

1996

Predicting exercise adherence using the California psychological inventory and demographic factors

P Littlejohn
San Jose State University

Follow this and additional works at: https://scholarworks.sjsu.edu/etd_theses

Recommended Citation

Littlejohn, P, "Predicting exercise adherence using the California psychological inventory and demographic factors" (1996). *Master's Theses*. 1386.

DOI: <https://doi.org/10.31979/etd.jz5b-3n5a>

https://scholarworks.sjsu.edu/etd_theses/1386

This Thesis is brought to you for free and open access by the Master's Theses and Graduate Research at SJSU ScholarWorks. It has been accepted for inclusion in Master's Theses by an authorized administrator of SJSU ScholarWorks. For more information, please contact scholarworks@sjsu.edu.

INFORMATION TO USERS

This manuscript has been reproduced from the microfilm master. UMI films the text directly from the original or copy submitted. Thus, some thesis and dissertation copies are in typewriter face, while others may be from any type of computer printer.

The quality of this reproduction is dependent upon the quality of the copy submitted. Broken or indistinct print, colored or poor quality illustrations and photographs, print bleedthrough, substandard margins, and improper alignment can adversely affect reproduction.

In the unlikely event that the author did not send UMI a complete manuscript and there are missing pages, these will be noted. Also, if unauthorized copyright material had to be removed, a note will indicate the deletion.

Oversize materials (e.g., maps, drawings, charts) are reproduced by sectioning the original, beginning at the upper left-hand corner and continuing from left to right in equal sections with small overlaps. Each original is also photographed in one exposure and is included in reduced form at the back of the book.

Photographs included in the original manuscript have been reproduced xerographically in this copy. Higher quality 6" x 9" black and white photographic prints are available for any photographs or illustrations appearing in this copy for an additional charge. Contact UMI directly to order.

UMI

A Bell & Howell Information Company
300 North Zeeb Road, Ann Arbor MI 48106-1346 USA
313/761-4700 800/521-0600

**PREDICTING EXERCISE ADHERENCE USING THE CALIFORNIA
PSYCHOLOGICAL INVENTORY AND DEMOGRAPHIC FACTORS**

A Thesis

Presented to

the Faculty of the Department of Psychology

San Jose State University

In Partial Fulfillment

of the Requirements for the Degree

Master of Arts

by

John P. Little

December 1996

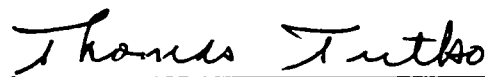
UMI Number: 1382590

UMI Microform 1382590
Copyright 1997, by UMI Company. All rights reserved.

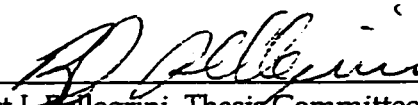
**This microform edition is protected against unauthorized
copying under Title 17, United States Code.**

UMI
300 North Zeeb Road
Ann Arbor, MI 48103

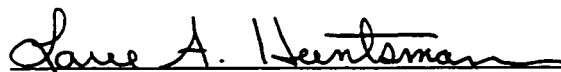
APPROVED BY THE MASTER'S THESIS COMMITTEE



Thomas Tutko, Thesis Chairperson




Robert J. Pellegrini, Thesis Committee Member



Laree A. Huntsman, Thesis Committee Member

APPROVED FOR THE UNIVERSITY



© 1996

John P. Little

ALL RIGHTS RESERVED

ABSTRACT

PREDICTING EXERCISE ADHERENCE USING THE CALIFORNIA PSYCHOLOGICAL INVENTORY AND DEMOGRAPHIC FACTORS

By John P. Little

The evidence for the benefits of exercise are well known. Despite this evidence, only 10% of the U.S. adult population exercises regularly enough to elicit these reported benefits. Many theories have been developed to explain why some people adhere to a regular routine and why some do not. Psychological factors studied include depression, anxiety, and self-motivation. Oddly, no study has included a broad-based, non-pathological personality measure in relationship to exercise adherence. The following study was intended to address that void.

The California Psychological Inventory (CPI) was used, along with the demographic variables of age, gender, and education level, to predict exercise adherence in 27 individuals in Northern California. Only the CPI factor of Well-being was found to be significant using a stepwise logistic regression. The implications of this finding are discussed along with recommendations for future research.

ACKNOWLEDGEMENTS

First I would like to thank Dr. Tutko for his time, passionate interest, and encouragement in completing this thesis.

Dr. Pellegrini was enthusiastic, positive, and encouraging from day 1.

Dr. Huntsman endured the tedious task of editing my original proposal - a task she was not responsible for but nonetheless completed. She also showed patience and displayed generosity in completing revisions in less time than she was officially allowed.

Last but not least, I would like to thank my parents for supporting me during the long time it took for me to complete this project.

TABLE OF CONTENTS

SECTION	PAGE
INTRODUCTION	3
METHOD	7
Research Participants	7
Design	9
Task	10
RESULTS	11
DISCUSSION	13
Personality and Demographic Factors	13
Limitations	21
Conclusion and Future Directions	22
REFERENCES	25
APPENDICES	29
Appendix A. Signed Approval Forms	29
Appendix B. The 20 folk concepts and 3 Vectors of the CPI and their intended meanings	31
Appendix C. Survey used in data collection.	34
Appendix D. Sign-up sheet used to recruit participants	36
Appendix E. Sample consent form	38

LIST OF TABLES

TABLE		PAGE
1.	Descriptive statistics for participants in study	12
2.	Chi-squares of factors included in exercise adherence model	14
3.	Chi-squares of factors not included in exercise adherence model	15
4.	Summary of responses to open-ended survey questions	17

Running Head: PREDICTING EXERCISE ADHERENCE

PREDICTING EXERCISE ADHERENCE USING THE CALIFORNIA
PSYCHOLOGICAL INVENTORY AND DEMOGRAPHIC FACTORS

John P. Little

San Jose State University

Footnotes

Requests for reprints should be sent to John P. Little,
Department of Psychology, San Jose State University, San Jose, California

95192

Abstract

The evidence for the benefits of exercise are well known. Despite this evidence, only 10% of the U.S. adult population exercises regularly enough to elicit these reported benefits. Many theories have been developed to explain why some people adhere to a regular routine and why some do not. Psychological factors studied include depression, anxiety, and self-motivation. Oddly, no study has included a broad-based, non-pathological personality measure in relationship to exercise adherence. The following study was intended to address that void.

The California Psychological Inventory (CPI) was used, along with the demographic variables of age, gender, and education level, to predict exercise adherence in 27 individuals in Northern California. Only the CPI factor of Well-being was found to be significant using a stepwise logistic regression. The implications of this finding are discussed along with recommendations for future research.

Predicting Exercise Adherence Using the California Psychological Inventory and Demographic Factors

Despite extensive evidence of the health benefits associated with exercise, more than 70% of the adult population in the U.S. do not participate in regular physical activity (Blair 1988; Caspersen et al. 1986). In fact, less than 10% of the U.S. adult population exercises 3 or more times per week at an intensity that will elicit improvements in cardiorespiratory fitness, while another 20% report no leisure time physical activity at all (Healthy People 2000, 1990).

There have been many theories to account for exercise adherence. The earlier studies of exercise adherence included biological predictors (Dishman, 1981) such as body composition, body weight and metabolic capacity. These studies found that those with lower body weight and body fat percentage were more likely to adhere to an exercise program.

Psychobiological models, which include biological factors and psychological measures, such as self-motivation, attitude toward physical activity, and physical estimation and attraction scales, were used as early as 1980 (Dishman & Gettman) and continue to be used (Young & Steinhardt, 1991) to explain variance in exercise behavior.

Early cognitive theories included self-persuasion vs. balanced decision making (Wankel & Thompson, 1977). Both self-persuasion and balanced decision making lead to greater adherence than controls. Social cognitive theories used constructs such as self-efficacy (Bandura, 1977) to predict exercise adherence (Deshtarnais, Bouillon, & Godin, 1986; McAuley, 1993; McAuley et al., 1993; Strecher et al., 1986). Self-efficacy is the

belief that one can perform the behaviors necessary for an outcome (behavior expectations) and that those behaviors will actually result in said outcome (outcome expectations). Self-efficacy has also been studied in combination with the theory of planned behavior and reasoned action (Rodgers & Brawley, 1993), decision-making and stages of change (Marcus et al., 1994), and goal setting (Poag & McAuley, 1992). Collectively, these studies have generally shown that individuals with high levels of self-efficacy are more likely to adhere to an exercise program. This may be because self-efficacy is associated with planned behavior and reasoned actions, decision making and states of change, and goal setting, all of which are necessary for maintaining an exercise program.

In addition to self-efficacy, decision-making, and planned behavior, previous psychological factors also studied in relation to exercise adherence include self-motivation (Dishman et al., 1980; Dubbert, 1992) State-Trait anxiety (Klonoff, Annechild, & Landrine, 1994; Welsh, Labbe, & Delaney, 1991), and depression (Klonoff et al., 1994). Not surprisingly, participants with higher self-motivation were more likely to adhere to an exercise program. In studies measuring anxiety and exercise adherence, results were mixed. Some studies showed a correlation between anxiety and adherence (Welsh, Labbe, & Delaney, 1991). Participants with high levels of anxiety were more likely to adhere to an exercise program. Other studies showed no significant relationship between anxiety levels and adherence to an exercise program (Klonoff, Annechild, & Landrine, 1994). Finally, no relationship between depression and exercise adherence have been found when measures of depression have been used.

Oddly, no study has employed a broad-based, multivariate, non-pathological personality measure in relationship to exercise adherence. The purpose of this study is to fill that void. The California Psychological Inventory (Gough, 1956, 1987) was used to measure possible relationships between personality characteristics and exercise adherence. The California Psychological Inventory (CPI) was chosen because it is a broad-based, multivariate measure of personality not associated with pathology. The CPI has been used in status-of-health studies of middle-aged women (Cartwright et al., 1995; Adams, 1994) and in distinguishing between Type A and Type B behaviors (Haemmerlie & Beamish, 1990).

The CPI is composed of 462 items that are based on common and enduring "Folk Concepts" (e.g., self-control, well-being, and intellectual efficiency) that are socially relevant within and among different cultures, rather than on a particular personality theory or theory of pathology. There are 20 Folk Concept and 3 Vector scales measured by the CPI (see Appendix B). Megargee (1972) reported that a Folk Concept can transcend a given era or a particular society. In studies of health in middle aged women where the CPI was used (Adams, 1994; Cartwright et al., 1995), good health was correlated with certain personality traits including higher degrees of intellectual efficiency and empathy and relatively less hostility.

There was no proposed hypothesis as to which personality characteristics might relate to exercise adherence; this was an exploratory study to see if any significant relationship does exist. Speculation about which personality characteristics might be significant could not be empirically based and because this is the first study to use the

CPI, or any broad-based, multivariate test of personality, in relationship to exercise adherence, there was little basis for such speculation. Speculation would also be problematic. For example, as listed in Appendix B, the characteristic of Well-being indicates a person feeling good physically and mentally and feeling optimistic about the future. Does that mean they feel less need to exercise because they feel good already? Or does that mean they exercise regularly to maintain their feelings of well-being? Only empirical testing and follow-up research could provide that answer. Therefore, all Folk Concept scales of the CPI were included. This and future research may reveal which personality characteristics, and perhaps even which specific items, on the CPI relate most strongly to exercise adherence.

In addition to CPI scores, demographics will be used to predict exercise adherence. In particular, the variables of age, gender, and education will be included in the regression analyses. It has been found that physical activity decreases with age in national samples (Gartside et al., 1984; Schoenborn, 1986). Most studies of vigorous physical activity have found that men are more active than women (Sallis et al., 1985; Schoenborn, 1986; Stephens et al., 1985). However, when light or moderate activities are included in the measurement of activity levels, differences between genders decrease or disappear altogether (Stephens et al., 1985).

Differences between levels of education of those who exercise regularly and those who do not have consistently been shown (Schoenborn, 1986; Stephens et al., 1985). Those with higher levels of education are more likely to be involved in physical activity

during leisure time. The current study will include these three demographic factors (age, gender, and education) to see if previous trends are supported.

The final aspect of this study will involve the use of two open-ended questions regarding exercise habits. This investigator believes it is important to elicit idiosyncratic responses from participants rather than using a set theory or model of exercise adherence to direct close-ended questions. Instead of trying to pigeon-hole responses into a certain theory, it may be of value to generate responses to open-ended questions that may lead to new ideas in the challenge of understanding and facilitating exercise adherence. These responses will be categorized and discussed in light of previous theories and possible future research.

In summary, the CPI personality test and the demographic factors of age, gender, and education will be used to predict exercise adherence.

Method

Participants

Originally, participants were to be recruited from a chain of five commercial gyms. However, this was unsuccessful because of delays in sign-up processes at two of the gyms. Perhaps most importantly, it was becoming clear that non-adherers were not signing up for the study. (Although it may at first seem logical that gym members would all be adherers, the high turnover rate at gyms is evidence that not all gym members exercise regularly. A more plausible explanation was stated by one of the on-site coordinators of the study: "People just don't want to admit that they don't exercise regularly.")

Because a more evenly balanced group of adherers and non-adherers was desired, only one of the original gyms was kept as a site while two small, non-fitness related Silicon Valley companies were added as sites. There were 28 participants recruited for the study among the three sites. Participants were offered a personality profile in return for their participation.

Sign-up sheets describing the study (See Appendix D) were posted at the 3 sites. Participants signed-up in either the adherer or non-adherer category as described in the instructions. A voluntary on-site coordinator was recruited at each site to hand-out and pick-up study materials to and from participants. Participants were informed that the survey required approximately 60 - 90 minutes to complete and that they would have 1 week to fill-out and return their survey and completed test materials from the time they picked them up from their gym/company.

For their participation, participants received a personality profile comparing their scores to established norms. Participants were informed that only a clinician trained in the interpretation of the CPI can give them a clinical evaluation. However, their scores would give them a picture of their personality in comparison to population norms.

Participants were informed that their personal information would remain confidential. Numbers will be assigned to each subject and no names would be used in data analysis or in any reporting of results. Data are kept on file with the author.

Design

This study used a between-participants design, with a relationship being measured between exercise adherence and scores on the CPI, age, gender, education, and site.

In developing the criteria for what determines exercise adherence, we began with the traditional fitness guidelines. "For developing and maintaining cardiorespiratory fitness, body composition, and muscular strength and endurance in the healthy adult," the American College of Sports Medicine (1990) recommends training 3-5 days per week at an intensity of 60-90% of maximum heart rate for 20-60 minutes (p. 265). Recommended modes of activity include those that involve large muscle groups (e.g., legs and back) and that can be maintained continuously. Resistance training (weight training - either free weights or machines like Nautilus) is also recommended in order to develop and maintain lean body mass, at a frequency of 2 times per week.

The above recommendations are aimed at improving fitness levels. There is a growing body of knowledge, however, to indicate that light to moderate physical activity can lead to improved health (American College of Sports Medicine, 1996; Leon, Connell, & Rauramaa, 1987). In fact, any activity which raises the heart rate above resting levels can improve health. Therefore, because the current study is interested in the benefits of exercise on a person's health, both weight lifting and aerobics (e.g., walking, jogging, swimming, bicycling, and all varieties of aerobic classes) will be

included when measuring exercise adherence, rather than just focusing on aerobic exercise which falls in the target zone of 60-90% of maximum heart rate.

Duration and frequency will be the criteria used to measure adherence using the following guidelines: Adherence will be operationally defined as exercising at least 3 times per week for a duration of at least 30 minutes, for at least six months. The latter criteria is added because there is evidence that exercise habits maintained for a minimum of six months lead to more permanent routines. Participants self-reported either a "Yes" or "No" on this question on the survey.

Task

Participants were asked to fill out a questionnaire (Appendix C). This questionnaire included demographic information (age, gender, and education), and two open-ended questions. For those meeting the criteria of an adherer, the questions were as follows: 1) "What are 3 reasons you continue to exercise regularly?" and 2) "List 3 things that would interrupt your exercise routine for more than 3 weeks." For non-adherers the questions were as follows: 1) "What are 3 reasons you do not exercise consistently?" and 2) "List 3 things which you feel would help you to exercise routinely."

Participants were then instructed to answer the 462-item California Psychological Inventory (Consulting Psychologists Press, 1986). Participants were provided with a test booklet (which included instructions on how to take the test) and an answer sheet.

Participants were also required to read, sign, and date a consent form included with their test packet (see sample consent form, Appendix E).

Results

A number system was used to code the answer sheets and surveys so that when analyses were performed, survey information and personality test scores for each participant matched. Twenty-eight California Psychological Inventory test sheets were hand-scored using scoring templates supplied by the publisher of the test. A score on each of the 20 folk scales and the 3 Vector scales (see Appendix B) was measured for each participant. Data from the short survey accompanying the CPI were compiled for each participant. Data from this survey included the participant's age, gender, Level of Education, and the site at which they signed-up for the study.

All tests and surveys were checked for completeness. No missing information was found. One subject was eliminated from the analyses because an invalid protocol was detected from the validity formulas determined by Gough (1987). The scores for the participant eliminated from analyses showed a possible random response pattern to the test questions. Twenty-seven participants remained in the analysis. Descriptive statistics for the 27 participants are given for each of the three sites in Table 1.

A stepwise logistic regression was used to analyze the data. A logistic rather than a linear regression was used because the dependent variable (exercise adherence) was dichotomous (adherer or non-adherer). Variables were ranked according to their predictive ability of exercise adherence. An initial criterion level for entry into the

Table 1

Descriptive Statistics for Participants of the 3 Study Sites

	Site 1	Site 2	Site 3	Totals
Adherers (%)	6 (75%)	6 (55%)	7 (88%)	19 (70%)
Non-adherers (%)	2 (25%)	5 (45%)	1 (12%)	8 (30%)
Males (%)	2 (25%)	7 (64%)	3 (38%)	12 (44%)
Females (%)	6 (75%)	4 (36%)	5 (62%)	15 (56%)
Average age in years (<u>SD</u>)	27.5 (4.1)	37.2 (8.6)	40 (7.9)	35.2 (8.8)
Average Level of Education ^a (<u>SD</u>)	2.9 (0.35)	2.5 (0.82)	3.8 (0.46)	3.0 (0.78)

^a Level of Education:

1 = GED, 2 = High School, 3 = Bachelor's degree, 4 = Graduate degree

prediction model was set at $p = .15$. Only one factor, the Folk Concept of Well-being, met this criterion. Therefore, the criterion level was increased by .05 until a minimum of 3 factors were entered into the model. At $p = .25$, 3 factors were entered into the model. These three factors were the Well-being Folk Concept, Level of Education, and Vector 2 (the Norm-favoring scale). The statistics for these three factors are listed in Table 2. Statistics for factors not in the model are listed in Table 3.

Finally, responses to the open-ended questions (see Appendix C) were tallied. Results are listed in Table 4. The number in the parentheses next to each response indicate the number of participants who listed that particular reason.

Discussion

Personality and Demographic Factors

The only factor contributing to the model of exercise adherence at a statistically significant level was the Folk Concept of Well-being. Those with higher scores were more likely to exercise regularly. If an individual scored higher on this Folk Concept, they feel good physically and emotionally and were optimistic about the future. From these results then, one would then ask does an individual exercise regularly because they feel good or is it because of regular exercise that they feel good? If the latter, the research question of why some individuals stick with exercise and some do not remains unanswered.

The next two factors entered into the model with more relaxed statistical criterion ($p=.25$ instead of $p=.15$, the standard p -value for a stepwise logistic regression model) were Level of Education and Vector 2, the Norm-favoring vector. The higher the

Table 2

Variables Included in the Regression Model of Exercise Adherence*

Variable	Number In	Chi-square	p
Well-being	1	3.0182	.0823
Education	2	1.4059	.2357
Norm-favoring	3	1.9189	.1660

*p < .25

Table 3

Variables Not Included in the Model of Exercise Adherence.

Variable ^a	Chi-square	p
Py	0.7873	.3749
In	2.5314	.1116
V1	5.8349	.0157
Sa	4.3815	.0363
Site	2.2061	.1375
Gender	0.4228	.5155
Age	0.2119	.6453
Do	3.6857	.0549
Do	3.6857	.549
Cs	0.2630	.6080
Sy	0.3084	.5786
Sp	0.0928	.7606
Sa	4.3815	.0363
Em	0.5600	.4542
Re	0.0219	.8825
So	0.0740	.7856

^a See Appendix B for description of variables

Table 3 (cont.)

Variables Not Included in the Model of Exercise Adherence.

Variable ^a	Chi-square	p
Sc	0.0058	.9394
Gi	0.3452	.5568
Cm	0.1186	.7306
To	2.7493	.0973
Ac	1.6261	.2022
Ai	0.3871	.7108
Ie	0.3871	.5338
Fx	0.2506	.6166
F/M	3.0870	.0789
V3	0.3183	.5726

* See Appendix B for description of variables.

Table 4

Responses of Exercise Adherers (N=19) to Open-ended Questions on Survey

Why do you exercise regularly?	What would interrupt your routine for at least 3 weeks?
stay in shape/fitness (7)	vacation (7)
feel better/more energy (6)	illness (6)
health (5)	injury (6)
enjoy it (4)	work (4) (change in routine, increased workload)
weight control (4)	burned out (1)
look better/vanity (3)	school (1)
reduce stress (2)	family problems (1)
leads to a better outlook (1)	not enough time (1)
habit (1)	loss of motivation (1)
feel better about myself (1)	old age (1)
to be outside (1)	
if I stop, it would be difficult to start again (1)	

Table 4 (cont)

Responses of Exercise Non-adherers (N=8) to Open-ended Survey Questions.

What are 3 reasons you do not exercise regularly?	What would help you exercise regularly?
lack of time/ too busy (6)	workout partner (3)
too tired (5)	having my own equipment at home (2)
boredom (3)	having more time (2)
injury (2)	access to gym for weights (1)
lazy (2)	exercise that would fit into schedule (1)
too much work, too much time to see results (1)	exercise which would show quick results (1)
not interested in most forms of exercise/aerobics (1)	variety (1)
high costs of gym membership (1)	less job committment (1)
lack of motivation (1)	more knowledge of fitness and nutrition (1)
distractions (1)	having no injury (1)
no safety (1)	personal trainer (1)
illness (1)	playing softball (1)
forget (1)	taking vitamins (1)
	having a regular schedule (1)
	feeling better about myself (1)
	getting into a routine (1)
	starting - just once (1)

education level and the higher the score on Norm-favoring, the more likely an individual was to exercise regularly. This trend toward a relationship between education and exercise adherence is consistent with previous research (Schoeborn, 1986; Stephens et al., 1985). Matthews, et al. (1989) have suggested that those with higher education levels tend to be predominantly white-collar workers whose jobs require little physical activity compared to blue-collar workers and are therefore more likely to participate in leisure-time activity. However, no research clearly indicates why those with higher levels of education exercise more regularly than those with less education. Is it because those with more education have more knowledge of the benefits of exercise? Or is it because those with higher levels of education tend to be white collar workers and therefore have more money to buy gym memberships, have more leisure time, and are less tired at the end of the day because they are not performing manual labor? These questions remain unanswered and further study is needed.

Those with higher scores on the Norm-favoring vector also tended to exercise more regularly than those who scored lower. If individuals scored higher on Norm-favoring they tend to be seen as well-organized, conscientious, conventional, dependable, and controlled (see Appendix B), whereas those scoring lower on Norm-favoring tend to be seen as rebellious, restless, pleasure-seeking, and self-indulgent. From these descriptions one might understand why those who are more "controlled," "conventional," and "conscientious" would be more likely to follow an exercise routine than those who are "restless," "pleasure-seeking," and "self-indulgent." Those who are

conventional might be more likely to “follow the rules” than those who are self-indulgent. Exercise takes discipline and often does not feel very pleasureable.

Some studies (Gough, 1994; Wallbrown & Jones, 1992) evaluating the CPI have interpreted this test of personality as a measurement differentiating between more socialized and less socialized individuals as well as measuring an individual’s level of personal adjustment. Other studies (Adams, 1994; Cartwright, Wink, & Kmetz, 1995) have used 33 of the CPI items as a measure of hostility and have found that lower levels of hostility are correlated with better overall health. Therefore, a low score on Norm-favoring could be correlated with higher levels of hostility and a lower level of personal adjustment. If this correlation has any validity, it could be speculated that an individual with low scores on the Norm-favoring vector may have difficulty with the rules and regulations associated with exercise and/or may have other issues related to lack of personal adjustment, such as difficulty dealing with frustration or inability to delay gratification, which may impact their ability to exercise regularly.

Despite the discussion above, however, both Level of Education and high scores on the Norm-favoring vector were not statistically significant factors in the model of exercise adherence and can only be discussed as potential factors which might warrant further research.

Responses to Open-ended Questions

One of the outstanding features of the responses to the open-ended questions is the relative consistency of responses for adherers (N=19) compared to the lack of consistency of responses for non-adherers (N=8). The non-adherers, although

accounting for less than 1/3 of total respondents, had a more varied set of responses to their two open-ended questions than did the adherers. It should be noted that each group answered essentially opposing questions: Adherers were asked why they exercised regularly while non-adherers were asked why they did *not* exercise regularly? Adherers were asked what would *hurt* their exercise routine while non-adherers were asked what would *help* them establish a regular exercise routine?

Were the non-adherers simply giving excuses, masking the real reasons for lack of adherence? Or should each response be taken at face-value and addressed on an individual basis? Further research is necessary to answer these questions. However, given the wide variety of responses the non-adherers gave, it is difficult to formulate a theory that could account for the lack of adherence. The two reasons with the most responses of why an individual does not exercise regularly, lack of time and being "too tired", are not very helpful. Lack of time is a barrier to regular exercise for both adherers and non-adherers (Dishman, Sallis, & Orenstein, 1985) and the reason of being "too tired" brings up the question of the chicken and the egg - exercise gives you energy, but you need energy to exercise.

Limitations

The first limitation of this research is that it relied on self-report. There is potential for inaccuracy here, especially if an individual is inclined to give the "right answer" and report exercising regularly when in fact they do not meet the criteria for being an adherer. A second limitation was the lack of a participants. Only 28 people participated, with one being excluded from analysis for possible random responses to

the CPI. A larger sample may have enhanced power and provided stronger evidence for or against any possible relationships between personality and exercise adherence.

Finally, if a relationship *does* exist between personality and exercise adherence, what can a person do about it? Is personality malleable? Or are people who are naturally rebellious and self-indulgent forever destined to a life of inactivity? In response to these concerns, if a relationship between personality and exercise adherence is revealed, there may be environmental or program factors that could be changed to meet the needs of individuals who have low scores on the norm-favoring vector. For example, a normal aerobics class might not appeal to such an individual, but water polo, rock-climbing, team-rollerblading, or contemporary dance might.

Conclusion and Future Directions

In conclusion, the only statistically significant factor entered into a model of exercise adherence from the current research was the Folk-concept of Well-being, with higher scores indicating an individual feels good physically and emotionally and feels optimistic about the future. With more a more relaxed statistical criteria of $p=.25$ (as compared to $p=.15$ normally used in regression models), the factors of education and the Norm-favoring Vector also contributed to the regression model.

Non-adherers had a more varied set of responses to the open-ended questions than adherers, which makes it difficult to formulate a concise theory as to why some individuals fail to participate in exercise routinely. Further research needs to be conducted studying the barriers individuals encounter when trying to establish an exercise routine such as perceived lack of access to facilities (Shephard, 1988) and time

constraints (Dishman, 1981; Martin & Dubbert, 1985), as well as the interventions needed to circumvent these barriers.

This study attempted to provide one small piece to the exercise adherence puzzle. More research is necessary to further examine the extent to which personality and exercise adherence are correlated. Questions such as "If there is a relationship between personality and exercise adherence, what practical implications would such a relationship have?" and "What kind of interventions would be successful in encouraging regular exercise behavior for people with different personality traits?" still need to be answered.

However, it is apparent that one factor is unlikely to provide the answer to this problem, whether that factor be personality traits, education, age, or income. For example, even though there has been considerable support for the relationship between self-efficacy and exercise adherence recently (Dzewaltowski, Noble, & Shaw, 1990; McAuley & Jacobson, 1991; Sallis, et al., 1989), when studied along with other cognitive factors such as locus of control, feelings of personal health responsibility, and knowledge and beliefs concerning exercise, self-efficacy becomes a poor predictor of exercise activity, adherence, and dropout (Dishman, 1991).

While complex, all-inclusive theories are being developed which would take into account such factors as personality, knowledge and beliefs, education, societal norms, and role models, etc., one is left with a most important question: What does one do today to increase and maintain exercise behaviors? A practical recommendation has been offered by Belisle, Roskies, and Levesque (1987): Instead of searching for the

perfect treatment, it would be wiser to use a variety of low cost interventions and then evaluate each one using a cost-benefit ratio. The practitioner could then utilize the strategies which work the best and cost the least. This recommendation would likely result in increasing at least part of the population's exercise habits while providing valuable data for complex, multi-component theories currently in development.

Exercise adherence is an important area of study. There are physical, mental, and fiscal consequences associated with lack of exercise. The latter, with increasing attention being paid to health care costs, may prove to be the greatest impetus to solving the problem of lack of exercise adherence. Until the cost of inactivity becomes fiscally unacceptable, researchers and health promoters may be a long way from developing and implementing successful interventions to increase the exercise adherence of a major segment of the population.

References

American College of Sports Medicine. (1990). The recommended quantity and quality of exercise for developing and maintaining cardiorespiratory and muscular fitness in health adults. Medicine and Science in Sports and Exercise, *22*, 265-274.

American College of Sports Medicine. (1996). Target heart rates: A new view of an old chart. Certified News, *6*, 8-9.

Adams, S.H. (1994). Role of hostility in women's health during midlife: A longitudinal study. Health Psychology, *13*, 488-495.

Bandura, A. (1977). Toward a unifying theory of behaviorai change. Psychological Review, *84*, 191-215.

Belisle, M., Roskies, E., & Levesque, J.M. (1987). Improving adherence to physical activity. Health Psychology, *6*, 159-172.

Blair, S.N. (1988). Exercise, health, and longevity. In Lamb & Murray (Eds.) Perspectives in Exercise Science and Sports Medicine (pp. 443-489). Benchmark Press Inc., Indianapolis.

Cartwright, L.K., Wink, P., & Kmetz, C. (1995). What leads to good health in midlife women physicians? Some clues from a longitudinal study. Psychosomatic Medicine, *57*, 284-292.

Caspersen, W., Christenson, G.M., & Pollard, R.A. (1986). Status of the 1990 physical fitness and exercise objectives - evidence from NHIS 1985. Public Health Reports, *101*, 587-592.

Desharnais, R., Bouillon, J., & Godin, G. (1986). Self-efficacy and outcome expectations as determinants of exercise adherence. Psychological Reports, *59*, 1155-1159.

Dishman, R.K. (1981). Biological influences on exercise adherence. Research Quarterly for Exercise and Sport, *52*, 143-159.

Dishman, R.K. (1982). Compliance/adherence in health-related exercise. Health Psychology, *1*, 237-267.

Dishman, R.K. (1991). Increasing and maintaining exercise and physical activity. Behavior Therapy, *22*, 345-378.

Dishman, R.K., & Gettman, L.R. (1980). Psychobiologic influences on exercise adherence. Journal of Sport Psychology, 2, 295-310.

Dishman, R.K., Ickes, W., & Morgan, W.P. (1980). Self-motivation and adherence to habitual physical activity. Journal of Applied Social Psychology, 10, 115-132.

Dishman, R.K., Sallis, J.F., & Orenstein, D.R. (1985). The determinants of physical activity and exercise. Public Health Reports, 100, 158-171.

Dubbert, P.M. (1992). Exercise in behavioral medicine. Journal of Consulting and Clinical Psychology, 60, 613-618.

Dzewaltowski, D.A., Noble, J.M., & Shaw, J.M. (1990). Physical activity participation: social cognitive theory versus the theories of reasoned action and planned behavior. Journal of Sports, Exercise, & Psychology, 12, 388-405.

Gartside, P.S., Khoury, P., & Glueck, C.J. (1984). Determinants of high-density lipoprotein cholesterol in blacks and whites: The second National Health and Nutrition Examination Survey. American Heart Journal, 108, 641.

Gough, H.G. (1956). Manual for the California Psychological Inventory. Palo Alto, CA: Consulting Psychologists Press.

Gough, H.G. (1987). CPI Administrator's Guide. Palo Alto, CA: Consulting Psychologists Press.

Gough, H.G. (1994). Theory, development, and interpretation of the CPI Socialization scale. Psychological Reports, 75, 651-700.

Haemmerlie, F.M., & Beamish, P. (1990). The Jenkins Activity Survey and the CPI - Revised: Further evidence of adaptive and maladaptive Type A traits. Journal of Clinical Psychology, 46, 573-581.

Healthy People 2000 (1990). National health promotion and disease prevention objectives. Department of Health and Human Services, No. PHS 91-50213, US Government Printing Office, Washington, D.C.

Klonoff, E.A., Annechild, A., & Landrine, H. (1994). Predicting exercise adherence in women: The role of psychological and physiological factors. Preventive Medicine, 23, 257-262.

Leon, A.S., Connell, D.R.J., & Rauramaa, R. (1987). Leisure-time physical activity levels and risk of coronary heart disease and death. Journal of the American Medical Association, 258, 2388-2395.

Marcus, B.H., Eaton, C.A., Rossi, J.S., & Harlow, L.L. (1994). Self-efficacy, decision-making, and stages of change: An integrative model of physical exercise. Journal of Applied Social Psychology, 24, 489-508.

Martin, J.E. & Dubbert, P.M. (1985). Exercise applications and promotion in behavioral medicine: Current status and future directions. Journal of Consulting and Clinical Psychology, 50, 1004-1017.

Matthews, K.A., Kelsey, S.F., Meilahn, E.N., Kuller, L.H., & Wing, R.R. (1989). Educational attainment and behavioral and biologic risk factors for coronary heart disease in middle-aged women. American Journal of Epidemiology, 129, 1132-1144.

McAuley, E. (1993). Self-efficacy and the maintenance of exercise participation in older adults. Journal of Behavioral Medicine, 16, 103-113.

McAuley, E. & Jacobson, L. (1991). Self-efficacy and exercise participation in adult females. American Journal of Health Promotion, 5, 185-191.

Megargee, E.I. (1972). The California Psychological Inventory handbook. London: Jossey-Bass.

Poag, K., & McAuley, E. (1992). Goal setting, self-efficacy, and exercise behavior. Journal of Sport & Exercise Psychology, 14, 352-260.

Rodgers, W.M., & Brawley, L.R. (1993). Using both self-efficacy and the theory of planned behavior to discriminate adherers and dropouts from structured programs. Journal of Applied Sport Psychology, 5, 195-206.

Sallis, J.F., Haskell, W.L., & Wood, P.D. (1985). Physical activity assessment methodology in the Five-City Project. American Journal of Epidemiology, 121, 91-106.

Sallis, J.F., Hovell, M.F., Hofstetter, C.R., & Faucher, P. (1989). A multivariate study of determinants of vigorous exercise in a community sample. Preventative Medicine, 18, 20-34.

Schoenborn, C.A. (1986). Health habits of U.S. adults: The "Alameda 7" revisited. Public Health Report, 101, 571-580.

Shephard, R.J. (1987). Physical Activity and Aging. London: Croom Helm.

Shephard, R.J. (1988). Exercise adherence in corporate settings: personal traits and program barriers. In R.K. Dishman (Ed.) Exercise Adherence: Its Impact on Public Health (pp. 305-320). Champaign, IL: Human Kinetics.

Stephens, T., Jacobs, D.R., & White, C.C. (1985). A descriptive epidemiology of leisure-time physical activity. Public Health Report, 100, 147-159.

Strecher, V.J., McEvoy DeVellis, B., Becker, M.H., & Rosenstock, I.M. (1986). The role of self-efficacy in achieving health behavior change. Health Education Quarterly, 13, 73-91.

Wallbrown, F.H. & Jones, J.A. (1992). Re-evaluating the factor structure of the Revised California Psychological Inventory. Educational and Psychological Measurement, 52, 379-386.

Wankel, L.M. & Thompson, C. (1977). Motivating people to be physically active: Self-persuasion vs. balanced decision making. Journal of Applied Social Psychology, 7, 332-340.

Welsh, M. C., Labbe, E.E., & Delaney, D. (1991). Cognitive strategies and personality variables in adherence to exercise. Psychological Reports, 68, 1327-1335.

Young, D.R., & Steinhardt, M.A. (1991). An Analysis of the psychobiological model in a supervised setting. Health Values, 15, 42-48.

Appendix A
Signed use of subjects and proposal approval forms



A campus of The California State University

Office of the Academic Vice President • Associate Academic Vice President • Graduate Studies and Research
One Washington Square • San Jose, California 95192-0025 • 408/924-2480

TO: John Little
12505 Woodside Court
Saratoga, CA 95070

FROM: Serena W. Stanford 
AAVP, Graduate Studies & Research

DATE: July 10, 1996

The Human Subjects-Institutional Review Board has approved your request to use human subjects in the study entitled:

"Predicting Exercise Adherence using the California Psychological Inventory and Demographic Factors"

This approval is contingent upon the subjects participating in your research project being appropriately protected from risk. This includes the protection of the anonymity of the subjects' identity when they participate in your research project, and with regard to any and all data that may be collected from the subjects. The Board's approval includes continued monitoring of your research by the Board to assure that the subjects are being adequately and properly protected from such risks. If at any time a subject becomes injured or complains of injury, you must notify Serena Stanford, Ph.D., immediately. Injury includes but is not limited to bodily harm, psychological trauma and release of potentially damaging personal information.

Please also be advised that all subjects need to be fully informed and aware that their participation in your research project is voluntary, and that he or she may withdraw from the project at any time. Further, a subject's participation, refusal to participate, or withdrawal will not affect any services the subject is receiving or will receive at the institution in which the research is being conducted.


If you have any questions, please contact me at (408) 924-2480.

Appendix A
(cont.)


APPROVED BY THE MASTER'S THESIS COMMITTEE



Thomas Tutko, Thesis Chairperson



Robert J. Pellegrini, Thesis Committee Member



Laree A. Huntsman, Thesis Committee Member

Appendix B

The 20 Folk Concepts and 3 Vectors of the CPI and their intended meaning (Gough, 1987).

<u>Scale Name</u>	<u>Intended implications of higher and lower scores</u>
Do (Dominance)	Higher: confident, assertive, dominant, task-oriented Lower: unassuming, not forceful
Cs (Capacity for Status)	Higher: ambitious, wants to be a success, independent Lower: unsure of self, dislikes direct competition
Sy (Sociability)	Higher: sociable, likes to be with people, friendly Lower: shy, feels uneasy in social situations, prefers to keep in the background
Sp (Social Presence)	Higher: self-assured, spontaneous; a good talker; not easily embarrassed Lower: cautious, hesitant to assert own views or opinions; not sarcastic or sharp-tongued
Sa (Self-acceptance)	Higher: has good opinion of self; sees self as talented, and as personally attractive Lower: self-doubting; readily assumes blame when things go wrong; often thinks others are better
In (Independence)	Higher: self-sufficient, resourceful, detached Lower: lacks self-confidence, seeks support from others
Em (Empathy)	Higher: comfortable with self and well-accepted by others; understands feelings of others Lower: ill at ease in many situations; unempathic
Re (Responsibility)	Higher: responsible, reasonable, takes duties seriously Lower: not overly concerned about duties and obligations; may be careless or lazy
So (Socialization)	Higher: comfortably accepts ordinary rules and regulations; finds it easy to conform Lower: resists rules and regulations; finds it hard to conform; not conventional

(cont.)

(Appendix B, cont.)

Sc (Self-control)	<p>Higher: tries to control emotions and temper; takes pride in being self-disciplined</p> <p>Lower: has strong feelings and emotions, and makes little attempt to hide them; speaks out when angry and annoyed</p>
Gi (Good Impression)	<p>Higher: wants to make a good impression; tries to do what will please others</p> <p>Lower: insists on being himself or herself, even if this causes friction or problems</p>
Cm (Communality)	<p>Higher: fits in easily; sees self as a quite average person</p> <p>Lower: sees self as different from others; does not have the same ideas, preferences, etc., as others</p>
Wb (Well-being)	<p>Higher: feels in good physical and emotional health; optimistic about the future</p> <p>Lower: concerned about health and personal problems; worried about the future</p>
To (Tolerance)	<p>Higher: is tolerant of others' beliefs and values, even when different from or counter to own beliefs</p> <p>Lower: not tolerant of others; skeptical about what they say</p>
Ac (Achievement via Conformance)	<p>Higher: has strong drive to do well; likes to work in settings where tasks and expectations are clearly defined</p> <p>Lower: has difficulty in doing best work in situations with strict rules and expectations</p>
Ai (Achievement via Independence)	<p>Higher: has strong drive to do well; likes to work in settings that encourage freedom and individual initiative</p> <p>Lower: has difficulty in doing best work in situations that are vague, poorly defined, and lacking in clear-cut methods and standards</p>
Ie (Intellectual Efficiency)	<p>Higher: efficient in use of intellectual abilities; can keep on at a task where others might get bored or discouraged</p> <p>Lower: has a hard time getting started on things, and seeing them through to completion</p>

(cont.)

(Appendix B cont.)

Py (Psychological-mindedness)	<p>Higher: more interested in why people do what they do what they do; good judge of how people feel and what they think about things</p> <p>Lower: more interested in the practical and concrete than the abstract; looks more at what people do than what they feel or think</p>
Fx (Flexibility)	<p>Higher: flexible; likes change and variety; easily bored by routine life and everyday experience; may be impatient, and even erratic</p> <p>Lower: not changeable; likes a steady pace and well-organized life; may be stubborn and even rigid</p>
F/M (Femininity / Masculinity)	<p>Higher: sympathetic, helpful; sensitive to criticism; tends to interpret events from a personal point of view; often feels vulnerable</p> <p>Lower: decisive, action-oriented; takes the initiative; not easily subdued; rather unsentimental</p>
Vector 1 (Internality)	<p>Higher: reticent, shy, reserved, moderate, modest, reluctant to initiate or take decisive action</p> <p>Lower: tends to be outgoing, confident, talkative, and to have social poise and presence</p>
Vector 2 (Norm-favoring)	<p>Higher: well-organized, conscientious, conventional, dependable, and controlled</p> <p>Lower: rebellious, restless, pleasure-seeking, and self-indulgent</p>
Vector 3 (Realization)	<p>Higher: moderate, mature, insightful, optimistic, and have a wide range of interests</p> <p>Lower: dissatisfied, uncomfortable with uncertainty and complexity, and have a narrow or reduced range of interests</p>

Appendix C (survey to be included with CPI)

Please answer all of the following questions. Results will be completely confidential.

1. Have you exercised aerobically and/or with weights for at least 30 minutes, 3 times per week, for the last six months?

Yes _____ No _____

2. Age _____

3. Sex _____

4. Level of Education:

GED _____ HS Diploma _____ Bachelor's Degree _____

Graduate Degree _____

If you answered yes to questions #1, answer questions #5 and #6.
If you answered no to question #1, answer questions #7 and #8.

Everyone please answer question #10 regarding your desire (or lack of) to receive study results. Study results will be available beginning July 15, 1996.

5. What are 3 reasons you continue to exercise regularly? Use an extra sheet of paper if needed.

1. _____
2. _____
3. _____

6. List 3 things that would interrupt your exercise routine for more than 3 weeks. Again, use an extra sheet of paper if needed.

1. _____
2. _____
3. _____

(Appendix C cont:
survey to be used in collection of demographic data)

7. What are 3 reasons you do not exercise regularly? Use an extra sheet of paper if needed.

1. _____
2. _____
3. _____

8. List 3 things which you feel would help you to exercise regularly. Again, use an extra sheet of paper if needed.

1. _____
2. _____
3. _____

9. Would you like to receive a summary of study results? (please circle)

Yes/No

If yes, please include a self-addressed, stamped envelope (size #10).

Thank you for participating in this study. You will receive your personality profile within 2 weeks of turning in your materials.

Thank you again for your time and interest in this study.

(Appendix D)

What kind of personality do you have?

You can find out for *free* by participating in the following study! This study is going to look at exercise habits and personality. Please read on

If you would like to participate in this study, there are a few things you should know. **First**, it will be completely confidential. All study materials and results will be placed in sealed envelopes with your name on it. No one but you and the researchers will have access to information obtained from this study. **Second**, two weeks after you drop off your completed materials at this gym, you will receive a personality profile which compares you to the rest of the population. Only a trained professional can give you a clinical evaluation of your personality but this profile will give you an interesting snapshot of yourself (don't worry, this personality test is non-pathological - in other words, it's not testing for mental illness, just normal personality traits). **Finally**, these materials will take approximately 60-90 minutes to complete. Once you pick up these materials from your gym you will have one week to complete and return them to this gym. You can complete them at any time which is convenient for you during that one week period!

If you are interested in participating please sign-up on the next page in the **proper category**. If you have any questions you can call me, John Little, at (408) 777-0851 and will be happy to answer any of your questions!

I WOULD LIKE TO THANK YOU IN ADVANCE FOR PARTICIPATING! I KNOW YOU WILL FIND THIS FUN AND INTERESTING!

PLEASE SIGN-UP ON THE NEXT PAGE

If you have exercised regularly, at least 3 times per week (aerobics and/or weights), at least 30 minutes per session, for at least six months, please sign-in below. Please include your area code with your phone number.

Women

Men

	<u>Name</u>	<u>phone #</u>
1.	_____	_____
2.	_____	_____
3.	_____	_____
4.	_____	_____
5.	_____	_____
6.	_____	_____

	<u>Name</u>	<u>phone #</u>
1.	_____	_____
2.	_____	_____
3.	_____	_____
4.	_____	_____
5.	_____	_____
6.	_____	_____

Alternates

7.	_____	_____
8.	_____	_____

7.	_____	_____
8.	_____	_____

If you **haven't** exercised regularly, at least 3 times per week, for at least 30 minutes, and for at least 6 months, sign-in below. Please include your area code with your phone number.

Women

Men

	<u>Name</u>	<u>phone #</u>
1.	_____	_____
2.	_____	_____
3.	_____	_____
4.	_____	_____
5.	_____	_____
6.	_____	_____

	<u>Name</u>	<u>phone #</u>
1.	_____	_____
2.	_____	_____
3.	_____	_____
4.	_____	_____
5.	_____	_____
6.	_____	_____

Alternates

7.	_____	_____
8.	_____	_____

7.	_____	_____
8.	_____	_____

You will be contacted about when you can pick up your study materials.

