checking those statements that best apply to how you feel. If any statement does not apply to you, please put NA in the blank before the statement.

___ I enjoyed exercising to the exercise tapes.
___ The class was held at an inconvenient time.
___ I disliked the walking.
___ Those people in my life that I am with the most encouraged me to exercise.
___ I enjoyed the walking.
___ I disliked exercising to the exercise tapes.
___ I would like to use exercise tapes in the future as a way to exercise.
___ I would like to walk as a way to exercise in the future.
___ The class interfered with my schedule.
___ I plan to exercise after the class is completed.
___ Those people in my life that I am with the most encouraged me not to exercise.
___ The class was located in an inconvenient place.

Please give your comments on exercising to the exercise tapes:

Please give your comments on using walking as exercise:
Please rate the instructor, honestly (circle one). Remember, these questionnaires are anonymous!

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What did you like most about the class?

What did you like least about the class?

If you completed the class, what would you say is the main reason you kept coming?

If you dropped out of the class, what would you say is the main reason you did?
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(for control group only)

The adventuresome tapes were (check all that apply):

___ dumb
___ interesting
___ informative
___ took my mind off other things while I watched them
___ bored me
___ other (please specify)

The adventuresome tapes made me feel:

___ relaxed
___ nothing
___ anxious
___ motivated
___ other (please specify)

(for intervention group only)

The information taught on "how to adhere" (check all that apply):

___ was boring
___ was interesting
___ was useful
___ helped me to continue exercising
___ did not help me to continue exercising
___ was taught in a way that I could understand
___ was not taught in a way that I could understand

True or False:

___ I did apply what I learned in the intervention to myself and my own behavior in exercising.

___ It would have been more helpful to have learned the whole intervention before the class started.

Please give any comments that you have about the intervention:
Follow-Up Results

Table 4 presents the percentage of subjects in each group answering either Yes or No to the following questions: 1) Are you exercising more now than before the class?; 2) Has your attitude about exercise changed?; and 3) Do you enjoy exercising more now than before the class?

Table 4.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>Yes</td>
<td>.50</td>
<td>.25</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>.50</td>
<td>.75</td>
</tr>
<tr>
<td>Intervention</td>
<td>Yes</td>
<td>.66</td>
<td>.83</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>.33</td>
<td>.17</td>
</tr>
</tbody>
</table>

Control n=8, Intervention n=6

Subjects whose attitudes about exercise had changed since before the study reported an improvement in their attitudes. Three of the four subjects in the intervention group with improvements in attitudes contributed it to something they had learned from the intervention. Specifically, these subjects stated that they had stopped criticizing themselves and feeling guilty when they did not exercise. Instead, they see exercising more as a choice, rather than a requirement. Additionally, they contributed this attitude change, in part, to having learned that exercising three times a week is enough to gain benefit. Apparently, before the class, they thought exercising daily was required to gain benefit.

Whether subjects enjoy exercise more now or not does not indicate if they enjoyed exercising before the class. For example, several subjects reported that they did not enjoy exercising more now because they had always enjoyed exercising, even before the class when they exercised infrequently.

Table 5 presents subjects' self-reports of their current, average level of exercise according to frequency (times per
Exercise Adherence

week), duration (length of exercise in minutes per exercise period), and intensity (either easy (E), medium (M), or hard (H)).

Table 5.

<table>
<thead>
<tr>
<th>Groups</th>
<th>Subjects' Self-Report</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>frequency</td>
</tr>
<tr>
<td>Control</td>
<td>1  4  2  3  3  3  1  0</td>
</tr>
<tr>
<td></td>
<td>30  30  30  60  17  45  30  0</td>
</tr>
<tr>
<td></td>
<td>M   M   M   M   H   M   M   -</td>
</tr>
<tr>
<td>Intensity</td>
<td>0  0  1  3  3  3</td>
</tr>
<tr>
<td></td>
<td>0  0  60  25  30  45</td>
</tr>
<tr>
<td></td>
<td>-  -  M   M   M   H</td>
</tr>
</tbody>
</table>

Control n=8, Intervention n=6