LOCUS OF CONTROL AND ADHERENCE TO EXERCISE PROGRAMS

by

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Abstract

Many exercise adherence studies have attempted to identify characteristics associated with dropout behavior, however few of these have been grounded in theory. The purpose of this investigation was to examine the relationship between exercise program adherence and the social psychological construct, locus of control. As a multidimensional concept, locus of control may be described as a person's generalized expectancy to perceive reinforcements as being: dependent upon their own behavior or characteristics (internal control); under the control of powerful other people (powerful others control); or the result of forces beyond their control (chance control).

Social learning theory, out of which locus of control developed, emphasizes the importance of measuring reinforcement value along with locus of control when predicting behavior. Consistent with this concept, exercise adherence was expected to be greatest among those who highly value one or more exercise reinforcements (e.g., release of tension) and have an internal locus of control (i.e., a high expectancy that their behavior will result in the reinforcement). In contrast, adherence was expected to be negatively related to the combined effects of reinforcement value and external locus of control (powerful others or chance). A number of demographic, behavioral, and situational factors were also examined in relation to exercise adherence.

The subjects were 61 females (48 registered and 13 drop-in) aged 15-57, (M=28) who had voluntarily elected to participate in

8-12 week aerobic fitness programs. The primary instruments employed in this study were: the Internal, Powerful Others, and Chance Scales; the Exercise Objectives Locus of Control Scales, developed by the investigator; and the Revised Children's Attitudes Toward Physical Activity inventory. Adherence data were determined from class attendance sheets.

Findings suggest that locus of control measures combined with values held toward physical activity are not very strongly related to exercise program adherence. Results of stepwise multiple regression analyses revealed that two attitudes were the best predictors of exercise adherence. In general, those subjects who, at the outset of the program, had a less positive attitude toward participating in physical activity for continuing social relations and a more positive attitude toward participating in order to reduce stress and tension--tended to have a higher percent attendance.

Findings also indicated that there is no statistically significant relationship between exercise adherence and any of the following variables: age, percent leisure time activity, smoking, employment status, nonleisure exertion, spouse support, family support, enrolling with or without a friend, previous number of program enrollments or completions, sports participation, previous individual exercise habits, social desirability, exercise goals, expected success and success in goal attainment.

Implications of these results and suggestions for future adherence studies were discussed.

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Introduction

Concern over high rates of attrition in adult exercise programs has given rise to numerous adherence studies, many of which have attempted to identify characteristics associated with dropout behavior. Unfortunately, most of these investigations have been guided more by philosophical speculation than by theory. The use of conceptually relevant social psychological theories in the study of exercise adherence may provide a more basic and complete understanding of the behavior, which in turn could serve as the basis for more effective interventions to facilitate adherence. The purpose of this investigation was to examine the relationship between exercise program adherence and the theoretical construct, locus of control.

Locus of control was originally conceived (Rotter, 1966) as a person's generalized expectancy to perceive reinforcements as being either dependent upon one's own behavior (internal control), or contingent upon forces beyond one's control (external control). More recently, the work of Levenson (1974, 1981) has indicated that locus of control may be more accurately described as a multidimensional concept, wherein people perceive that reinforcements are: dependent upon their own behavior or characteristics (internal control); under the control of powerful other people (powerful others control); or the result of forces beyond their control (chance control).

In order to predict behavior, locus of control may be measured either as a generalized reinforcement expectancy, or as a situation specific expectancy. The relative importance of

these expectancies is dependent upon the amount of experience a person has in a particular situation. Generalized expectancies are more important in situations that are novel, while specific expectancies are more important in familiar situations (Rotter, 1975).

The locus of control construct developed out of social learning theory (Rotter, 1954; Rotter, Chance, & Phares, 1972). This theory postulates that the potential for a behavior to occur is a function of both the expectancy that the behavior will lead to a reinforcement and the value of that reinforcement (Rotter, 1975). Consistent with this concept, exercise adherence is expected to be greatest among those who highly value one or more exercise reinforcements (e.g., release of tension or fitness) and have an internal locus of control (i.e., a high expectancy that their behavior will result in the reinforcements).

Initial support for the efficacy of this theoretical model has been obtained in an exercise adherence study (Dishman & Gettman, 1980) which used the Health Locus of Control (HLC) Scale (Wallston, Wallston, Kaplan, & Maides, 1976), along with a measure of health and fitness value (Kenyon, 1968a). Results showed no significant difference between adherers and dropouts based solely on HLC scores. However, when median splits of the HLC scores were combined with median splits of health and fitness value scores, it was found that subjects with an internal locus of control and high health and fitness value scores were significantly more likely to adhere than subjects

with an external locus of control and low health and fitness value scores.

Use of a health specific locus of control scale in the previously mentioned study was based on the assumption that health is the primary reinforcement of exercise. Although this assumption may be true, some individuals may perceive that other exercise reinforcements are just as important or even more important than health (e.g., looking better, feeling better, etc.). As a result, it may be possible to achieve a stronger relationship between locus of control and adherence using a locus of control instrument which takes into account the multiple reinforcements associated with exercise. Such an instrument could be either: a generalized locus of control measure, in which case the numerous reinforcements of exercise would not matter; or a specific exercise reinforcement locus of control measure, in which case the reinforcements of exercise would be the focus of the inventory.

Although no mention has been made of generalized locus of control measures in studies of exercise program adherence, results of related studies demonstrate the potential usefulness of such measures. Significant positive relationships have been found between internal locus of control and adherence to women's intercollegiate sports (Moore, 1980), and to participation in physical activity (Bonds, 1980; Sontroem & Walker, 1973).

Little evidence exists regarding the use of exercise specific locus of control measures in connection with exercise adherence. However, one such inventory, the Exercise Locus of

Control Scale (EXLOC), was developed (Noland, 1981) and used to examine the exercise behavior of women (N=215) in two age groups (25-45 yrs, 46-65 yrs). The findings for the older group showed a significant positive relationship between internality and exercise behavior, and a negative relationship between exercise behavior and the Chance and Powerful Others scales. While the title of this exercise specific inventory and the findings of Noland's study suggest that the EXLOC may be appropriate for examining locus of control in an exercise adherence study, closer inspection of the instrument reveals that the scales are aimed at people's perceptions of what controls their exercise behavior, rather than their perceptions of what controls their reinforcements. In other words, the EXLOC does not conform to the basic assumption that locus of control is a reinforcement expectancy variable. Consequently, it was deemed necessary to develop and test a more theoretically sound exercise specific inventory.

The main objective of this study was to examine the relationships between exercise program adherence and the combined effects of values held toward physical activity and locus of control--using a generalized measure (Levenson's Internal, Powerful Others, & Chance [IPC] Scales), and a specific exercise reinforcement locus of control measure (Exercise Objectives Locus of Control [EOLOC] Scales, which was developed by the author). It was hypothesized that adherence would be positively related to the combined effects of locus of control and values held toward physical activity, when locus of

control was measured by the Internal scales of the IPC and EOLOC inventories. In addition, it was expected that adherence would be negatively related to the combined effects of locus of control and values held toward physical activity, when locus of control was measured by the Powerful Others and Chance scales of the IPC and EOLOC inventories.

Supplementary objectives of the study included: testing the psychometric properties and potential efficacy of the newly developed EOLOC Scales; and assessment of a variety of factors which have been found to be related to adherence in other studies (e.g., social support, goal attainment, previous behavior). The exercise behavior of dropouts and adherers subsequent to their quitting or completion of the program, and dropout's attributions of their reasons for quitting were also examined.

Review of Literature

Locus of Control

Theoretical Background

Locus of control is an expectancy variable derived from social learning theory (Rotter, 1954, 1966; Rotter et al., 1972); a personality theory that integrates the stimulus-response theories and cognitive theories of social psychology. In social learning theory, "the general formula for behavior is that the potential for a behavior to occur in any specific psychological situation is a function of the expectancy that behavior will lead to a particular reinforcement in that situation and the value of that reinforcement" (Rotter, 1975, p. 57).

Underlying the social learning model of behavior are several important assumptions (Rotter, 1966, 1975). Most basic of these is the idea that a reinforcement serves to increase one's expectancy that a certain event or behavior will result in that same reinforcement in the future. Second, a reinforcement that is perceived as being related to one's own behavior will increase expectancy more than a reinforcement that is seen as being related to external forces. As a result, individual's develop different beliefs about control of reinforcements based on their own experiences. Third, when a person perceives situations as similar, his or her expectancies about reinforcement will generalize somewhat across situations. Finally, it is postulated that people have situation specific expectancies which act in conjunction with generalized

expectancies to determine behavior.

The locus of control construct was originally seen as a generalized expectancy regarding the degree to which people believe that their reinforcements are dependent on their own behavior or upon forces external to them. This conceptualization prompted the development of Rotter's (1966) Internal-External (I-E) control scale, which has highly influenced research on the locus of control construct and the development of subsequent scales (Strickland, 1977).

More recently, a multidimensional generalized instrument has been developed. The Internal, Powerful Others, and Chance (IPC) Scales (Levenson, 1974) differ from the I-E scale in that the external orientation has been split into two dimensions, powerful others and chance. This split was based on the idea that those who believe their reinforcements to be controlled by powerful people behave differently than those believing the world is unpredictable and unordered. In the former case, there is at least potential for control (Levenson, 1981).

Locus of control can also be seen as a situation specific expectancy. The Health Locus of Control Scale (Wallston et al., 1976) and the Multidimensional Health Locus of Control Scales (Wallston, Wallston, & deVellis, 1978), for example, were developed to measure beliefs in control of health reinforcement. While specific to health, these scales are still relatively generalized expectancy measures, cutting across a variety of behaviors and health related settings. A number of more specific expectancy measures have also been developed. Examples

of these include the Weight Locus of Control Scale (Saltzer, 1978) and the Exercise Locus of Control Scale (Noland, 1981), which purport to measure beliefs in weight control and exercise reinforcements respectively.

The usefulness of generalized and specific expectancy measures varies in importance depending on the level of predictability required. A generalized measure allows prediction in a wide range of situations, but at a low level. In situations where predictability is of prime importance, specific measures of expectancy may be more beneficial (Phares, 1976; Rotter, 1975). Since increased predictability in the area of exercise behavior may provide important clinical advantages for improving adherence, the need exists for an exercise specific locus of control measure.

As mentioned previously, measures of locus of control expectancies combined with reinforcement value measures should, according to social learning theory, contribute to the prediction of a behavior. This notion has been examined in relation to exercise adherence and exercise participation.

Exercise Adherence

The studies which have attempted to predict exercise adherence using a locus of control measure have been largely unsuccessful. However, these studies have had problems of a theoretical, methodological or statistical nature. Dishman, Ikes and Morgan (1980) conducted a 20-week exercise adherence study involving 66 adult males. A number of psychological variables, including health locus of control were examined,

however, only self-motivation was found to be significantly related to adherence. The failure of health locus of control to discriminate between adherers and dropouts may have been due to several factors. First, the subjects were not a homogeneous population in terms of health; 45 were apparently healthy, while 21 were suffering from coronary heart disease. As a result the health locus of control orientation of these two groups may have been different. Second, use of a health specific locus of control measure presupposes that everyone views physical activity as a health behavior, whereas some may feel that the primary reinforcement of exercise lies in other realms, such as social experience or catharsis. As a result, the HLC Scale can only be expected to predict exercise behavior when health is the primary value associated with the activity. Third, a measure of reinforcement value was not included with locus of control when the data were analyzed; a step which is postulated as essential when attempting to predict behavior using this concept (Rotter, 1975). Some support for the validity of these latter two criticisms was supplied when Dishman and Gettman (1980) reanalyzed this data by combining median splits for the HLC Scale with median splits of health and fitness value scores. Results showed that subjects with an external locus of control and low health and fitness value scores were less likely to adhere, 52.4% (11 out of 21), than subjects with an internal locus of control and high health value scores, 81.8% (18 out of 22).

O'Connell and Price (1982) used the Multidimensional Health

Locus of Control Scales in an attempt to identify differences between participants, dropouts, and nonparticipants in a 10-week corporate fitness program. Although, it was reported that the one-way analysis of variance was significant for scores on the Internal Scale, in fact significance was not obtained at the $p < .05$ level. Possible reasons for this result include: the use of a health specific expectancy measure, lack of a measure of reinforcement value, and absence of an analysis by sex--even though there were 102 females and only 19 males.

Two studies which have assessed the relationship between locus of control and adherence to sports have achieved equivocal results. In a study assessing the differences in locus of control orientation between college women athletes in team sports versus individual sports, Moore (1980) made a corollary discovery. Using the IPC Scales it was found that athletes who continued to play their sport through the competitive season scored significantly higher on the Internal scale than those who dropped out. In contrast, Sonstroem and Kampper (1980) found no significant relationship between scores on Bialer's (1961) locus of control scale (a scale designed for children) and adherence to flag-football or cross-country running among grade seven and eight boys. However, in a follow-up interview many dropouts reported that they had volunteered initially as a result of peer pressure and had subsequently quit because of their involvement in other athletic events or school activities.

Participation in Physical Activity

The relationship between locus of control and reported

physical activity participation has been studied by a number of investigators. Results have generally shown a positive relationship between these two factors.

In the Sonstroem and Walker (1973) study, Rotter's I-E scale and Kenyon's (1968b) Attitude Toward Physical Activity (ATPA) inventory were examined in relation to cardiorespiratory fitness and reported voluntary exercise. The sample of 102 males was divided into four groups by combining median splits of the I-E scores with median splits of the ATPA scores. It was found that internal subjects with more favorable attitudes toward physical activity reported greater amounts of voluntary physical exercise and obtained significantly better fitness scores than the rest of the sample.

Bonds (1980) examined the relationship between the I-E scale and several aspects of behavior in a sample of 69 women and 31 men, aged 65-86. Internal locus of control was found to be positively related to the number of reported hours of recreational exercise engaged in per week.

Noland (1981) studied the relationship between participation in regular, vigorous exercise and several factors, including: exercise locus of control; attitudes toward physical activity; values held toward health, physical appearance, and physical fitness; and perceived barriers to exercise. The sample which comprised 215 women from a number of women's clubs, was divided into 2 age groups. In the 46 to 65 year old age group, findings revealed positive relationships between reported exercise behavior and internality on the EXLOC Scales, attitude

toward physical activity, and physical fitness value. Negative relationships were discovered between exercise behavior and the Chance and Powerful Others scales of the EXLOC. In the 25 to 45-year age group, exercise behavior was found to be positively related to attitude toward physical activity, health value, and physical fitness value. A negative relationship was reported between exercise behavior and perceived barriers to exercise.

In a recent study of 70 women (aged 24-65), Laffrey and Isenberg (1983) examined the relationship between internal health locus of control (using the Internal Scale of the Multidimensional Health Locus of Control Scales) health value, perceived importance of exercise, and reported amount of participation in leisure-time physical activity. Results of the study revealed a significant positive relationship between amount of physical activity during leisure and perceived importance of physical activity. However, the relationships between amount of leisure-time physical activity and Internal Health Locus of Control or health value were not significant at the $p<.05$ level. When the combined effects of internal locus of control, health value, and perceived importance of physical activity were examined using a stepwise multiple regression procedure, practically all of the variance in amount of physical activity during leisure was explained by perceived importance of exercise. The failure of health locus of control and health value to predict exercise participation in this case, may be attributable to the use of health-specific measures. That is, the women in the sample may not have perceived leisure exercise

as being primarily a health promoting modality.

Several researchers have examined the relationship between generalized locus of control and actual participation in competitive sports. Results have consistently demonstrated no significant difference in generalized locus of control orientations between athletes and nonathletes (Di & Raymond, 1973; Gilliland, 1974; Kildea, 1980; Lynn, Phelan, & Kiker, 1969; McKelvie & Huband, 1980). An exceptional finding was reported by Morris, Vaccaro, and Clarke (1979) in a study of 20 competitive swimmers, aged 7 to 17. Results showed that these swimmers were more internal, as measured by the Children's Locus of Control Scale, than published norms for their nonathletic peers. Possible explanations for this contrasting discovery include: the use of norms rather than a control group, the large age range of the sample--comprising both children and adolescents, and the use of a children's scale. The previously mentioned studies all used high school and college samples together with generalized adult locus of control measures.

In general, results to date indicate that among adults a positive relationship exists between internal locus of control and self-reported participation in physical activity; whereas among high school and college students there is no relationship between locus of control and sports participation. Further research is required in order to gain a better understanding of these seemingly contradictory findings.

Behaviors Related to Exercise Adherence

In order to gain a broader understanding of the

relationship between locus of control and exercise adherence, it is useful to examine the results of studies which have used locus of control measures to assess such related behaviors as compliance to medical regimens or weight reduction programs.

Medical Compliance. A number of investigators have focused on the relationship between health locus of control beliefs and compliance to medical regimens (e.g., diet control, medication taking, appointment keeping). Although a few studies have demonstrated a positive relationship between internality and desired behaviors, more investigators have shown medical compliance to be related to external beliefs (Wallston & Wallston, 1981). This relationship between compliance and externality would make sense if the external construct being measured was powerful others, but most studies have used the unidimensional Health Locus of Control scale which includes only one powerful others item. Thus, it seems that the relationship between medical compliance and locus of control requires further study.

Weight Reduction. Studies by Balch and Ross (1975) and Wallston et al., 1976) have found a relationship between locus of control orientation and success in different types of weight reduction programs. This indicates that self-control and group weight reduction programs may be more effective for internal and external subjects respectively.

The results of three studies have shown no relationship between locus of control orientation and successful weight loss (Monahan, 1972; Tobias & MacDonald, 1977; Wallston, et al.,

1976). One possible explanation for these results is the lack of specificity of the expectancy measures used. All three studies used Rotter's generalized I-E scale, while Wallston et al. also used the HLC scale. This specificity argument is weakened somewhat by the fact that Tobias and MacDonald also utilized a weight specific locus of control scale. Recently however, Saltzer (1978) developed a weight-loss specific scale which has been successful at predicting weight reduction.

Saltzer (1982) administered the Multidimensional Health Locus of Control (MHLC) Scales and the Weight Locus of Control (WLOC) Scale along with a health and physical appearance value survey, to 115 female subjects voluntarily beginning a medical weight reduction program. Subjects were categorized as those who remained at least 6 weeks--attending regularly for 39 days or more (completers), and those who dropped out in less than 6 weeks (noncompleters). Median splits were used to divide subjects into internals and externals on the various locus of control scales and to differentiate between those with high or low values on health and physical appearance. The analysis revealed that subjects categorized as internal on the WLOC scale were more likely to be completers than were WLOC externals. No relationship was found between the MHLC scales and program completion. It was also found that WLOC internals who placed a high value on health or physical appearance were more successful in achieving their weight loss goals than were WLOC externals. Furthermore, the highest correlation between the intention to lose weight and actually losing weight was obtained by WLOC

internals who placed a high value on physical appearance rather than health. Saltzer interpreted this latter finding as an indication that for some people health may not be the most influential weight loss reinforcement. This idea may also explain the failure of the health specific MHLC and HLC scales to predict adherence or weight loss.

Smoking Reduction. Numerous studies have assessed the relationship between smoking and generalized locus of control. In general, these investigations have shown that nonsmokers and individuals who were able to stop smoking were more internal than smokers (Strickland, 1978).

Several studies have used health locus of control measures to predict success in reducing smoking in behaviorally-oriented smoking cessation programs. Kaplan and Cowles (1978) found that HLC internals with high health values were more successful than other subjects in reducing smoking over a 15-week treatment period and in maintaining this behavior change over a 3 to 5.5 month followup period. Similarly, Wildman, Rosenbaum, Framer, and Johnson (cited in Wallston & Wallston, 1981) showed that HLC internals smoked significantly less than HLC externals at the end of a 7-week program and throughout a 21-month followup period. In a study using the MHLC scales, Shipley (cited in Wallston & Wallston, 1981) found smoking abstinence six months after treatment to be related to high scores on the Internal scale and low scores on the Chance scale.

Preventive Health Behaviors. The results of a number of studies have demonstrated positive relationships between

generalized internal locus of control and preventive health behaviors such as going to the dentist for check ups, obtaining immunization, wearing seat belts, and practicing birth control (Strickland, 1977, 1978). In contrast, several studies using health locus of control measures have failed to substantiate the expected relationship between internality and health maintenance or preventive behaviors (Wallston & Wallston, 1981). The results of some of these studies may have been more predictive if the investigators had included measures of health value in their analyses.

Change in Locus of Control Orientation Over Time

A number of studies have examined changes in locus of control orientation as a result of physical activity. This is an important factor to take into account when examining the test-retest reliability of a locus of control measure--using scores obtained prior to and following a program of physical activity.

Changes in locus of control orientation in an internal direction have been reported in two 12-week exercise studies. Jeffers (1977) found that the I-E scores of 100 university students (50 male and 50 female) were significantly lower (more internal) following participation in a 12-week physical conditioning class. Among the male participants, changes in I-E score were also significantly different from the changes in the control group (n=50). In a rather complex behavioral intervention study with a very small sample comprising 6 post-infarct male subjects (3 Type A personalities and 3 Type B

personalities), it was found that the Health Locus of Control scores of the Type B's became significantly more internal following a 12-week cardiac rehabilitation program (Wellwood, Kennedy, & Sharratt, 1982).

Several studies have failed to show a change in locus of control orientation following a period of exercise participation. Howley (1982) found no change in health locus of control scores among 31 disabled and able-bodied subjects following a 3-week training program. Generalized locus of control, as measured by the Adult Nowicki-Strickland Internal-External Control Scale, remained unchanged by exercise in both a 6-week study of 45 coronary heart patients (Cunningham, 1980), and in a 10-week study of 54 unfit students in jogging and volleyball classes (Blackinton, 1981). Similarly, the results of a study by Wieman (1980) failed to support the hypothesis that subjects (N=63) in a jogging class would experience a change in locus of control in an internal direction.

The findings of these studies have been inconsistent, a result which may be attributable to the use of generalized locus of control measures, as well as diverse time periods, samples and sample sizes. Further research is necessary before any conclusions can be drawn on whether or not locus of control orientation changes as a result of physical activity. Such research might benefit from using an exercise specific expectancy measure, which would theoretically (Rotter, 1975) be more sensitive to change in an exercise setting than would a

generalized instrument.

The relationship between locus of control orientation and chronological age has been studied by a number of investigators. In a study using Rotter's I-E scale, Lao (cited in Levenson, 1981) found that personal efficacy increased from youth to adulthood and did not decrease significantly in middle or old age. These findings were extended by Ryckman and Malikioski (1975) in a study using Levenson's IPC scales. The sample consisted of 100 college students (aged 17-20) and 383 adults (aged 21-79). The results showed that the college students were less internal than the adults, although this difference was not significant for the oldest age group (70-79). Adults in their fifties had the highest belief in control of powerful others, while the septuagenerians were least likely to believe that other people were in control of their lives. Subjects in the 30 and 40 year age groups scored lower on the Chance scale than people who were either older or younger. This indicates perhaps that the 30 and 40 year olds felt their lives were more predictable and stable than the other age groups did.

Since there appears to be some relationship between age and locus of control orientation, this is a variable that should be taken into account when dealing with a sample of varying ages.

Additional Exercise Adherence Research

Much of the research concerned with exercise program adherence has sought to identify characteristics and situational factors which distinguish dropouts from adherers. A review of the variables most pertinent to this study is provided in the

following discussion.

Psychological Factors

Attitude. Attitudes toward exercise have been measured in a number of adherence studies using a variety of standardized and subjective questionnaires. In general, the standardized measures of attitude have shown little or no relationship with adherence, while self-ratings of attitudes have demonstrated a positive relationship with adherence.

Sonstroem (1978) developed the Physical Estimation and Attraction Scales to assess one's attraction to physical activity and one's estimation of achieving personal success in the activity. These scales have been unsuccessful in predicting adherence among 66 adult male exercisers (Dishman & Gettman, 1980) or among 181 grade seven and eight male athletes (Sonstroem & Kampper, 1980).

In a study involving 639 subjects from a cardiac rehabilitation program, Andrew et al. (1981) found that the dropout rate was greater among those who were not enthusiastic about the program and/or did not have a strong belief in the value of exercise for their health. Ho et al. (1981) reported that adherence was significantly predicted by positive ratings of elementary school physical education experiences, in a group of 48 males.

Based on a conceptual model characterizing physical activity as having a number of dimensions, Kenyon (1968a, 1968b, 1968c) developed an inventory to assess attitudes toward

physical activity as: a social experience (providing a medium for social interactions), health and fitness (contributing to one's health and fitness), the pursuit of vertigo (providing an element of risk or thrill), aesthetic experience (providing a medium for experiencing beauty in movement), catharsis (providing a release of tension), an ascetic experience (demanding long and hard training and delayed gratification), and as chance (possessing an element of luck). Among men, Kenyon's ATPA inventory does not appear to differentiate between exercise adherers and dropouts (Dishman & Gettman, 1980; Massie & Shephard, 1971; Shephard & Cox, 1980). However, among 191 women, Shephard and Cox found that dropouts placed significantly less value on catharsis and higher value on exercise as a game of chance, than did high adherers. There has also been some indication that subdomains of ATPA may predict adherence when combined with a measure of locus of control (Dishman & Gettman, 1980). This finding will be examined further in this study.

Motivation. Motivation appears to be an important factor in adherence. Low motivation is commonly cited by dropouts as one of their main reasons for discontinuing participation in exercise programs (Bruce, Frederick, Bruce, & Fisher, 1976; Faulkner & Stewart, 1978; Oldridge, Wicks, Hanley, Sutton, & Jones, 1978; Stovel, Bailey, & Cumming, 1970). Self-motivation as measured by the Self-Motivation Inventory (Dishman & Ikes, 1981) has proven successful in distinguishing between dropouts and adherers in a group of 64 female intercollegiate rowers (Dishman et al., 1980) and among 66 men in 20-week medically

prescribed exercise programs (Dishman & Gettman, 1980). This finding has been supported by the results of two studies which have used alternate motivation measurement instruments. Massie and Shephard (1971) reported that dropouts from a 28-week course of regular exercise (n=52) scored significantly lower on the Shephard Motivation Quiz than did adherers. Snyder, Franklin, Foss, and Rubenfire (1982) in a study involving 160 subjects, found poor compliance in cardiac rehabilitation programs to be associated with a low motivation index.

Since internal locus of control has been found to be related to a number of characteristics often associated with motivation, such as goal-directed behavior, achievement behavior, taking full advantage of situations, and delaying gratification (Strickland, 1977), it was deemed redundant to measure or control for motivation in this study.

Goal attainment. Another seemingly important adherence factor is the setting and attainment of exercise objectives. Following a survey of 254 dropouts from a company exercise program, Danielson and Wanzel (1977) reported that those participants who did not attain their exercise goals, dropped out at a significantly faster rate than those who did. Related to this, Ho et al. (1981) found that exercise adherence among 81 males was positively correlated with setting long-term goals, and negatively correlated with the likelihood of quitting with unmet expectations. Consequently, it appears that goal attainment is an important variable to measure or control in studying adherence.

Personality. In general, studies have been unable to establish a systematic relationship between personality characteristics and exercise adherence. Contrasting results have been found with respect to social introversion-extroversion, anxiety, and self-image (Blumenthal, Williams, Wallace, Williams Jr, & Needles, 1982; Ho et al., 1981; Massie & Shephard, 1971; Shephard & Cox, 1980).

Several studies have examined the effect of Type A versus Type B personality on exercise adherence. Oldridge et al. (1978) reported that dropouts from a four-year cardiac rehabilitation program (N=163) tended to have a Type A personality pattern, characterized by ambition, aggression, competitiveness, and a chronic sense of time urgency. However, this result has not been supported by the findings of several other studies (Shephard & Cox, 1980; Snyder et al., 1982; Wellwood, Kennedy, & Sharratt, 1982). The discrepant findings characterizing the literature dealing with the relationship between exercise adherence and personality variables may be a result of several factors, including the use of a variety of standardized instruments, subjective measures, and differing samples (e.g., healthy versus cardiac rehabilitation patients). Alternatively, it may be that personality traits are not useful predictors of adherence behavior. Regardless, the inconsistency of this approach precludes the necessity of measuring or controlling for such factors in this study.

Behavior and Demographics

Smoking appears to be related to exercise adherence. It

has been found to predict fitness program dropouts among both healthy exercisers (Massie & Shephard, 1971) and cardiac rehabilitation participants (Oldridge, 1979; Oldridge & Jones, 1981; Oldridge & Spencer, 1983; Oldridge et al., 1978).

The relationship between socioeconomic status and adherence has been examined by a number of researchers, however, the results have been inconsistent. Snyder et al. (1982) found that compliance to a cardiac rehabilitation program was unaffected by blue or white collar status; whereas other studies (Oldridge, 1979; Oldridge & Jones, 1981; Oldridge & Spencer, 1983) reported that more dropouts than adherers were blue collar workers. A study by Friedman and Hellerstein (1973) showed that adherence rate was inversely correlated with annual income among 173 upper-middle class Jewish businessmen and professionals.

Findings of several studies have indicated that poor compliance among cardiac exercise program participants is related to being inactive during leisure time (Oldridge, 1979; Oldridge & Jones, 1981; Oldridge & Spencer, 1983; Snyder et al., 1982).

The relationship between exercise adherence and registration fees has received little attention. Massie and Shephard (1971) found that adherence was much greater in a YMCA class (52.6%) where participants paid a fee of $60.00, than in an individual program (18.2%) the cost of which was a $1.00 copy of a book. However, it is not known whether this adherence discrepancy was a result of financial incentive in the YMCA group, lack of support in the individual group, or some other

spurious factor.

Since previous behavior would seem to be a logical predictor of present behavior, it is surprising that in a study involving 362 males, Dishman (1981) found no relationship between self-reported previous involvement in physical activity and program adherence. This contrasts with the finding of Snyder and Baber (1979) that former college athletes (n=233) demonstrated more interest and involvement in sports and physical activity than former nonathletic students (n=190).

Situational Factors

Social Factors. Andrew et al. (1981) reported that cardiac rehabilitation participants who felt their spouses were indifferent or negative toward the program were three times more likely to dropout than those who felt spouse support. Similarly, in a study involving 195 men, Heinzelmann and Bagley (1970) found that exercisers with supportive spouses were twice as likely to have good adherence as those with unsupportive spouses. Faulkner and Stewart (1978) reported that, following a 10-week exercise program, female subjects (N=149) commonly cited in a questionnaire that spouse and friend influence were important for adherence.

Two studies have reported significantly lower adherence rates among those exercising alone than among group participants (Massie & Shephard, 1971; Wilhelmsen et al., 1975). Heinzelmann and Bagley (1970) found that almost 90% of 195 exercisers indicated that they preferred to exercise with others. Related to this, findings of a study involving 302 males and 58 females,

showed that support was significantly predictive of exercise activity level 12 months after coronary artery bypass surgery (Knapp, Gutmann, Squires, & Pollock, 1983).

Program Factors. The convenience and accessiblity of the program setting seem to be important adherence factors. Andrew et al. (1981) found that the dropout rate in a longitudinal (seven year) study was greater among those who felt that the exercise center was inconveniently located and found parking difficult. This result was supported by an earlier finding that subjects (N= 1708) who indicated a willingness to participate in exercise programs lived nearer the facilities than those unwilling to participate (Teraslinna, Partanen, Oja, & Koskela, 1970). Program dropout rates have also been greater among participants who found it difficult to attend on time (Andrew et al., 1981), or did not like the training time (Mann, Garrett, Farhi, Murray, & Billings, 1969).

The relationship between program personnel and exercise adherence has rarely been reported. Andrew et al. (1981) found that more dropouts than adherers felt that they had received little individual attention and that the program staff were impersonal and unreceptive.

Although the behavioral, demographic, and situational factors mentioned in the above discussion lack the explanatory power of theoretically based variables, they are nevertheless of interest to measure in relation to exercise adherence.

Exercise Adherence Rates and Measurement

In order to determine average dropout and attendance rates,

as well as methods for measuring adherence, 35 exercise adherence studies, including 14 involved with healthy subjects and 21 dealing with coronary heart disease patients, were reviewed.

Among the studies which used healthy samples (e.g., Faulkner & Stewart, 1978; Massie & Shephard, 1971), the dropout rates ranged from 9% to 75%, with a mean of 33% (over an average time span of eight months). Twenty cardiac rehabilitation studies (e.g., Blumenthal et al., 1982; Bruce et al., 1976) reported dropout rates ranging from 3% to 87%, with a mean of 44% (over an average time period of 26 months). Average percent attendance which was reported in six studies of healthy subjects ranged from 42% to 80.5%, with a mean of 59%; whereas among five cardiac studies, the mean attendance rate was 73%, with a range of 58.5% to 85%.

Information on the methods used for determining adherence was gathered from 22 studies. Of these, six studies placed subjects in adherence categories based on subjective inspections of attendance data, eight described dropouts as those who stopped attending any time prior to completion of the program, and eight defined dropouts according to some predetermined attendance criteria. The inconsistency of adherence measurement techniques across studies makes comparison of findings difficult and may contribute to the equivocal results often obtained in adherence studies. Adherence measurement is an area that needs to be examined in future research.

Method

Subjects and Setting

The subjects were 61 females, aged 15 to 57 (M=28), who had voluntarily elected to participate in 8-12 week fitness programs offered at various schools and community centers throughout the Greater Vancouver and Fraser Valley areas. These coeducational programs were sponsored by a local fitness organization which maintains uniformity of instruction, content, and level of difficulty across programs. Subjects were taken from 14 programs, which met two or three times per week for one hour. Registered participants (n=48) were required to pay a fee of $1.50 per class, while drop-in (n=13) participants paid $2.00 per class. The programs were designed to increase cardiovascular endurance, flexibility, strength, body awareness, and movement control. Each class also featured a warm-up, cool-down, and some exercises considered beneficial for the back.

Measures

Two locus of control instruments were used. Generalized locus of control was measured using Levenson's Internal, Powerful Others, and Chance (IPC) Scales (1974, 1981), while exercise specific locus of control was assessed by the Exercise Objectives Locus of Control (EOLOC) Scales, developed by the researcher (Appendix A). Values held towards exercise were measured using the Revised Children's Attitudes Toward Physical Activity (CATPA) Inventory (Schutz, Smoll, & Wood, 1981a). A measure of social desirability was obtained using a shortened

version of the Marlowe-Crowne Social Desirability Scale (Crowne & Marlowe, 1960), called the M-C 1(10) scale (Strahan & Gerbashi, 1972). This measure tested whether or not the EOLOC Scales were contaminated by social desirabilty. The recently developed Causal Dimension Scale (Russel, 1982) was used to determine the locus of causality, stability, and controllability of the reasons dropouts gave for discontinuing participation in the program. A detailed description of each of these measures is provided in Appendix B.

Adherence data were determined from class attendance sheets maintained by the program instructors. Drop-in participants were required to sign one of these sheets each time they attended a class. Registered participants were asked to sign an attendance sheet in some programs, while in others the instructor checked off the dates which they attended. All attendance records were forwarded to the head office where they were made available to the researcher.

Procedure

Prior to the start of the fitness programs, instructors were given packages containing the first questionnaire, a covering letter, a pencil, and a prestamped envelope bearing the address of the investigator (Appendix C). The instructors were asked to distribute these packages to registered participants who had not previously been enrolled in the program nor been following a regular regimen of physical activity over the last year. Neither the instructors nor the subjects were informed that adherence was the focus of the study.

The covering letter which accompanied each questionnaire comprised a brief description of the study, an informed consent form, and general instructions on how to complete and return the questionnaire. Subjects were asked not to collaborate with others when completing the questionnaire, and assurances were made that all data would be kept strictly confidential. A summary report of the study results was offered as a small reward for participation.

The first questionnaire consisted of six sections. The first section pertained to demographic and behavioral factors such as: age, sex, smoking habits, leisure and work activity, employment status, spouse and family support, and previous exercise behavior. This was followed by the IPC Scales, Revised CATPA Inventory, and the M-C 1(10) Scale. Subjects were then asked to list the goals they most wanted to achieve, (to a maximum of three), and to rate on a 5-point Likert-type scale their expectancy of successfully obtaining each of them. The EOLOC Scales made up the final section of this 13-page questionnaire.

A total of about 120 questionnaires were distributed. In order to promote more candid responses, subjects were not requested to put their names on the questionnaires. However, since names were needed in order to trace subjects' daily attendance, the instructors were requested to record the name, telephone number, and questionnaire number of each subject.

Two to three weeks following termination of the fitness programs, the researcher contacted by telephone, 63 of the 66

subjects for whom names were available. The other three could not be reached because telephone numbers were not provided. Those who were contacted were asked if they would complete a followup questionnaire. Sixty-two subjects agreed to this request, and a package containing the second questionnaire was subsequently mailed to each of their homes. Once again, a covering letter, pencil and return stamped envelope were included in the package. One month later, those subjects who had not returned the second questionnaire were called and reminded to do so.

The followup questionnaire comprised three parts (Appendix C). The EOLOC was included in order to obtain a measure of the test-retest stability of locus of control orientation as measured by this instrument. The exercise goals that each subject had recorded in the first questionnaire were provided and subjects were asked to rate how successful they had been at achieving these goals. Finally, a distinction was made between dropouts and adherers--by asking subjects whether or not they had continued to attend classes until the program terminated. Both groups were then asked questions about their subsequent exercise behavior. In addition, those who had not finished the program were asked to identify the main reason they had stopped attending and to rate this reason on the Causal Dimension Scale.

Data Analysis

In keeping with the exploratory nature of this study exercise adherence was measured using three methods. In the first method subjects were divided into three groups based on

the percentage of classes attended out of the total number of possible attendances. These groups were broken down according to the following classification: low attendance (under 50%), moderate attendance (50%-74%), and high attendance (over 74%). These cut-off percentages were chosen to yield approximately equal group sizes. Since a number of previous studies (e.g., Dishman & Gettman, 1980; Massie & Shephard, 1971) have categorized adherers and dropouts according to whether or not they attended until the end of their program, a second method of measuring adherence was used in which subjects were classified into three groups according to their attendance during the final six fitness classes in their program. One group consisted of those who did not attend any of the last six classes. The second group included subjects who attended more than one and less than six of the last classes. The third group comprised those individuals who attended the last class of the program and at least three other classes of the final six. These groups were so chosen because it was felt that there was a difference in degree of commitment to exercise between these classifications.

The third technique used for measuring adherence was percent attendance (based on the number of classes attended out of the total number possible) measured on an interval scale rather than by discrete categories.

Descriptive statistics including means, standard deviations, ranges, and frequencies were calculated for each variable. In addition, a missing value correlation matrix was

determined for the dependent and independent variables, as well as other variables of interest. In this procedure only those cases with data present for both variables were used in estimating the correlations.

Multivariate analyses of variance (MANOVA) were used to test for any differences among the low, moderate, and high attendance groups. Separate MANOVAs used the following two sets of dependent variables: EOLOC (3 scores) and CATPA (8 scores); IPC (3 scores) and CATPA (8 scores). CATPA was used in both MANOVAs because in keeping with social learning theory, the locus of control-CATPA interrelationship was of primary interest. Two separate MANOVAs were also used to test the difference between the three last-six-classes adherence groups on the strength of their EOLOC and CATPA scores, and on their IPC and CATPA scores.

Since some information is lost by classifying attendance into discrete categories, stepwise multiple regression analyses were conducted in order to determine whether or not a linear relationship exists between percent attendance and the two sets of predictor variables (i.e., EOLOC and CATPA, IPC and CATPA).

Based on social learning theory which postulates that the potential for a behavior to occur is a function of both expectancy and reinforcement value, several interactive effects were also examined using stepwise multiple regression analyses. Each of the three locus of control subdomains (internal, powerful others, and chance) of the EOLOC and IPC Scales were multiplied by Social Continuation and Catharsis--the two CATPA

variables that correlated highest with percent attendance. As a result, six new variables were created, each of which was the product of an expectancy score and a value score. These interactive variables were created to test the extent to which the joint effect of expectancy and value affects exercise adherence.

Frequency tables and Chi Square analyses were used to determine the degree of relationship between nominally scaled questionnaire data (e.g., smoking, spouse support, etc.) and attendance (low, moderate, high). Many of the categories in these variables were collapsed in an effort to bring the expected cell frequencies up to 5.

Procedure for handling missing values. Missing values from the IPC (5 subjects each had 1 missing value) and EOLOC (see Appendix A) Scales were replaced with the corresponding group item mean. Data missing from CATPA subdomains (2 subjects each missed 1 subdomain) were replaced with a value of 15, since this score indicates mid-point responses on the 5 bipolar adjectives of the semantic differential scale. Six subjects completed the CATPA inventory incorrectly, resulting in missing values for all eight subdomains. These values were not replaced and these six subjects were not used in any analyses which used CATPA scores.

Missing responses from demographic items and other questionnaire data were not altered.

Results

Questionnaire Return

Of the 120 (approximately) initial questionnaires distributed, 91 were returned for a response rate of about 76%. Since only four of these questionnaires were completed by males, they were eliminated, thereby reducing the number to 87. Some fitness instructors did not record the names of subjects to whom the questionnaires were handed out. As a result only 66 of the returned questionnaires had names to match them. A total of 62 followup questionnaires were distributed, of which 53 were returned--a response rate of 85%. Attendance data were not available for 5 of the 66 subjects for whom names were available thereby the number of usable initial questionnaires was reduced to 61.

Descriptive Statistics

Table I presents the descriptive statistics of the attendance data. Percent attendance ranged from 6% to 100% with a mean attendance rate of 60%. A total of 16 subjects (26%) were absent from the final six classes of the program, while 28 participants (46%) attended one to five of the last six classes excluding the very last class, and 17 subjects (28%) attended the last class and at least three others of the last six. These results are comparable to the mean percent attendance and dropout percentages reported in exercise adherence studies of similar length (Epstein, Wing, Thompson, & Griffin, 1980; O'Connell & Price, 1982).

The means of the primary dependent variables (EOLOC, IPC,

and CATPA) in each of the adherence classifications are presented in Table II. Also included are the total group means and standard deviations for each variable.

In general, the sample tended to be internally oriented. The average internal score on the IPC was approximately 37, out of a maximum of 48, compared to the average external scores of 20 and 21. Similarly, the internal average of 27, out of a possible 30, on the EOLOC was substantially higher than the external scales' average scores of 10 and 11. This finding supports the comment made by Levenson (1981) that subjects engaged in health-related activies tend to be more internal. In this study, subjects also tended to score more homogeneously on the EOLOC Scales than on the IPC Scales. This is especially true of the Internal Scale of the EOLOC where it is seen that 72% of the subjects scored either 29 or 30 out of 30.

The mean CATPA scores were all very positive with the exception of the Vertigo and Ascetic subdomains. This result agrees with the finding of an earlier study (Schutz, Smoll, & Wood, 1981b) in which 215 young female athletes were seen to have considerably less positive attitudes about these two variables than about other CATPA variables.

MANOVA Analyses

Multivariate analyses of variance revealed no significant difference among low, moderate, and high attenders on their EOLOC and CATPA scores, ($F<1.0$); or on their IPC and CATPA scores, ($F(22,84)=1.24$, $p<.25$). In addition, results of two separate MANOVAs showed no significant difference between the

three last-six-classes adherence groups on the strength of their EOLOC and CATPA scores, ($F(22,84)=1.11$, $p<.40$); or on their IPC and CATPA scores, ($F(22,84)=1.13$, $p<.35$). These nonsignificant results indicate that there is essentially no difference among adherence groups in locus of control orientation or attitudes toward physical activity.

Stepwise Multiple Regression

Results of the stepwise multiple regression procedure, using EOLOC and CATPA as predictors, revealed a significant linear relationship ($F(3,51)=5.07$, $p<.01$) between percent attendance and three CATPA variables. With the F-to-Enter set at 2.0, Social Continuation, Catharsis, and Health and Fitness: Value contributed to the prediction equation. In a second multiple regression analysis, using IPC and CATPA as predictors, the two external locus of control variables entered the regression equation ($F(5,49)=4.13$, $p=<.01$) following the three CATPA variables mentioned above (See Table III). Inclusion of these five variables resulted in a multiple correlation of .54 (adjusted $R^2=.22$). However, most of the variance accounted for was due to Social Continuation and Catharsis (adjusted $R^2=.16$). Since these factors account for only 22% of the variance in percent attendance, they cannot be considered strong predictors. In general, individuals with higher percent attendance tended at the beginning of the fitness program to have less positive attitudes toward physical activity as a means of continuing social relations and achieving health and fitness, more positive attitudes toward physical activity

for release of tension, a weaker belief that their reinforcements are controlled by powerful other people, and a stronger belief that chance elements affect their lives.

Results of a multiple regression analyses using EOLOC and CATPA, as well as six interactive variables (Internal, Powerful Others, and Chance Scales were each multiplied by Catharsis and Social Continuation) revealed no change in the previously described regression equation. When this procedure was repeated using IPC and CATPA as well as six interactive variables, a small but significant linear relationship ($F(5,49)=4.39$, $p<.01$), was found between percent attendance and five variables (Table IV). These variables entered the regression equation in the following order: Social Continuation, Catharsis, Powerful Others x Catharsis, Chance, and Internal x Social Continuation. As a result of including interactive variables in the analysis, the multiple R was increased slightly to .56, with an adjusted R^2 of .24. Again most of the variance accounted for was a result of Social Continuation and Catharsis (adjusted $R^2=.16$).

Table V comprises a correlation matrix of the major dependent variables and the adherence variables, as well as several other factors of interest (age, social desirability, the EOLOC retest scores, and the Causal Dimension Scale subdomains).

Age did not correlate with any of the locus of control subscales nor with the adherence measures. This indicates that there is no linear relationship between age and locus of control orientation, or age and exercise adherence. As a result it was deemed unnecessary to examine age as a factor in the

multivariate analyses.

Social desirabilty was not correlated with adherence indicating that individuals with high scores did not tend to adhere more than those subjects who were less concerned with social desirability.

The relationship between the two locus of control scales and the attributions of dropouts, as measured by the Causal Dimension Scale subdomains, were examined. Neither Locus of Causality (internal-external) nor Stability correlated significantly with the subscales of the IPC or the EOLOC. Controllability correlated negatively with the Powerful Others scale of the EOLOC (r=-.57). This suggests that individuals who stated that their reason for dropping out was controllable, tended to have a weaker belief that their reinforcements are controlled by other people.

Chi Square Analyses

The Chi Square analyses showed that adherence, as measured by high, moderate, and low attendance, was independent (p>.10) of any of the nominally scaled questionnaire variables such as percent leisure time activity, enrolling with a friend, etc. Only smoking and spouse support approached significance (p<.10). Table VI presents the means and frequency distributions of all of the collapsed demographic, situational, and behavioral data.

Of those subjects who claimed to have remained in the program until it ended (n=35), 88% stated that they intended to continue exercising regularly (2-3 times per week). Of these, 83% said they intended to enroll in another fitness class. The

second most popular activity choice among this group was aerobic activities such as jogging, biking, swimming, and cross-country skiing. A total of 15 subjects stated that they had discontinued participation prior to the end of the program. Of these, only 38% claimed that they had been exercising regularly after leaving program. The primary types of exercises that these subjects had been doing were the aerobic activities mentioned above.

Discussion

In general, the findings of this study suggest that locus of control measures combined with values held toward physical activity are not very strongly related to exercise program adherence. The EOLOC was expected to predict adherence better than the generalized IPC however, data indicate that the reverse is true. Results also show that there is no statistically significant relationship between adherence and any of the demographic, situational, and behavioral variables measured. The only factors which appear to predict adherence are two attitude variables--values held toward physical activity for Social Continuation and Catharsis.

The findings of this study provide very weak support for the hypothesis that exercise adherence is positively related to the combined effects of generalized internal locus of control and values held toward physical activity. Internal locus of control by itself does not appear in either regression equation; while a very small positive relationship is seen between percent attendance and the interaction of internal locus of control and

attitude toward Social Continuation. This interactive variable is however, a very weak predictor of adherence, accounting for only 3% of the total explained variance.

Results of the multiple regression analyses provide weak support for the hypothesis that exercise adherence is negatively related to a generalized belief in Powerful Others control combined with exercise reinforcement values. Results of a multiple regression analysis (Table III) show a negative relationship between Powerful Others and percent attendance in combination with 3 CATPA variables. A negative relationship also exists between percent attendance and the interaction of Powerful Others belief and Catharsis (Table IV). However, since Powerful Others and the interactive variable each account for only about 4% of the total variance explained in their respective regression equations, they are very poor predictors of exercise adherence.

The hypothesis is not supported that a negative relationship exists between generalized Chance orientation combined with values held toward exercise. Although Chance appears in both multiple regression equations, it is seen to be positively rather than negatively related to adherence (percent attendance) as predicted. Again this finding does not coincide with social learning theory which posits that the potential for a behavior to occur is lower when belief in control of reinforcement is more externally oriented (Rotter, 1966, 1975). It is not readily explainable why adherence tends to be greater among subjects with a stronger general belief that luck, chance,

or fate control their reinforcements. This could possibly be a chance finding.

Data indicate that there is no relationship between exercise specific locus of control and exercise adherence. Therefore, all three hypotheses regarding the ability of the EOLOC to predict adherence can be rejected. This finding does not support the suggestion made earlier that specific expectancy measures may be more beneficial than generalized instruments in situations where predictabilty is of prime importance (Phares, 1976; Rotter, 1975; Saltzer, 1982). One possible explanation for the failure of EOLOC to predict adherence is that the scores on the subscales, and in particular the Internal Scale, were quite homogeneous.

A possible explanation for the relative homogeneity of the EOLOC Scales is that the subjects are homogeneously positive in their beliefs about exercise locus of control. If this is the case, the problem could possibly be rectified by increasing the number of positively worded responses. Another possibility is that the items in EOLOC, and in particular the Internal Scale, require some revisions to make them less similar in wording. With little variability to explain--it is difficult to achieve a high correlation between variables.

Two attitude variables--Social Continuation and Catharsis are seen to be related to exercise adherence, as measured by percent attendance. In general, those subjects who, at the outset of the program, had a less positive attitude toward participating in physical activity for continuing social

relations and more positive attitude toward participating in order to reduce stress and tension--tended to have a higher percent attendance. The positive relationship between exercise adherence and Catharsis has been reported previously. Shephard and Cox (1980) found that female dropouts from an industrial fitness program placed significantly less value on Catharsis than did adherers. The negative relationship between Social Continuation and adherence is interesting in light of the fact that this attitude variable has not been used in previous adherence studies. The Social Continuation subdomain was created recently (Schutz et al., 1981a) by splitting the Social Experience domain of CATPA into two separate dimensions, the other dimension being Social Growth (to meet new people).

Speculating on possible reasons for the negative relationship between percent attendance and Social Continuation, it could be that those individuals who enroll in order to be with friends are disappointed by the lack of opportunity for social interaction during an aerobic fitness class and as a result tend to participate less or to dropout. Alternatively, it may be that those individuals with more positive attitudes toward Social Continuation may have a greater tendency to enroll with a friend and to attend only when the friend attends; whereas those with a less positive attitude toward Social Continuation may have more of a tendency to attend alone and not to be influenced by the attendance patterns of others.

A number of investigators have reported relationships between exercise adherence and demographic, situational or

behavior factors. Findings of this study indicate that age, percent leisure time activity, employment status, types of goals set, expected success and success in goal attainment, nonleisure exertion, family support, enrolling with or without a friend, previous number of program enrollments or completions, sports participation, previous individual exercise behavior, and social desirability, are all unrelated to exercise adherence. There was a tendency for nonsmokers and those with full spouse support to have greater percent attendance.

Information regarding the exercise behavior of dropouts subsequent to leaving exercise programs is seldom reported. Data indicate that some dropouts do continue to exercise after they discontinue participation in the program, primarily in activities such as biking, jogging, and swimming. Most dropouts however, do not engage in regular physical activity after leaving a program.

A number of suggestions for future exercise adherence research are listed below.

1. Since other studies have demonstrated the potential usefulness of situation specific locus of control measures, it may be worthwhile pursuing the development of an exercise locus of control scale. Adjustments to the EOLOC Scales combined with further research, may improve the ability of this instrument to predict behaviors in physical activity settings.

2. The relationship between exercise adherence and values held toward physical activity for Social Continuation and Catharsis deserves further attention. As mentioned previously, Social

Continuation is of particular interest, as this variable is seen to be the strongest predictor of adherence in this study and it has not been used in adherence studies previously.

3. It is also suggested that future adherence studies undertake to examine the exercise behavior of dropouts subsequent to leaving a program. Those dropouts who engage in regular exercise may be more similar to adherers than to other dropouts who do not exercise regularly.

4. Since the rather haphazard methods of measuring adherence makes the comparisons of results difficult, it is recommended that the problem of measuring adherence be examined. Adherence is measured in so many different ways that comparison of results in the literature is very difficult.

5. Since the study of exercise adherence often requires the use of a large number of variables and concomitant multivariate statistical techniques to deal with them, it is suggested that larger sample sizes be obtained in future studies.

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TABLE I

Descriptive Statistics of Attendance Data

(rounded to nearest whole number)

Variables	M	SD	Mode
No. possible attendances	22	6	18
No. actual attendances	13	6	7
Percent attendance	60%	26%	83%

KEY TO VARIABLE ABBREVIATIONS USED IN SUBSEQUENT TABLES

IPCIN.....IPC(Internal)

IPCPO.....IPC(Powerful Others)

IPCCH.....IPC(Chance)

SOCIALG.....CATPA(Social Growth)

SOCIALC.....CATPA(Social Continuation)

VERTIGO.....CATPA(Vertigo)

H&FUSE.....CATPA(Health & Fitness: Value)

H&FENJ.....CATPA(Health & Fitness: Enjoyment)

AESTHET.....CATPA(Aesthetic)

CATHARS.....CATPA(Catharsis)

ASCETIC.....CATPA(Ascetic)

EOLOCIN.....EOLOC(Internal)

EOLOCPO.....EOLOC(Powerful Others)

EOLOCCH.....EOLOC(Chance)

EOLOC2IN.....Followup EOLOC(Internal)

EOLOC2PO.....Followup EOLOC(Powerful Others)

EOLOC2CH.....Followup EOLOC(Chance)

LOFCAUS.....CDS(Locus of Causality)

CONTROL.....CDS(Controllability)

STABIL.....CDS(Stability)

PERCATT.....Percent Attendance

ATTL6.....Attendance During Last 6 Classes

TABLE II

Means and Standard Deviations of Dependent Variables

	% Attendance			Att. Last 6 Classes				
Variable	Low	Mod	High	Low	Mod	High	Total	
	M	M	M	M	M	M	M	SD
IPCIN	36.1	36.2	36.8	36.2	37.8	37.2	37.3	5.1
IPCPO	23.1	19.4	19.8	23.1	19.9	20.1	20.4	6.0
IPCCH	20.5	22.8	20.7	20.3	22.2	20.2	20.6	6.4
SocialG	23.2	22.1	22.1	21.9	22.2	22.5	22.1	2.9
SocialC	23.2	22.6	20.9	23.5	22.4	20.1	22.3	3.3
Vertigo	14.7	12.3	16.7	14.5	14.2	16.4	14.6	5.8
H&F:Use	9.9	9.7	9.8	10.0	9.9	9.6	9.9	0.5
H&F:Enjoy	13.5	13.0	13.0	13.5	13.2	12.8	13.3	2.2
Aesthetic	21.5	20.7	21.5	22.0	21.0	21.0	21.4	3.5
Catharsis	21.7	22.1	23.1	22.4	22.2	22.5	22.4	3.2
Ascetic	14.4	11.7	15.6	13.4	13.6	15.9	14.0	4.9
EOLOCIN	26.5	27.1	27.6	27.3	26.6	28.0	27.3	3.0
EOLOCPO	10.6	9.0	9.5	10.8	9.9	8.3	9.6	3.2
EOLOCCH	11.4	11.9	10.9	10.5	12.5	10.1	11.3	4.2

TABLE III

Stepwise Multiple Regression Results

(Predictors=IPC and CATPA)

Step No.	Variable Entered	F-To-Enter	Adj R^2	SEE
0	------	----	---	27.110
1	Social Continuation	7.53	.11	25.606
2	Catharsis	4.28	.16	24.847
3	Health & Fitness:Value	2.55	.18	24.485
4	IPC Powerful Others	2.15	.20	24.215
5	IPC Chance	2.45	.22	23.872

ANOVA TABLE

Source	df	Mean Square	F	p
Regression	5	2353.11	4.13	<.01
Residual	49	569.85		

MR equation: Percent attendance=-2.51(Social Continuation)+ 2.92(Catharsis)-9.0(Health & Fitness: Value)- 1.23(Powerful Others)+0.94(Chance)+143.89

TABLE IV

Stepwise Multiple Regression Results

(Predictors=IPC,CATPA, and Interactive Variables)

Step No.	Variable Entered	F-To-Enter	R^2	SEE
0	------	----	---	27.110
1	Social Continuation	7.53	.11	25.606
2	Catharsis	4.28	.16	24.847
3	PO x Catharsis	2.81	.19	24.426
4	IPC Chance	2.84	.22	23.996
5	IN x Soc. Cont.	2.48	.24	23.648

ANOVA TABLE

Source	DF	Mean Square	F	P
Regression	5	2457.11	4.39	<.01
Residual	49	559.24		

MR Equation:Percent attendance=-3.90(Social Continuation)+
3.50(Catharsis)-0.07(POxCatharsis)+1.29(Chance)+
0.04(INxSocial Continuation)+34.96

TABLE V

Correlations of Dependent Variables and Other Selected Factors

		AGE 1	IPCIN 2	IPCPO 3	IPCCH 4	SOCIALG 5	SOCIALC 6	VERTIGO 7	H&FUSE 8	H&FENJ 9	AESTHET 10
AGE	1	1.0000									
IPCIN	2	0.1476	1.0000								
IPCPO	3	0.0399	-0.0771	1.0000							
IPCCH	4	-0.1547	-0.3090	0.4453	1.0000						
SOCIALG	5	0.0111	0.1432	-0.0485	-0.2498	1.0000					
SOCIALC	6	-0.0117	0.0317	0.1495	-0.1308	0.4053	1.0000				
VERTIGO	7	-0.1800	0.0633	-0.0163	-0.1239	0.1025	-0.0164	1.0000			
H&FUSE	8	0.0301	-0.1664	0.0390	-0.0893	0.0756	0.0439	-0.0777	1.0000		
H&FENJ	9	-0.0869	-0.1362	0.0550	0.1017	0.0101	0.1046	0.0524	0.3484	1.0000	
AESTHET	10	0.1572	-0.0912	0.1750	-0.0721	0.2486	0.3430	0.2374	0.2574	0.2910	1.0000
CATHARS	11	0.0726	0.1539	0.0026	-0.1438	0.3644	0.1141	0.1493	0.3611	0.1721	0.4784
ASCETIC	12	0.0854	0.2937	-0.0495	-0.2645	0.2246	0.0711	0.3951	0.0076	0.2994	0.2660
SOCDES	13	0.0779	0.3342	-0.2536	-0.2518	-0.2047	-0.1500	-0.1326	0.0419	-0.1083	-0.0521
EOLOCIN	14	-0.0978	0.0699	0.1604	-0.0107	0.0583	-0.0870	0.0926	0.2094	0.0733	0.3064
EOLOCPO	15	-0.0788	-0.1208	0.3856	0.2740	-0.1865	0.0317	0.0207	0.0998	0.0766	-0.0507
EOLOCCH	16	-0.1446	-0.1951	0.1306	0.4163	-0.0060	-0.2478	-0.1221	0.0033	0.0127	-0.3478
EOLOC2IN	17	-0.1620	-0.0527	-0.1431	-0.0913	0.1396	-0.0422	0.0839	0.2320	0.1622	0.2283
EOLOC2PO	18	0.0127	0.1514	0.3295	0.2078	-0.0734	0.0434	-0.1098	-0.0267	-0.0452	-0.0410
EOLOC2CH	19	0.1537	-0.0273	0.2887	0.3929	0.0173	-0.0374	-0.0269	-0.1485	0.0731	-0.2608
LOFCAUS	20	0.0434	-0.1357	0.1509	-0.0607	-0.6283	-0.0415	0.3307	0.2090	-0.1892	0.3192
STABIL	21	0.2365	0.2004	-0.2088	-0.4423	0.2633	0.1008	-0.0562	0.1029	-0.8915	0.0186
CONTROL	22	-0.0485	0.0143	-0.0503	0.2673	-0.5059	-0.1988	0.3196	-0.2956	0.3017	-0.1231
PERCATT	23	0.0650	0.0934	-0.1891	0.1481	0.0444	-0.3342	0.1623	-0.0995	-0.0445	0.0296
ATTL6	24	0.0511	0.0346	-0.1579	0.0282	0.0754	-0.3248	0.0834	-0.2288	-0.0862	-0.0761

		CATHARS 11	ASCETIC 12	SOCDES 13	EOLOCIN 14	EOLOCPO 15	EOLOCCH 16	EOLOC2IN 17	EOLOC2PO 18	EOLOC2CH 19	LOFCAUS 20
CATHARS	11	1.0000									
ASCETIC	12	0.1708	1.0000								
SOCDES	13	-0.0141	-0.0372	1.0000							
EOLOCIN	14	0.4061	0.0025	-0.0773	1.0000						
EOLOCPO	15	0.0087	-0.1372	0.0546	-0.1422	1.0000					
EOLOCCH	16	-0.2054	-0.2973	0.0319	-0.3978	0.4000	1.0000				
EOLOC2IN	17	0.2231	0.2195	-0.0630	0.3230	-0.3886	-0.2526	1.0000			
EOLOC2PO	18	0.0469	-0.2748	0.1381	-0.0478	0.7194	0.4243	-0.5882	1.0000		
EOLOC2CH	19	-0.2240	-0.1758	-0.0745	-0.2046	0.2830	0.5980	-0.5427	0.4540	1.0000	
LOFCAUS	20	-0.1811	-0.5362	0.1727	0.4099	-0.2490	-0.4492	0.1482	-0.2473	-0.1341	1.0000
STABIL	21	0.2779	0.0077	0.2286	0.1505	-0.1800	-0.1953	0.1949	-0.0103	-0.0483	0.2206
CONTROL	22	-0.5438	-0.0710	-0.2215	0.0154	-0.5745	-0.1929	0.4221	-0.6540	-0.2092	0.4004
PERCATT	23	0.2307	0.0724	0.0705	0.1498	-0.1010	0.0845	0.1717	-0.1923	0.0166	-0.1869
ATTL6	24	0.0338	0.1853	0.0727	0.1089	-0.2609	0.0185	0.2593	-0.3296	-0.0295	-0.4206

		STABIL 21	CONTROL 22	PERCATT 23	ATTL6 24
STABIL	21	1.0000			
CONTROL	22	-0.4130	1.0000		
PERCATT	23	-0.3202	0.4087	1.0000	
ATTL6	24	-0.3573	0.4090	0.8225	1.0000

Critical r values:

IPC, EOLOC.....$r_{.05;55}$=.261

CATPA, EOLOC2.....$r_{.05;48}$=.279

Causal Dimension Scale....$r_{.05;13}$=.514

TABLE VI

Frequency Distributions of Selected Questionnaire Data

(N=61)

	Percent Attendance		
	low	mod	high
Age			
15-26	13	7	11
26-57	7	10	13
Inactive leisure time			
20-60%	11	9	11
60-95%	9	8	13
Active leisure time			
5-35%	9	8	13
35-95%	11	9	11
Smoking			
smoker	6	9	5
nonsmoker	14	8	19
Employment status			
employed	8	10	15
not employed	12	7	8
Nonleisure exertion			
some to great deal	15	16	18
minimal	5	1	6
Spouse support			

not full support	6	4	1
full support	14	13	23
Family support			
not full support	8	5	4
full support	12	12	19
Who enrolled with			
1 or more friend/relatives	11	14	15
no friends/relatives	9	3	9
Previous program enrollments			
one or more	10	11	15
none	10	6	8
Previous program completions			
one or more	9	10	11
never/NA	10	7	12
Participated school sports			
yes	12	10	18
no	8	7	6
Participated post school sports			
yes	6	2	7
no	13	15	16
Participating sports currently			
yes	4	1	3
no	16	16	21
Previously exercised regularly on own			
yes	9	4	8
no	11	13	16

Primary exercise goal			
health/fitness/feel better	10	10	16
weight loss/look better/other	10	7	8
Second exercise goal			
health/fitness/feel better	15	9	12
weight loss/look better/other	5	8	11
Third exercise goal			
health/fitness/feel better	17	12	17
weight loss/look better/other	3	4	4
Expected success goal 1			
unsuccessful to moderate	6	6	7
quite to very successful	14	11	17
Expected success goal 2			
unsuccessful to moderate	4	9	10
quite to very successful	16	8	14
Expected success goal 3			
unsuccessful to moderate	7	7	8
quite to very successful	13	10	16
Success achieved goal 1			
unsuccessful to moderate	15	15	15
quite to very successful	5	2	9
Success achieved goal 2			
unsuccessful to moderate	16	13	17
quite to very successful	4	4	7
Success achieved goal 3			
unsuccessful to moderate	14	10	14
quite to very successful	6	7	10

Appendix A

Development of the Exercise Objectives Locus of Control Scales

The EOLOC Scales were modeled after Levenson's (1974, 1981) multidimensional IPC Scales which assess three distinct dimensions: internality, powerful others externality, and chance externality. Initially, a 24-item test pool was developed, which included eight items for each of the three subdomains (IN, PO, CH) mentioned above. This inventory was presented to 10 graduate students who acted as judges in assessing the face validity of the factor structure and the clarity of the statements. The dimensions associated with 22 of the items were correctly identified by all of the judges, while 90% of the judges placed the other 2 items in the correct grouping. None of the items were deemed by the judges to be unclear.

Study 1. Since the judges responses were favorable, the same 24 items were administered to 60 participants (50 females and 10 males) from two UBC Aquatic Center aerobic fitness classes. These subjects ranged in age from 17 to 55 (M=30). On average the subjects had been participating in the classes for 15 months (range=1 day to 4.5 years). Subjects responded to each item on a 5-point Likert format. A "do not understand" response category was also included in order to determine the extent to which subjects did not comprehend the items, and to eliminate the ambiguity of the midpoint response of "undecided". An item analysis of the raw data was then completed. Based on the item-total correlations, the lowest two items from each subdomain were deleted. In a subsequent analysis, all remaining

item-total correlations were greater than .60, .45, and .15 for the IN, PO, and CH Scales respectively. Cronbach's alphas were calculated for each subdomain following deletion of the six items and values of .86 (IN), .79 (PO), and .57 (CH) were obtained. Since the CH Scale had the lowest alpha and two of the remaining items in it had item-total correlations less than .20, two new chance items were developed and included in the EOLOC for the subsequent study.

Study 2. The revised 20-item EOLOC was administered to 87 females, aged 15 to 57 (M=30), who had voluntarily elected to participate in 8-12 week fitness programs sponsored by a local fitness organization.

Prior to analyzing the inventory, all missing values (7 subjects had 1 missing value and 2 subjects had 2 missing values) from the raw data were replaced by the corresponding group item mean. Based on the results of an item analysis, the two items in the Chance Scale which correlated the lowest with the total were deleted. The item-total correlation of the remaining 18 items were all greater than .30. Cronbach's alphas of .79, .69, and .75 were obtained for the Internal, Powerful Others, and Chance Scales, respectively. A positive correlation of .402 was found between the Powerful Others and Chance Scales, while a negative correlation of -.40 was found between the Chance and Internal Scales. The Internal and Powerful Others Scales were found to be unrelated with a correlation of -.14. The correlation between the IPC and EOLOC Internal Scales was .07, indicating no relationship between these scales. However,

the Powerful Others and Chance Scales of the EOLOC and IPC correlated positively .39 and .42, respectively.

Test-retest correlations (3 to 4 months) of the three scales were .32 (Internal), .72 (Powerful Others), and .60 (Chance), indicating that Internal Scale in particular is not highly stable over time. Another possible explanation is that the locus of control orientation of subjects changed as a result of participating in a physical activity program as seen in a previous study (Jeffers, 1977).

Correlations of -.07, .05, and .03 were found between the M-C 1(10) Scale and the Internal, Powerful Others and Chance Scales of the EOLOC. These results indicate that the EOLOC is not contaminated by social desirability.

Appendix B

Description of Measures

Internal, Powerful Others, and Chance Scales

Generalized locus of control was measured using Levenson's IPC Scales (1974, 1981) which comprise three 8-item subscales presented as a unified scale of 24 items. Subjects rated each item, on a 6-point Likert-type scale, by placing a checkmark under the heading they felt was most appropriate. These responses were scored from 1 (strongly disagree) to 6 (strongly agree) and a total score was computed for each subscale. This method of rating differs from Levenson's format in which subjects are asked to respond to each statement by circling a number ranging from -3 to +3. Scoring was altered because there was concern that subjects would be less inclined to disagree with statements if they attached a negative connotation to negative numbers.

Internal consistency estimates of the IPC Scales have been moderate, ranging from: .51 to .67 for the I scale, .72 to .82 for the P scale, and .73 to .79 for the C scale. Spearman-Brown split-half reliabilities were reported at .62, .66, and .64 for the I,P, and C scales respectively. Test-retest reliabilities were in the .60 to .79 range (Levenson, 1981). Validity of the IPC scales has primarily been established through theoretically anticipated positive and negative relationships with other variables and through convergent and discriminant methods which have shown low-order correlations with other locus of control measures (Levenson, 1981).

Revised Children's Attitude Toward Physical Activity Inventory

Values held toward physical activity were measured using the Revised CATPA inventory (Schutz, et al., 1981a). Subjects were required to rate seven subdomains of physical activity on a 5-point semantic differential scale which used five bipolar adjectives. A score ranging from 5 to 25 was obtained for each subdomain with the exception of Health and Fitness which had two scores--one for the first two word pairs and one for the last three word pairs. Internal consistency estimates of the revised CATPA inventory have been reported as being relatively high--with Cronbach's alphas ranging from .77 to .94 (Schutz et al., 1981a).

Kenyon's Attitude Toward Physical Activity Scale (ATPA), from which CATPA was derived, was not used in this study for two reasons. First,, the simplified wording in the revised CATPA makes the statements clearer thereby reducing the possibility of ambiguous or inconsistent interpretation. Second, the revised CATPA was considered to be more time efficient and psychometrically superior to ATPA (Schutz, et al., 1981a). These justifications are expanded in the following discussion of the development of CATPA and revised CATPA.

The original CATPA inventory (Simon & Smoll, 1974) was adapted from the semantic differential version of Kenyon's ATPA (1968b). This adaptation mainly involved simplifying the wording, while the form and content of Kenyon's inventory were followed closely. The equivalence of the CATPA and ATPA inventories was later tested by Schutz and Smoll (1977).

Findings showed that the two inventories were essentially equivalent with the exception that CATPA yielded small but consistently higher scores on the ascetic subdomain than did the adult inventory.

Recently, a revised CATPA inventory (Schutz, et al., 1981a) was developed, based on the results of two studies (N=1,752 and N=1,895). This inventory includes the following six modifications:

1. Three of the original eight adjective pairs (bitter-sweet, dirty-clean, steady-nervous) were eliminated as they were psychometrically weak compared to the other five.
2. The scale for each word pair was reduced from 7-points to 5-points based on frequency distribution of responses and the findings of Mattell and Jacoby (1971).
3. An "I do not understand this idea" response category was added in order to reduce ambiguity when interpreting a midpoint response.
4. An action element was added to each statement by including the phrase "Taking part in physical activity".
5. The Social subdomain was split into two dimensions: Social Growth (to meet new people) and Social Continuation (to be with friends).
6. The Health and Fitness subdomain was left intact but two scores are derived on the basis of two sets of adjective pairs. Health and Fitness Value is made up of the good-bad and useful-of no use word pairs, while Health and Fitness Enjoyment comprises the word pairs pleasant-not pleasant, nice-awful, and

happy-sad.

M-C 1(10) Scale

Social desirability was measured using the M-C 1(10) Scale (Strahan & Gerbashi, 1972) which is a 10-item version of the 33-item Marlowe-Crowne Social Desirabiltity Scale (M-C SDS). This shortened scale was used to avoid excessive questionnaire length. Subjects responded to each of the scales items by answering true or false. Half of the items were negatively keyed and half were positively keyed as a control for acquiescence set. A score of one was given for each item which was answered in a socially desirable direction.

The M-C 1(10) scale was reported to have moderate Kuder-Richardson formula 20 reliability coefficients ranging from .59 to .70. The correlations between the M-C SDS and this shorter scale were all in the .80s and .90s (Strahan & Gerbashi, 1972).

Causal Dimension Scale

Three dimensions of the causal attributions of dropouts were assessed using Russel's Causal Dimension Scale (1982). Subjects who did not continue attending classes until the registration period ended were asked to state their main reason for discontinuing participation. They were then requested to rate this reason on the Causal Dimension Scale, which consists of three 3-item subscales measuring locus of causality (internal-external), stability (stable-unstable), and controllability (controllable-uncontrollable). This scale uses a semantic differential format with a 9-point scale. A score

for each subscale was obtained by summing the responses to the three items in each of them. High scores on these subscales indicated that the reason for dropping out was perceived as internal, stable, and controllable.

The internal consistency estimates of the subscales were moderately high with reported alpha coefficients of .87, .84, and .73 for locus of causality, stability, and controllability respectively (Russel, 1982). Although the validity of the Causal Dimension Scale has not yet been established in real-world settings, this measure was considered to be more accurate than having the researcher subjectively translate reasons for dropping out into causal attributions.

Exercise Objectives Locus of Control Scales

Exercise specific locus of control was measured using the Exercise Objectives Locus of Control (EOLOC) Scales developed by the investigator (see Appendix A). The EOLOC Scales consist of three 6-item subscales presented as a unified scale. Each item was rated on a 5-point Likert-type format, ranging from strongly agree (5) to strongly disagree (1). A score ranging from 6 to 30 was obtained for each subscale. Internal consistency estimates, obtained as part of this study, were moderate with Cronbach's alphas of .79, .69, and .75 for the Internal, Powerful Others, and Chance Scales respectively. Validity of the EOLOC has not been established yet.

Appendix C

Questionnaires

Initial Informed Consent

We are conducting a research study assessing some aspects associated with participation in exercise programs.

For the purposes of this study we are interested only in those people who have NOT been exercising regularly (2 or 3 times per week) over the last year, either in organized programs or individually. If you fit this category (ie. if you have not been exercising consistently over the last year), we would like 20 minutes of your time to complete this set of questionnaires.

All information collected from your participation will be kept strictly confidential, and will be identified only by number.

A summary report of the study's findings will be made available on request to those who participate in this study.

Your participation in this study is completely voluntary, and you may withdraw at any time without penalty of any kind. If the following questionnaires are completed it will be assumed that consent has been given to use the data from your responses.

INSTRUCTIONS

Please complete the following set of questionnaires and return it by mail in the addressed and stamped envelope provided.

When you respond to the questionnaires, please do so without discussing the items with others. We want only your own opinions and answers. Also, please try to respond to all statements and questions.

For your convenience, a pencil has been enclosed for use in completing the questionnaires. We ask that you return the pencil along with the questionnaires.

Your cooperation is very sincerely appreciated, as it makes a difference to the overall success of this study. We thank you.

Primary researcher: Marina McCready (graduate student)

Under the direction of: Dr. B. Long

Background Questions

1. Age_____

2. Gender (male or female)_____

3. Estimate what percentage of your leisure time (when not working or engaged in compulsory activities) you spend:
   a. physically inactive_____%
   b. physically active _____%
   (NOTE: these should add up to 100%)

PLEASE READ THE FOLLOWING STATEMENTS AND CIRCLE THE LETTER BESIDE THE RESPONSE WHICH IS MOST APPROPRIATE FOR YOU. FOR EXAMPLE, IF YOU ARE A SMOKER YOU WOULD CIRCLE THE LETTER "a" IN QUESTION #4.

4. I am:
   a. a smoker
   b. an occasional smoker
   c. a nonsmoker

5. I am currently:
   a. employed
   b. unemployed
   c. retired
   d. a housewife
   e. a student

6. My normal non-leisure activities (work or compulsory activities) require:
   a. a great deal of physical exertion
   b. some physical exertion
   c. minimal physical exertion

7. The most important person in my life (eg., spouse, mate, relative etc.):
   a. does not support my participation in this exercise program
   b. is somewhat supportive of my participation in this program
   c. is indifferent to my participation in this program
   d. fully supports my participation in this program

8. My family:
   a. does not support my participation in this exercise program
   b. is somewhat supportive of my participation in this program
   c. is indifferent to my participation in this program
   d. fully supports my participation in this program

9. I enrolled in this program with:
   a. a friend or relative
   b. more than one friend or relatives
   c. no friends or relatives

10. I have previously been enrolled in an organized fitness class
    a. once
    b. twice
    c. three or more times
    d. never

11. Of the fitness classes I have previously been enrolled in I completed the program from start to finish
    a. once
    b. twice
    c. three or more times
    d. not applicable

12. I used to participate in organized sport:
    i) during my school years
       a. yes
       b. no
    ii) after leaving school
       a. yes
       b. no

13. I am currently participating in organized sport:
    a. yes
    b. no

14. I have previously exercised (swimming, jogging, cycling, etc.) on a regular basis (2 or 3 times per week) on my own:
    a. yes
    b. no

CATPA Instructions

The following questionnaire is designed to find out how you feel about certain aspects of physical activity.

At the top of each page in this questionnaire, there is a box containing an idea. Down below the box are five different pairs of words. You are being asked to mark each of these word pairs to show how you feel about the idea. There are no right or wrong answers.

Here is how you are to use these scales:

Read the idea in the box, say for example, RUNNING. Now go down to the first pair of words--Good-Bad. Think how you feel about running.

If you think running is very good you would place a check-mark as follows: good___✓___:____:____:____:____bad

If you think running is pretty good but not super good you would place a check-mark as follows: good____:___✓___:____:____:____bad

If you think running is neither good nor bad (ie., a neutral feeling) you would put a check-mark in the middle space as follows: good____:____:___✓___:____:____bad

If you think running is sort of bad but not really bad you would place a check-mark as follows: good____:____:____:___✓___:____bad

If you think running is very bad you would place a check-mark as follows: good____:____:____:____:___✓___bad

If you do not understand the idea in the box put a check-mark in the <u>do not understand</u> box on the middle of the page.

It is important for you to remember several things. First of all, put your check-marks in the middle of the space, not on top of the dots. Second, never place more than one check-mark on a single scale. Third, there are five pairs of words on each page; <u>do not omit any</u>.

Read the idea in the box at the top of the page and fill in how you feel about all of the word pairs before you go on to the next page. Do not go back to a page after you have finished it, and do not try to remember how you answered the other pages. Think about each word pair by itself. Work fairly quickly through this questionnaire; do not worry or think too long about any word pair. Mark the first thing that comes into your mind, but do not be careless. Remember, the idea in the box is a new idea, so think only about that idea.

Exercise Goals and Goal Attainment

SETTING EXERCISE GOALS

Using the blank spaces below, list the goal or goals you would most like to achieve in this exercise program. List a maximum of three goals ranked in order of importance, so that number one corresponds to the goal that is most important to you, and so on.

1. _____

2. _____

3. _____

Indicate how successful you expect to be at achieving these goal(s) by placing a check-mark under the appropriate heading seen below. If you find that none of the headings totally reflects your opinion, check the one that most closely approximates the way you feel.

	unsuccessful	slightly successful	moderately successful	quite successful	very successful
Goal 1	_____	_____	_____	_____	_____
Goal 2	_____	_____	_____	_____	_____
Goal 3	_____	_____	_____	_____	_____

EOLOC Scales

The statements listed below are commonly held opinions. You are being asked to indicate the extent to which you agree or disagree with these statements. There are no right or wrong answers.

First impressions are best. Read each statement carefully, decide the extent to which you agree or disagree, and then place a check-mark under the appropriate heading.

GIVE YOUR OPINION ON EVERY STATEMENT.

If you find that the headings do not adequately reflect your opinion, use the one that is closest to the way you feel. If you do not understand the statement, place a check-mark under the heading "Do Not Understand". Thank you.

	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree	Do Not Understand
1. Whether or not I reach my exercise objectives is dependent on circumstances beyond my control.	____	____	____	____	____	____
2. My own actions will determine whether or not I achieve my exercise objectives.	____	____	____	____	____	____
3. If it's meant to be, I will reach my exercise objectives.	____	____	____	____	____	____
4. Whether or not I obtain my exerise objectives depends mostly on my own behavior.	____	____	____	____	____	____
5. Whether or not I achieve my exercise objectives is largely a matter of good or bad fortune.	____	____	____	____	____	____
6. The encouragement I give myself will greatly affect whether or not I reach my exercise objectives.	____	____	____	____	____	____
7. If I do not attain my exercise goals, other people will be to blame.	____	____	____	____	____	____
8. For the most part, other people are in control over whether or not I attain my exercise goals.	____	____	____	____	____	____
9. Whether or not I achieve my exercise objectives is largely a matter of fate.	____	____	____	____	____	____
10. My actions or the actions of other people have nothing to do with whether or not I accomplish my exercise goals.	____	____	____	____	____	____
11. It is entirely up to other people whether or not I accomplish my exercise goals.	____	____	____	____	____	____
12. Whether or not I accomplish my exercise goals depends on how lucky I am.	____	____	____	____	____	____
13. I am directly responsible for whether or not I reach my exercise goals.	____	____	____	____	____	____
14. Achieving my exercise objectives will depend on how fortunate I am.	____	____	____	____	____	____
15. Whether or not I accomplish my exercise goals is entirely up to me.	____	____	____	____	____	____
16. Whether or not I reach my exercise objectives depends on the actions of certain other people.	____	____	____	____	____	____
17. Other people have the power to make certain that I accomplish my exercise objectives.	____	____	____	____	____	____
18. Not achieving my exercise objectives will be a matter of bad fortune.	____	____	____	____	____	____
19. The behavior of other people will greatly influence whether or not I reach my exercise objectives.	____	____	____	____	____	____
20. I am primarily in control over whether or not I reach my exercise objectives.	____	____	____	____	____	____

Followup Informed Consent

We have been conducting a research study (of which you have been a valuable part) assessing some aspects associated with participation in fitness classes.

If you volunteer once again to participate in this study, you will be asked to fill out the attached questionnaire which will take about ten minutes to complete.

All information will be kept strictly confidential and all completed questionnaires will be destroyed once the information is anonymously stored in a computer.

Your participation in this study is strictly voluntary, and you may withdraw at any time without penalty of any kind. If the following questionnaire is completed it will be assumed that consent has been given to use the data from your responses.

INSTRUCTIONS

Please complete the following questionnaire and return it by mail in the addressed and stamped envelope provided.

When you respond to the questionnaires, please do so without discussing the items with others. We want only your own opinions and answers. Also please try to respond to all statements and questions.

Your participation has been very sincerely appreciated, and has made a difference to the overall success of this study. Thank you very much. Happy New Year!

Primary researcher: Marina McCready (graduate student)

Under the direction of: Dr. Bonita Long

Followup Questions

Listed below are the goals you stated that you most wanted to achieve by attending fitness classes.

1. _____

2. _____

3. _____

Indicate how successful you feel you were at achieving these goals--by placing a check-mark under the appropriate heading below. If you find that none of the headings totally reflects your opinion, check the one that most closely approximates the way you feel.

	unsuccessful	slightly successful	moderately successful	quite successful	very successful
goal 1	_____	_____	_____	_____	_____
goal 2	_____	_____	_____	_____	_____
goal 3	_____	_____	_____	_____	_____

Did you continue to attend classes until the program ended? (circle Yes or No)

a. Yes (answer questions 1 to 3 below and ignore the following page)

b. No (go directly to the following page--ignore questions 1 to 3)

---

1. Now that you have completed this exercise program do you intend to continue exercising regularly (ie., 2 or 3 times per week)?

   a. Yes

   b. No

   c. Not sure

2. If you do intend to continue exercising regularly, what are the main types of physical activity you will be doing?

   _____

   _____

   _____

3. If you do not intend to continue exercising regularly, what is your main reason?

   _____

Followup Questions Continued

THIS PAGE IS FOR THOSE WHO DID NOT ATTEND UNTIL PROGRAM COMPLETION

4. Since you stopped attending classes have you been exercising regularly (ie., 2 or 3 times per week)?
   a. Yes
   b. No

5. If you have been exercising regularly, what are the main types of activities you have been doing?

   _____

   _____

   _____

6. If you have not been exercising regularly, what is your main reason?

   _____

7. What is the main reason you stopped attending ENERFIT classes?

   _____

Think of the reason you have written in number 7 above. The items below concern your impressions or opinions of this cause. CIRCLE one number for each of the following scales.