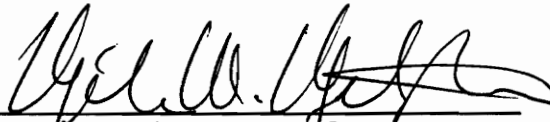


The Fit Family Program
by
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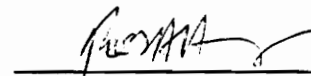
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ABSTRACT

The purpose of this study was to explore how families would respond to a health-related, home-centered family fitness program designed to improve lifestyle exercise and eating behaviors. This program involved five families (eleven subjects) recruited from Park Road High School in Rural Virginia. The program was based on family systems theory, and social learning principles. The program consisted of a one-week baseline period and five two-week intervention periods. A changing criterion design was utilized; and incentives (\$15 toward active sports equipment) were offered during the final two phases if all family members met their food goals for both weeks of the given phase.

The entire group was tested regarding personal health measures (flexibility, resting heart rate, resting blood pressure, height, weight, and body composition); strength (bent knee sit-ups, modified pull-ups); knowledge (written test); and cardiovascular endurance (one mile or 1/2 mile run/walk) at baseline at the six week point (interim) of the intervention, and at the ten week point (final).

In addition to the above measures, subjects received training in the use of diet and activity classification systems. Subjects were asked to keep daily diet/activity logs using these systems, and to work toward preset goals.

Following each two-week phase, each family received feedback on scores and measures as well as counseling on setting new goals for the next phase.

Results indicate that the subjects decreased their high-fat food consumption by an average of 21%.

Activity points (measured by activity system) increased by an average of 20%. The Fit Family Program participants also improved scores on all the other dependant measures on average. Further analysis showed similar results by families, and by individuals.

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Chapter I

Introduction

There is extensive interest among health professionals in the prevention of lifestyle-related diseases such as cardiovascular disease (CVD), and many types of cancers (Parcel, Simons-Morton, O'Hara, Baranowski, Kolke, & Bee, 1987). Much of the research in this area has established an inverse relationship between CVD risk and the amount of exercise performed (Blair & Kohl, 1989). Thus, the more a person exercises, the lower that person's risk of CVD. Some of the established beneficial effects of exercise on health include a reduced risk of CVD, desirable weight control, and reduced symptoms of stress (Blair, Jacobs, & Powell, 1985; Powell, Paffenbarger, 1985; Siscovick, LaPorte, & Newman, 1985; Taylor, Salles, & Needle, 1985).

Beneficial effects on the control and prevention of hypertension, diabetes, osteoporosis, and certain psychiatric conditions appear likely, but are not as firmly established (Siscovick et al., 1985; Taylor et al., 1985). There is evidence that our nation's children are becoming less fit, and more overweight than they were over the past few decades (Ross & Gilbert, 1985; Ross & Pate, 1987). According to some, excessive television watching and the video game explosion have spelled doom for a generation of children in terms of physical fitness levels (Ross & Pate,

1987). There is evidence that certain CVD risk factors can be influenced early in childhood, and thus may help to decrease the incidence of CVD in adulthood (Linder & Durant, 1982).

Blood pressure has been shown to be higher in children who are below average in fitness than in those who are above average in fitness (Fraser, Phillips, & Harris, 1983), and blood pressure has been shown to be positively related to the incidence of CVD (Holme, et. al, 1985). Also, HDL cholesterol has been shown to be protective against CVD (Holme, et al., 1985). These HDL cholesterol levels have been shown to be higher in highly-trained child athletes than in average children (Valimaki, Punlakoski, & Vubari, 1980). In addition to the benefits of CVD risk factor reduction, research has shown exercise to have potential health benefits even when there is no apparent training effect (Haskell, Montoye, & Orenstein, 1985).

Dietary habits have also been an area of focus in the prevention of CVD and certain types of cancer. A reduction in the amount of high saturated fat foods eaten has been shown to result in a lower incidence of CVD and certain types of cancers (Doll & Peto, 1981). One study of over 11,000 adults found that the percentage who reported eating foods which could potentially increase CVD and cancer risk was high; red meats (55%), bacon and lunch meats (43%).

This same study found that the percentage of subjects who reported eating foods in the American Cancer Society guidelines was small; cruciferous vegetables (18%), fruits and vegetables high in vitamin A (21%), and high fiber breads and cereals (16%) (Doll & Peto, 1981). This provides some evidence that simply exercising more and eating fewer high-fat foods could contribute toward reducing some of the nations biggest health problems.

Many researchers feel that CVD begins early in childhood. This supports the notion that children should be targeted for heart-healthy behavioral change programs while they are young. Lifestyle patterns are not then as deeply ingrained and may be easier to change (Haskell, Montoye, & Orenstein, 1985).

Many weight-loss studies have been performed to date-with mixed results. In one such study researchers found that children's food and exercise behaviors were directly related to those of their parents (Epstein, Wing, Sternachak, Dickson, & Michaelson, 1980).

Epstein et. al. (1980) also found that interventions with a family-focus had promising results with the development and maintenance of new dietary behaviors. In a follow-up study Epstein, Wing, Koeski, Andraski & Ossip (1981) reported that a family-focused intervention which utilized the social learning theory concepts of goal

setting, incentives, feedback, and role-modeling had even greater success in changing the dietary habits of families.

Most research to date has targeted specific individuals such as parents, children, males, or females for the focus of the intervention. There has not been much research attempting to change family lifestyle behaviors such as exercise and eating habits by focusing on the family as a unit for the intervention. More research is needed combining a family focus with the concepts of social learning theory to assist in the development and maintenance of more heart-healthy lifestyles.

Statement of the Problem

Children's fitness levels are not as high as many experts feel they should be. This and the high incidence of cancer and cardiovascular disease among adults demonstrates a need for intervention in the dietary and exercise habits of many people. The Fit Family Program is a home-based, health-related Family Fitness program designed to improve lifestyle eating and exercise behavior.

The following is a list of questions this study was designed to address:

Will participation in the Fit Family Program reduce the amount of high-fat foods consumed by parents and children?

Will parents and children engage in increased physical activity as a result of the Fit Family Program?

Will parents and children improve scores on health-related fitness parameters (body composition, endurance, flexibility, strength) as a result of the Fit Family Program?

Will parents and children reduce cardiovascular disease risk factors (blood pressure, resting heart rate) as a result of the Fit Family Program?

Will parents and children improve their knowledge of physical fitness and nutrition concepts as a result of the Fit Family Program?

Research Hypotheses

Parents and children participating in a 10-week health-related family fitness program will eat significantly fewer high fat foods each week.

Parents and children participating in a 10-week home-centered, health-related family fitness program will significantly increase their weekly activity levels.

Parents and children participating in a 10-week home-centered, health-related family fitness program will improve scores on health-related fitness parameters (body composition, endurance, flexibility, strength).

Measures of parents' and children's risk factors for coronary artery disease (blood pressure, resting heart rate) will improve following a 10-week home-centered, health-related family fitness program.

Parents' and children's knowledge of fitness and nutrition will improve following a 10-week home-centered, health-related family fitness program.

Limitations

Subjects were not randomly selected for this study.

Since subjects were not randomized, generalizations concerning the general population are not possible.

However, should the program prove to be effective for this

group, it could be recommended for extension to other family groups as well.

Delimitations

Subjects were 5 families with children affiliated with Park Road High School in rural Southwest Virginia. Some variables may differ between these subjects and the general population, which could have had an effect on results of the study. For this reason the results of this study should not be generalized beyond this specific study.

Definitions

Educational techniques derived from social learning theory refer to the use of self-monitoring, contracting, modeling, reinforcement, and education in the use of social support to effect changes in health behavior.

Families: For purposes of this study, 5 families were defined as at least one parent and one or more children between 9 and 18 years of age participating in the Fit Family Program.

Health related fitness refers to those parameters of fitness which reduce risk of hypokinetic diseases, particularly cardiovascular disease (body composition, endurance, flexibility, strength).

Hypokinetic diseases refer to those disease processes which are associated with sedentary lifestyles:

Cardiovascular disease, obesity, back pain, osteoporosis, diabetes, ulcer disease, some cancers, and depression.

Knowledge of fitness and nutrition was defined as the score on a 25-item test which was developed by compiling questions from other sources (Williams, Harageones, Johnson, & Smith, 1986; National Heart, Lung, and Blood Institute, 1988; Sander & Burton, 1987; United States Department of Agriculture, 1986). This test was designed for a fourth grade reading level. Both parents and children were given the same test.

Measures of risk factors for coronary artery disease for purposes of this study refer to blood pressure, body composition and resting heart rate.

Assumptions

It was assumed that participants were honest and reliable in their self-reporting of foods consumed, and number of exercise points, even with incentives offered for improvements during the final two phases of the intervention. However, any gross misrepresentation would become evident if objective fitness parameters failed to follow in the expected direction.

It is also assumed that the Fit Family Program, not other factors, was responsible for resulting changes in the fitness and dietary parameters.

This chapter provided an introduction to the Fit Family Program including a statement of the problem, research questions, and the research hypothesis. Also included were the delimitations, limitations, definitions, and assumptions pertinent to this study.

Chapter II

Review of Related Literature

The purpose of this chapter is to review the areas of completed research relevant to this study. These include: family-oriented interventions, physical education interventions, and individually-oriented lifestyle change interventions.

Family Oriented Interventions

The completed research utilizing a family focus is encouraging in its reported ability to change lifestyle behaviors. Many health professionals are beginning to advocate the use of the family approach for lifestyle changes such as dietary and exercise habits (Baranowski & Nader, 1985; Hertzler, 1983; Simons-Morton, et al., 1986).

Many of these professionals believe that in order for one family member to achieve changes in diet and/or exercise behaviors, other members of the family must be involved to reinforce the changes (Baranowski & Nader, 1985). In this way the entire family can work together to model and reinforce the necessary behaviors for each other. The techniques of modeling, self-monitoring, contracting, reinforcement, incentives, and social support are part of the social learning theory. This theory is based on the assumption that human behavior is a result of complex and changing interactions among cognitive, behavioral, and

environmental factors (Parcel & Baranowski, 1981). These techniques are significant because they may improve a family's ability to better support and assist each other in making changes through a team effort. If one member of the family has difficulty changing lifestyle patterns, it is likely that others can encourage him/her through those difficult times.

There are several studies which focus on the importance of family support in changing diet and exercise behaviors. Many health behaviors and risk factors have been shown to be more common within families than between families. While heredity is surely responsible for some of this; the family environment is probably a major factor as well (Baranowski & Nader, 1985; Simons-Morton, et al., 1986).

Another family-oriented study seeking to reduce hypertension among a group of first, second, and third grade students by reducing sodium intake reported a measure of success. Eighty families whose children had high blood pressure were randomly assigned to experimental or control groups. The experimental group received extensive nutritional education biweekly for four weeks, then bimonthly for a year. Parents and children were together for some parts and separate for other parts of the 90 minute sessions. The control group received no educational material. Both groups maintained three-day food logs and

collected 24-hour urine samples. At the end of the intervention, sodium intake reportedly decreased by 40% in the experimental group, even though blood pressures did not change significantly in either group (Gillium, Elmer, Prineas, & Surbey, 1981). Even with its limited success, this investigation provides support for the effectiveness of family-oriented interventions in changing eating behaviors.

In another study focusing on eating behaviors, parents of overweight children were shown to engage in more food-related rewards and offerings than the parents of average-size children, which could have contributed to the development of overeating patterns in children (Klesges, et al., 1983).

Concerning exercise, Ross and Pate (1987) found that parents who were physically active had children who were leaner, participated in more community-based sports, and watched less television. The leaner children's parents also exercised more with their children than did parents of the overweight children. However, just thirty percent of the parents in that study participated in any moderate-to-vigorous exercise, and less than one-half of those ever exercised with their children (Ross & Pate, 1987).

In a three-year study, four-hundred families of hypertensive children were randomly assigned to receive or not receive an educational pamphlet designed to teach family

members how to adhere to treatment guidelines. This intervention resulted in significant differences between the two groups regarding weight control, blood pressure and keeping doctor's appointments (Morisky, DeMuth, Field-Fass, Green, & Levine, 1985). These results demonstrate a positive long-term effect of family involvement upon lifestyle patterns, since the families were able to maintain the desirable changes throughout the 3-year study.

Another family-oriented study of cholesterol reduction over a three week period found that simply giving families an American Heart Association Cookbook, a supply of polyunsaturated oil and margarine, and counseling from a nutritionist, resulted in a ten percent reduction in cholesterol levels, and increased by sixty-percent heart healthy eating habits in the experimental group. In this study, forty-six families were randomly assigned to receive or not receive the intervention. Results were based upon dietary logs kept by the participants. The authors concluded that more longer-term studies were needed which include the use of incentives to help in the maintenance of new behaviors (Witschi, Singer, Wu-Lee, & Stare, 1978).

In a family-oriented, multiple baseline study (Coates, Jeffrey, & Slinkard, 1981) focusing on eating and exercise behaviors, fourth and fifth grade students in two different schools were given verbal and written information on how to

increase complex carbohydrates and exercise, decrease saturated fat, sodium, sugar, and cholesterol. Parents were involved via separate meetings with the PTA, by mailed information, and by giving the children rewards for heart-healthy home-packed lunches. Knowledge and attitude changes were assessed by written tests. Other evaluation methods involved direct observation of activity on the playground, observations by teachers of food eaten during school lunches, and by self-reports of parents concerning family dietary habits. These results indicate that it may be harder to change physical activity habits, than eating habits (Coates, Jeffrey, and Slinkard, 1981).

Mahoney (1974) demonstrated the effectiveness of behavioral techniques derived from the social learning theory. Forty-nine obese adults were assigned to one of four groups: one that self-reported and self-rewarded for weight loss; one that self-monitored and self-rewarded for behavior changes; one that self-monitored, but did not reward; and one that received delayed treatment and served as a control group. After an eight-week intervention phase, and a sixteen-week follow-up, results indicated that self-monitoring plus reward for changes in behavior was the most successful in terms of weight loss. The author concluded that social learning theory and behavioral techniques are useful in the change of lifestyle patterns and habits. If

families are the targets of such programs, then parents could serve as role models by demonstrating the new desirable behaviors (Baranowski, & Nader, 1985).

There is research supporting a "reverse-socialization" effect whereby parents interest in sports and food preferences are influenced by those of their children (Baranowski & Nader, 1985; Snyder & Purdy, 1982). In a related study, Epstein et al, (1980) randomly assigned 13 families with overweight children six- to twelve- years old to either a nutrition education group or a behavior modification group for a seven-week intervention and three month follow up. The results indicated that the behavior modification group lost significantly more weight after the seven-week intervention than did the nutrition education group. There was also a high correlation ($r = .75$) between parents' and children's weight loss in the behavioral modification group, while the nutritional education group had a correlation of only ($r = .26$) Both groups received the same diet and exercise information. Training in behavioral techniques such as self-monitoring, reinforcement, modeling, and contracting along with weekly phone calls to check progress was the difference between the groups. These results demonstrate the effectiveness of behavioral modification techniques within a family oriented intervention (Epstein et al., 1980).

In a follow-up to the previous study Epstein et al., (1981) randomly assigned 76 families to either a parent and child target group, a child only target group or a non-specific target group. The eight-week intervention and thirteen-month follow-up resulted in no significant changes in percent overweight among children across the three groups. As in the previous study they found that children's and parents' weight reductions were strongly correlated. Children's exercise behavior has also been shown to be related to that of their parents (Epstein et al., 1981).

In the National Children and Youth Fitness Study II (NCYFS II, Ross et al, 1987) data indicated that 42.1 percent of mothers and 48.0 percent of fathers with children grades 1-4 did not participate in any moderate to vigorous physical activity in the average week. Regarding mothers, 13.2 percent exercised one day per week, 16.1 percent exercised two days per week, and 28.6 percent exercised three or more days per week. Regarding fathers, 11.4 percent exercised two days per week, and 29.9 percent exercised three or more days per week. Thus, the "average" mother exercised 1.59 days per week while the "average" father exercised 1.65 days per week. In addition, mothers on average exercised with their children .87 days per week, while fathers exercised .82 days per week with their children (Ross et al., 1987). These data indicate that

parents did not exercise very much with their children. In general, the parents who were themselves exercising regularly already set a good example for their children.

Certain authors believe that many family-oriented studies have proven no better than other types mainly because of difficulty in contacting entire families for the educational requirements (Simons-Morton et al., 1986).

Family-oriented interventions have been shown to be effective in the development of healthier dietary and exercise habits, as well as in the reduction of certain CVD risk factors. This completed research is promising, but there is a need for more research featuring a family-focus to aid in the development of more heart-healthy behaviors.

Physical Education Interventions

Some feel that physical education in the schools is one solution to the health and fitness problems facing the children in this country. As these problems increase, more research is being done to focus on the unhealthy behaviors of children in this country.

There are many indicators of the effects of inactivity on children. Evidence that American children are suffering the effects of unhealthy behaviors can be found in the National Children and Youth Fitness Study which demonstrated that children have become more obese over the last twenty years (Ross & Gilbert, 1985; Ross & Pate, 1987).

In a related study, the National Assessment of Educational Progress reported that up to 32 percent of fourth grade students watch an average of six hours of television each day. Television watching is considered an important determining factor in the overall activity level of children (Ross, Pate, Casperson, Damberg, & Svilar, 1987).

Even with agreement among many researchers concerning the link between sedentary, unhealthy lifestyles, and certain chronic diseases, many adults and children continue to place themselves at risk. Certain diseases, such as colon cancer, breast cancer, cervical cancer, osteoporosis, ulcers, and diabetes, have been referred to as "hypokinetic" diseases, and are believed to develop early in childhood (Corbin, 1987; Simons-Morton, Parcel, O'Hara, Blair, & Pate, 1988). Many researchers agree that CVD begins early in childhood, and that children should be targeted for behavioral change programs while they are more easily influenced (Haskell, Montoye, & Orenstein, 1985). Research has shown that certain CHD risk factors can be influenced early in childhood, and thus may help to decrease the atherosclerotic process (Linder & Durant, 1982).

One cross-sectional study demonstrated higher HDL cholesterol levels in highly-trained child athletes (Valimaki, Pihlakoski, & Viikari, 1980). These HDL have

been shown to be protective against CVD (Holme et al., 1985).

Blood pressure has also been found to be higher in children who are below average in fitness (Fraser, Phillips, & Harris, 1983), and shown to be positively related to the incidence of CHD (Holme, et al., 1985).

Dwyer et al., (1983) studied 500 10-year old children in 7 Australian schools. Classes in the seven schools were assigned to either their usual physical education classes, skill-oriented physical education, or an intervention group which performed 1 1/4 hours per week of sustained moderate-to-vigorous physical activity. The post-test comparisons revealed improvements in (cycle ergometer) work capacity, and decreases in skinfold measurements for the intervention group, providing some evidence of the potential for regular, sustained, moderate-to-vigorous physical activity to elicit desirable changes in the body composition of young children.

One study that was physical education-oriented was performed by Duncan et al., (1983). This study consisted of 34 fifth grade children at two schools who were assigned to either their usual physical education classes or an intervention group. Post-test comparisons from this study reported improvements in the percentile for the American Alliance for Health, Physical Education, Recreation, and Dance (AAHPERD) one-mile run for the intervention group

compared to the control group. The intervention group performed 30 minutes of aerobic exercise including calisthenics, rope jumping, ball handling, walking, jogging, and running three times per week for nine months. Even though the sample size was very small, improvements in the one-mile run times are important because they provide some evidence that aerobic exercise of varying types can be effective in improving the muscular endurance of young children (Duncan et al., 1983).

There have been several studies examining the benefits of enhanced physical education classes in improving children's muscular endurance. Cooper et al., (1975) studied 1,215 children in grades 9-12 using a pre-post comparison, the intervention group significantly improved their time on a twelve-minute distance run over the control group. Nine schools were either assigned to their usual physical education programs or to an intervention consisting of jogging added to the usual physical education classes. They started with five minutes of additional jogging and progressed to about fourteen minutes over a semester.

Another study utilizing an endurance run as an evaluation tool was that of Siegel and Mantredi (1984). They used a 1600 meter run to assess the fitness of 169 third-grade children. The children were assigned to either their usual physical classes or to the intervention group.

Both boys and girls improved their times on the 1600 meter run (intervention group) compared to the control group. The intervention group performed 30 minutes of exercise four times per week. The exercise session began with 10 minutes of calisthenics, then proceeding to approximately 12 minutes of running (1500-3000 meters). There was also one day per week of skill-oriented physical education.

Ross et al., (1987) found that much of the activity children now receive is through community programs such as recreation departments, churches, scouts, sports, leagues and teams, and other organizations such as YMCA's and health clubs or spas. In addition, it appears that many of these programs favor the more highly skilled athletes to the exclusion of the less able participants. As children grow older the dropout rates increase. It is most often the lesser skilled individuals, who need the activity the most, who drop out of the programs (Ross et al., 1987).

This section has demonstrated some promising findings concerning the improvement of children's muscular endurance via physical education. However, a considerable amount of the studies in this area are actually training effects studies performed in a school setting. Unless physical education classes are converted to strict physical conditioning classes, it is unlikely that they alone can solve all the health and fitness problems facing children

today. Out-of-school interventions must be designed to reach those children who are not participating in school or community-based sports programs. Because sports are seasonal activities and don't necessarily reflect a lifestyle pattern, a more lasting change in fitness habits must occur to reduce health problems for years to come.

Lifestyle Change Programs

Lifestyle changes in dietary and exercise behaviors are difficult for many to make, and even more difficult to maintain. However, these are areas where changes could aid in the improvement for many health problems in this country.

There is extensive interest in health-related fitness and lifestyle related diseases among health professionals and educators nationwide (Parcel, Simons-Morton, O'Hara, Baranowski, Kolke, & Bee 1987; Simons-Morton, O'Hara, & Simons-Morton, 1986).

The established beneficial effects of physical activity on health includes a reduced risk of cardiovascular disease (CVD), desirable weight control, and reduced symptoms of stress and mild-to-moderated depression (Blair, Jacobs, & Powell, 1985; Powell & Paffenbarger, 1985; Siscovick, LaPorte, & Newman, 1985; Taylor, Salles, & Needle, 1985). Beneficial effects on the prevention and control of hypertension, diabetes, osteoporosis, and certain

psychiatric conditions appear likely, but are not as firmly established (Siscovick et al., 1985; Taylor et al., 1985).

Simply increasing physical activity levels and reducing the amount of fat eaten could go far in reducing the nation's major health problems. One study reported that a dose-response relationship exists between fitness levels and all-cause mortality rates based on a large-scale eight-year study of adult men and women. They also reported a relative risk for CVD deaths for the least fit men as 8 times that of the most fit subjects (Blair & Kohl, 1989).

Inactivity is not the only type of unhealthy behavior which is placing Americans at risk for disease. The contribution of diet to both the prevention and cause of cancer has been a major focus of research. One study reported that thirty-five percent of all cancer deaths could be linked to diet (Doll & Peto, 1981).

Another study found that Americans are consuming approximately fifty-six percent more fat today as compared to seventy years ago (Casperson, Christensen, & Pollard, 1986; Simons-Morton et al., 1986).

In a related study, 24-hour dietary recall data from 11,658 adult respondents in the National Health and Nutrition Examination Survey were used to examine the American diet in relation to certain dietary guidelines from the National Academy of Sciences and the American Cancer

Society. The percent who reported consuming any of the foods in those guidelines was small: Cruciferous vegetables (18%), fruits and vegetables high in vitamin A (21%), high fiber breads and cereals (16%). The percent consuming foods potentially increasing cancer risk was high: red meat (55%), bacon and lunch meats (43%). Proportions of persons eating fruits and vegetables increased with income. Diets were closer to the guidelines for females than males, for blacks than whites, and for older than younger Americans (Doll & Peto, 1981). When combined with exercise dietary improvements may reduce the incidence of many chronic diseases. These two factors work together to help control weight. In addition, many diseases such as CVD, cancer, diabetes, liver disease and atherosclerosis have been linked to nutrition (Doll & Peto, 1981).

The completed research in the area of lifestyle changes is promising, but more research is needed that combines a family-focus with emphasis on the improvement of exercise and eating behaviors. The inherent social-support system within the family unit could be an important aspect in achieving such difficult lifestyle changes.

This chapter provided a review of the completed research relevant to this study. The 3 areas of research focused upon were: family-oriented interventions, physical

education interventions, and individually-oriented lifestyle change interventions.

Chapter III

Research Methods

The purpose of this chapter is to describe the methods used to implement this study.

The Fit Family Program is a family-oriented home-based intervention. This Program was designed to improve dietary and exercise habits as well as knowledge in these areas. The study spanned a 12-week period and targeted many aspects of health-related fitness. Diet, exercise, knowledge of healthy dietary and exercise practices, and other cardiovascular disease risk factors were all targeted by this study.

There were 11 components of this program: the enlistment of families, an orientation meeting, baseline measures, a training session, 5 intervention phases, and interim and final fitness testing. Table 1 contains a timeline for the Fit Family Program used in this study.

Enlistment of Families

Invitational letters and program information were distributed by the author at Park Road High School in rural southwestern Virginia (Appendix A). Interested recipients were told who to contact, as well as the times and locations of the initial meetings. Health guidelines for participation in the program (based on the American College

TABLE 1. Timeline for the Fit Family Program

Baseline	- 1 week food logs, activity logs, HRF testing, knowledge testing, personal health indices.
Phase 1 (week 1-2)	- daily food logs, activity logs, red food goals, activity point goals bi-weekly counseling and feedback.
Phase 2 (week 3-4)	- daily food logs, activity logs, red food goals, activity point goals, bi-weekly counseling and feedback.
Phase 3 (week 5-6)	- daily food logs, activity logs, red food goals, activity point goals, bi-weekly counseling and feedback.
Interim	- HRF testing, personal health indices.
Testing (week 6)	
Phase 4 (week 7-8)	- daily food logs, activity logs, red food goals, activity point goals, bi-weekly counseling and feedback.
Phase 5 (week 9-10)	- daily food logs, activity logs, red food goals, activity point goals, bi-weekly counseling and feedback.
Final Testing (Week 11)	- HRF testing, personal health indices, knowledge test.

of Sports Medicine guidelines) were included (Appendix B). Those not meeting these guidelines following the initial health screening were informed by the author that they would need a physician's permission to participate in the study. Table 2 presents a list of subject characteristics, including age, gender, height, and weight.

Orientation

The orientation meetings were held on two days to accommodate different work schedules. During these meetings potential participants were given an introduction to the program, including all requirements for participation and an overview of what they could expect during the course of the study. They were given the opportunity to ask any questions after which they were asked to sign informed consent forms (Appendix C). They also completed a brief questionnaire regarding educational level, age, and gender (Appendix D). All records were kept confidential by assigning identification numbers to participants, and making the identification records accessible only to the program staff.

TABLE 2. Subject characteristics including age, gender, height and weight.

Subject	Age	Gender	Height(in.)	Weight(lb)
1	40	M	76	295
2	13	M	70	186
3	37	F	64	128
4	11	F	62	91
5	9	M	56	93
6	45	F	70	161
7	14	M	75	146
8	44	F	65	131
9	16	F	63	138
10	32	F	66	135
11	9	F	59	122

Baseline Measures

At the conclusion of the orientation meeting participants underwent a health screening including blood pressure, resting heart rate, height, weight, and personal health history conducted by the author (Appendix E). Resting heart rates and blood pressures were taken by the author after subjects had been seated for 30 mins. These measures were taken between 4 pm and 6 pm, at least 3 hours after the subjects' last meal. Participants had to pass this screening or obtain written permission from a physician to continue in the study. After this screening a short written test of fitness and nutritional knowledge was completed by all participants (Appendix F). The participants were then shown how to complete a one-week diet and exercise diary on the log forms provided (Appendix G).

Following the instruction on log completion, the participants who passed the health screening or had written permission from a physician were tested on several physical fitness criteria. The fitness testing included measures taken from the National Children and Youth Fitness Study (Ross et al., 1985). These measures were: the sit and reach test of flexibility, measured in centimeters using a standard box; the number of bent-knee sit-ups in one minute; the number of modified pull-ups completed; and the one-mile run/walk measured in minutes and seconds (Appendix H).

Following these tests, participants received healthy refreshments and were reminded to complete their two-week daily logs of exercise and diet and return them in envelopes provided.

Training Session

The participants attended one additional training session approximately three weeks after the first meeting. Results of the tests and logs were used to individualize the training as much as possible. The participants were instructed how to use the Stoplight Diet Plan (adapted from Epstein and Squires, 1988) to self-monitor and to improve dietary habits (Appendix I). This plan categorizes foods into three groups; red foods, yellow foods and green foods. Red foods are those high in fat content such as red meats and dairy products. Yellow foods are moderate in fat content such as pastas. Green foods are low in fat content, such as fruits and vegetables. Table 3 shows food examples and how they would be classified according to this plan.

Participants were also trained by the author to classify physical activities according to the Olympic Medal Activity Plan (Metzler & Williams, 1991). This plan categorizes activities according to their intensity (Table 4). Low intensity activities such as slow walking are Bronze activities, and have an intensity factor of 1.0. Silver refers to moderate intensity activities like light

TABLE 3. Foods and their classifications according to the stoplight diet.

<u>Food</u>	<u>Food Group</u>	<u>Stoplight Color</u>
Fish (baked)	Protein	Green
Bagel or English muffin	Grain	Green
Apple (non-cooked)	Fruits & Vegetables	Green
Skim milk	Dairy	Green
Popcorn (without butter)	Other	Green
Poultry (non fried, skin)	Protein	Yellow
Muffin, Pancake	Grain	Yellow
Avocado	Fruits & Vegetables	Yellow
Cottage Cheese	Dairy	Yellow
Angel Food Cake (no icing)	Other	Yellow
Beef	Protein	Red
Cornbread, danish	Grain	Red
Fried or creamed fruit or vegetable	Fruits & Vegetables	Red
Regular Cheese	Dairy	Red
Cakes, candy, cookies that aren't yellow	Other	Red
Any green or yellow <u>fried</u>		Red

TABLE 4. Physical activities and their intensity factors according to the olympic medal activity system.

<u>Activity</u>	<u>Medal</u>	<u>Intensity Factor</u>
Washing Car	Bronze	1.0
Clipping Hedges	Bronze	1.0
Auto repair	Bronze	1.0
Bowling	Bronze	1.0
Slow walking	Bronze	1.0
Billiards	Bronze	1.0
Raking leaves	Silver	2.0
Digging in garden	Silver	2.0
Cleaning windows	Silver	2.0
Moderate walking	Silver	2.0
Slow jogging	Silver	2.0
Volleyball (recreational)	Silver	2.0
Shoveling heavy snow	Gold	4.0
Hard digging	Gold	4.0
Splitting wood	Gold	4.0
Fast walking	Gold	4.0
Fast dancing	Gold	4.0
Competitive team sports	Gold	4.0

jogging, and have an intensity factor of 2.0. Gold activities are high intensity activities such as hard running or full court basketball, with an intensity factor of 4.0.

At the end of the training session the information from the one week baseline measures of diet and activity was analyzed and used to individually counsel families on setting appropriate goals for the first phase of the intervention.

Intervention Phases

This study was divided into five two-week intervention phases. Initial goals were set prior to the first intervention phase as follows: for participants who consumed less than ten red foods per day, the actual number was rounded off to the next lowest whole number, with the goal set at one red food per day less than that whole number. For participants who consumed more than ten red foods per day the actual number was rounded off to the next lowest whole number, with the goal set at two red foods per day less than that whole number. As the study progressed if the participant failed to achieve their goal then the goal remained the same. During the final four phases goals were set based on each individuals performance during the previous phase with no set pattern to the process.

Initial activity point goals were set by the author as follows: if the baseline level was below 1000 points then the goal was set at 70 points above baseline. If the baseline was at or above 1000 points the goal was to maintain 1000 points or more. This allowed the subjects to experience some initial success with moderate effort. If the first goal had been too high, subjects might have become discouraged. Initial activity point goals for non-sedentary parents were set at 70 points greater than their baseline level. One sedentary parent's goal was set at 50, for his baseline of 0 points. As the study progressed, activity points goals for all participants were set based on prior phase performance with no set pattern across participants. Incentives were only utilized during the final two phases (four weeks), to test the subjects' willingness to change without material contingencies. Each Family was offered \$15 toward the purchase of active sports equipment for each phase as an incentive if all family members achieved their individual red food goals for both weeks of the phase.

Personal contact was made with each family by meeting with the parent following each phase to discuss performance and to set new goals. Personal contact was made with each family at the six week point and the ten week point via fitness testing.

At the 6- and the 10-week points, all participants were retested on the fitness measures utilized at the beginning of the study. All participants were also re-evaluated on the personal health indices utilized at the beginning of the study.

Research Design

A changing criterion design was utilized in this study. As a specific design strategy it involves an A - B design on a repeated basis. After the initial one-week baseline period, treatment was carried out for two weeks. At the end of two weeks if the initial preset criterion was achieved, then that became the new baseline, and a new criterion was established for the next two-week phase. If the subject did not achieve the preset criterion, then it remained the same for the next two-week phase. This continued in a graduated manner throughout the five phases (ten weeks) of the program. At the end of the ten-week intervention all participants were retested on all fitness variables, personal health indices, and on the knowledge test. No control group was utilized, rather, experimental control was demonstrated by the immediacy and the large size of the changes after implementation of the intervention.

Data Analysis

The Fit Family Program was designed to reduce the number of high-fat foods eaten by the participants, and to increase the amount of physical activity performed by the participants. The intervention focused on 5 areas of behavior and health index changes: 1) reduced red food consumption; 2) increased physical activity points; 3) increased knowledge level; 4) improvement in the health related fitness variables; 5) and changes in personal health indices (blood pressure, resting heart rate, weight, height). Data were analyzed in the following ways: Changes in red food intake were analyzed by comparing mean red food consumption from baseline through 5 phases. These data were analyzed visually and through repeated measures analysis of variance (ANOVA) across phases.

Changes in activity points were analyzed in the same manner as red food intake. Mean point totals were compared across baseline and all phases, then analyzed visually and through repeated measures analysis of variance across phases.

Subjects' changes in knowledge were analyzed by comparing mean scores on the written test from baseline to final. Due to the inability to combine all scores into one group, only percent change scores were utilized in the analysis of this variable.

Subjects' changes in the health related fitness variables were analyzed by comparing scores across baseline, the 6-week point, and the final testing. Due to the inability to combine all scores into one group, only percent change scores were utilized in the analysis of this variable.

Subjects' changes in the personal health measures were also analyzed by comparing scores across the baseline, the 6-week point, and the final testing. Due to the inability to combine all scores into one group, only percent change scores will be utilized in the analysis of these variables.

All data analysis were made across individuals and families, and within the whole subject group when appropriate.

This chapter described the materials and methods utilized in this study. The following areas of methodology were described; purpose, enlistment of families, orientation, baseline measures, training sessions, intervention phases, research design, and data analysis.

Chapter IV

Results

The Fit Family Program results are divided into 6 areas of intervention: diet, physical activity, knowledge, cardiovascular endurance, strength, and personal health indices.

Diet

Diet was measured by self-reported servings of high fat (red) foods per week using the Stoplight Diet (Epstein et al., 1980). This diet classifies foods into three categories; red (high fat, STOP, eat very few or none), yellow (moderate fat, CAUTION, eat in moderation), and green (low fat, GO, eat as many as desired). The mean red foods consumed per week were analyzed visually and using Repeated Measures Analysis of Variance (ANOVA), with a Tukey follow-up. A preset alpha level of ($p < .05$) was used in this study. Summary ANOVA tables are presented in Appendix K and L for mean red food intake and mean activity point accrual, respectively.

Figure 1 presents the red food means from baseline through all 5 2-week treatment phases across all subjects. Table 5 presents the red food means from baseline through all 5 treatment phases across all subjects, by family, and by individual.

Weekly Red Food Intake

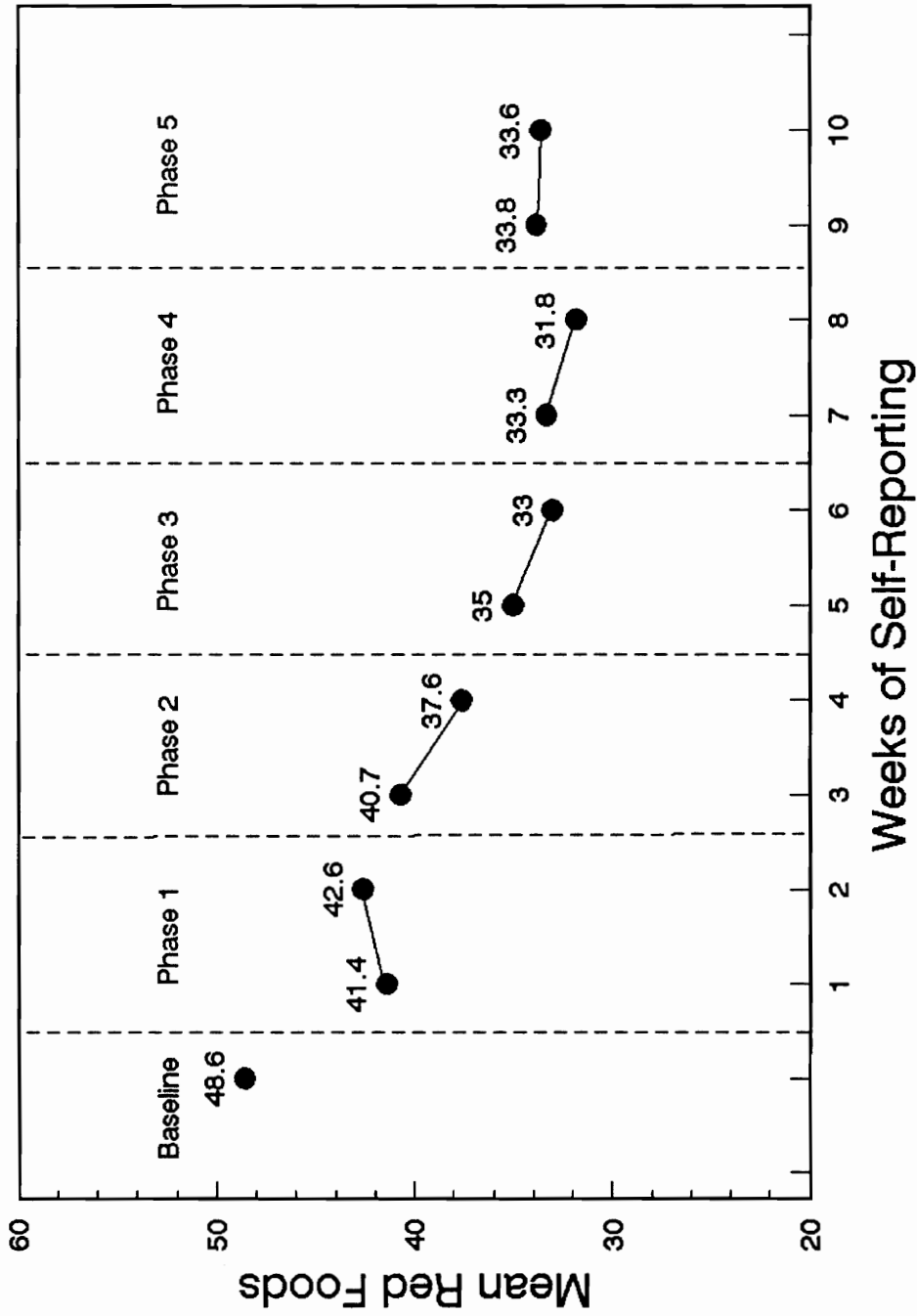


Figure 1

TABLE 5. Red foods consumed across all subjects, by family, and by individual from baseline through all five phases.

Sub.	De Cg	Bl m	P1 m	% Cg	P2 m	% Cg	P3 m	% Cg	P4 m	% Cg	P5 m	% Cg
Gp	(-)	46.5	41.4	-11%	38.0*	-18%	33.0*	-29%	32.0*	-31%	33.0*	-29%
F1	(-)	48.5	48.0	- 1%	45.0	- 7%	40.8	-16%	38.3	-21%	38.8	-20%
F2	(-)	70.0	48.0	-31%	53.3	-24%	41.8	-40%	37.7	-46%	39.8	-47%
F3	(-)	50.0	61.8	+23%	48.0	- 4%	42.8	-14%	43.3	-13%	45.0	-10%
F4	(-)	30.5	18.5	-39%	17.8	-25%	16.0	-47%	17.5	-26%	18.0	-41%
F5	(-)	33.5	30.5	- 9%	24.5	-27%	24.8	-26%	23.5	-30%	23.8	-27%
I1	(-)	46	43.5	- 5%	42.0	- 8%	38.0	-17%	36.0	-22%	36.0	-22%
I2	(-)	51	52.5	+ 3%	48.0	- 6%	43.5	-15%	40.5	-21%	41.5	-19%
I3	(-)	48	32.0	-33%	39.5	-18%	30.5	-16%	27.5	-43%	28.5	-40%
I4	(-)	83	52.5	-37%	62.5	-25%	42.5	-49%	39.0	-53%	40.5	-51%
I5	(-)	79	59.5	-25%	58.0	-26%	52.5	-31%	46.5	-39%	50.5	-36%
I6	(-)	24	32.0	+33%	23.0	- 4%	20.5	-15%	19.5	-19%	20.5	-14%
I7	(-)	76	91.5	+20%	73.0	- 4%	65.0	-14%	67.0	-12%	69.5	- 9%
I8	(-)	32	16.5	-48%	17.0	-49%	12.5	-61%	16.0	-50%	16.0	-50%
I9	(-)	29	20.5	-29%	18.5	-36%	19.5	-33%	19.0	-34%	20.0	-31%
I10	(-)	28	23.5	-16%	22.0	-21%	21.0	-25%	20.0	-29%	20.5	-27%
I11	(-)	39	37.5	- 4%	31.5	-19%	28.5	-27%	27.0	-31%	27.0	-31%

De = Desired
Cg = Change
Gp = Group
Bl = Baseline
m = Mean

Sub = Subject
I = Individual
P = Phase
F = Family

* denotes $F[(5, 50) = 13.34 (p < .000)]$

The baseline mean for red foods consumed per week across all subjects was 48.6 with a standard deviation of 21.5. At the end of the first 2-week intervention phase the mean red foods per week immediately decreased to 41.4 with a standard deviation of 21.5 across all 11 subjects. 4 out of 5 families decreased the mean number of red foods consumed per week at the end of the first phase as well, with a range of 1% to 39%. 8 out of 11 individuals decreased the mean number of red foods consumed per week at the end of the first phase with a range of 4% to 48%.

At the end of the second two-week intervention phase mean red foods consumed per week across all 11 subjects decreased to 38.0 with a standard deviation of 19.3. This decrease was significant at the .000 level (see Appendix K). All 5 families decreased the mean red foods consumed per week with a range of 4% to 27%. All 11 individuals decreased the mean red foods consumed per week with a range of 4% to 49%.

At the end of the third 2-week phase the mean red foods consumed per week across all subjects decreased to 33.0 with a standard deviation of 15.9. This decrease was significant at the .000 level from both the baseline and the first phase means. All 5 families decreased the mean red foods consumed per week with a range of 14% to 47%. All 11 individuals decreased the mean red foods consumed per week with a range of 14% to 49%.

At the end of the fourth 2-week phase the mean red foods consumed per week across all 11 subjects decreased to 32.0 with a standard deviation of 15.2. This decrease was significant between the baseline and first phase means. All 5 families decreased the mean red foods consumed per week with a range of 13% to 46%. All 11 individuals decreased the mean red foods consumed per week with a range of 12% to 53%.

At the end of the fifth and final 2-week phase, mean red foods consumed per week across all 11 subjects decreased to 33.0 with a standard deviation of 16.1. This decrease was significant at the .000 level. All 5 families decreased the mean red foods consumed with a range of 10% to 47%. All 11 individuals decreased the mean red foods consumed per week with a range of 9% to 50%.

Physical Activity

Physical activity was measured using the Olympic Medal Activity System (Williams, 1991). This system classifies activities based on Metabolic Equivalents (METs) into high (gold), medium (silver), and low (bronze) intensity groups. Gold activities had an intensity factor of 4.0, silver 2.0, and bronze 1.0. Subjects self-reported the number of minutes per week of each type of activity. Mean activity points per week were analyzed visually and through repeated measures ANOVA with a Tukey follow-up (Appendix L).

Figure 2 presents the activity point means across all subjects from baseline through all 5 phases. Table 6 presents the mean activity points across all subjects, by family, and by individual from baseline through all 5 phases.

The baseline mean for activity points per week across all 11 subjects was 482 with a standard deviation of 428.6. At the end of the first 2-week intervention phase the mean activity points per week across all subjects immediately increased to 944 with a standard deviation of 823.1. This increase was significant at the .001 level. 4 out of 5 families increased the mean activity points with a range of 1% to 455%. 8 out of 11 individuals increased mean activity points with a range of 30% to 900%.

At the end of the second 2-week phase mean activity points per week across all 11 subjects decreased to 824 with a standard deviation of 452.3. This mean was not significantly higher than the baseline mean. 4 out of 5 families increased mean activity points per week with a range of 6% to 277%. 9 out of 11 individuals increased mean activity points per week with a range of 6% to 1500%.

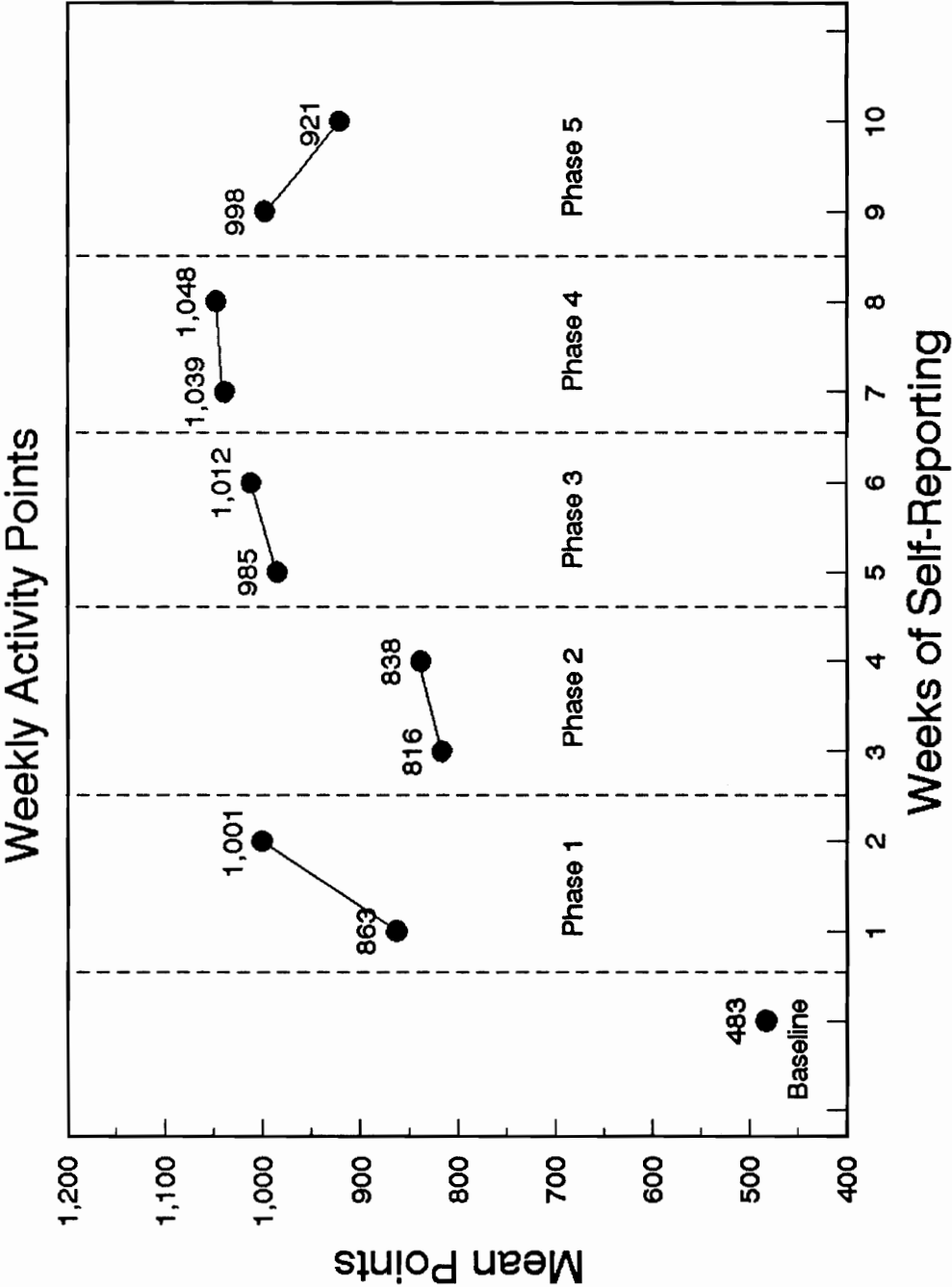


Figure 2

TABLE 6. Mean activity points across all subjects, by family, and by individual from baseline through all five phases.

	De	Bl	P1	%	P2	%	P3	%	P4	%	P5	%
Sub.	Cg	<u>m</u>	<u>m</u>	Cg	<u>m</u>	Cg	<u>m</u>	Cg	<u>m</u>	Cg	<u>m</u>	Cg
Gp	(+)	482	944*	+96%	824	+ 71%	1006*	+109%	1024*	+112%	959*	+ 99%
F1	(+)	650	480	-26%	547	-16%	697	+ 7%	705	+ 8%	617	- 5%
F2	(+)	815	823	+.1%	863	+ 6%	1006	+ 23%	1016	+ 25%	963	+ 18%
F3	(+)	445	2474	+455%	1550	+248%	2042	+358%	2072	+366%	1865	+ 319%
F4	(+)	201	596	+196%	652	+224%	712	+254%	722	+259%	715	+ 256%
F5	(+)	135	350	+159%	510	+277%	575	-326%	607	+350%	635	+ 370%
I1	(+)	0	20		125		130		155		155	
I2	(+)	1300	940	- 27%	970	- 25%	1265	- 3%	1255	- 4%	1080	- 17%
I3	(+)	680	1005	+ 48%	1175	+ 73%	1180	+ 74%	1200	+ 65%	1000	+ 47%
I4	(+)	630	615	- 2%	670	+ 6%	730	+ 16%	750	+ 19%	720	+ 14%
I5	(+)	1136	850	- 25%	745	- 34%	1110	- 2%	1180	+ 4%	1170	+ 3%
I6	(+)	530	2622	+395%	1500	+183%	1780	+236%	1960	+270%	1880	+ 225%
I7	(+)	360	2327	+546%	1600	+344%	2305	+540%	2185	+507%	1850	+ 414%
I8	(+)	132	840	+536%	825	+525%	820	+521%	830	+529%	820	+ 521%
I9	(+)	270	352	+ 30%	480	+ 77%	605	+124%	615	+128%	610	+ 120%
I10	(+)	30	300	+900%	480	+1500	500	+1567%	565	+1783%	605	+1917%
I11	(+)	240	400	+ 67%	540	+125%	650	+170%	650	+170%	665	+ 177%

De = Desired
Cg = Change
Gp = Group
Bl = Baseline

Sub = Subject
I = Individual
P = Phase
F = Family

m = Mean

* denotes $F(5, 50) = 5.27$ ($p < .00$)

At the end of the third 2-week phase the mean activity points per week across all subjects increased to 1006 with a standard deviation of 618.3. This mean was significantly higher than the baseline mean. All 5 families increased mean activity points per week with a range of 7% to 358%. 9 out of 11 individuals increased mean activity points with a range of 16% to 1567%.

At the end of the fourth 2-week phase mean activity points per week across all subjects increased to 1024 with a standard deviation of 642.2. This mean was significantly higher than the baseline mean. All five families increased mean activity points per week with a range of 8% to 366%. 10 out of 11 individuals increased mean activity points per week with a range of 4% to 1783%.

At the end of the fifth and final 2-week phase the mean activity points per week across all subjects decreased to 959 with a standard deviation of 525.2. This mean was significantly higher than the baseline mean, even though there was a slight decrease from the fourth phase mean. 4 out of 5 families increased mean activity points per week with a range of 18% to 370%. 10 out of 11 individuals increased mean activity points per week with a range of 3% to 1917%. This increase was much higher than anticipated.

Knowledge

Change in knowledge levels was measured by the change in percentage of correctly answered questions on the written test from baseline to the final test administration. Knowledge scores were analyzed by comparing the mean percentage of correct answers on the baseline test with the mean percent correct on the final test. Table 7 presents the knowledge test means for baseline and final test administration and percent change across all subjects, by family, and by individual. The baseline mean percentage of correct answers across all subjects was 55.7.

On the final test the mean percentage of correct answers across all subjects was 58.2. This was an increase of 4% over the baseline mean. 3 out of 5 families increased the mean percentage of correct answers with a range of 3% to 18%. 8 out of 11 individuals increased the mean percentage of correct answers with a range of 6% to 29%.

Cardiovascular Endurance

Cardiovascular endurance was measured by a timed one-mile (children) or one-half mile (adults) walk run. The data were analyzed by comparing the mean scores across the baseline testing, interim testing, and final testing, and calculation of the percent change. Table 8 presents the means and percent change on the timed run/walk across all

TABLE 7. Means for correctly answered knowledge test questions across all subjects, by family, and by individual for baseline and final testing.

	Desired Change	Baseline Mean	Final Mean	% Change from baseline*
Group	(+)	55.7	58.2	+ 4%
Family 1	(+)	66.7	65.0	- 3%
Family 2	(+)	52.2	51.1	- 2%
Family 3	(+)	55.0	65.0	+18%
Family 4	(+)	51.7	56.7	+10%
Family 5	(+)	55.0	56.7	+ 3%
Individual 1	(+)	60.0	70.0	+17%
Individual 2	(+)	73.3	60.0	-18%
Individual 3	(+)	56.7	60.0	+ 6%
Individual 4	(+)	46.7	53.3	+14%
Individual 5	(+)	53.3	40.0	-25%
Individual 6	(+)	56.7	73.3	+29%
Individual 7	(+)	53.3	56.7	+ 6%
Individual 8	(+)	56.7	60.0	+ 6%
Individual 9	(+)	46.7	53.3	+14%
Individual 10	(+)	56.7	63.3	+12%
Individual 11	(+)	53.3	50.0	- 6%

* Rounded to nearest whole number

TABLE 8. One-mile and 1/2 mile run/walk times across all subjects by family, by individual for baseline, interim, and final testing.

	Desired Change	Baseline Mean	Interim Mean	% Change from baseline	Final Mean	% Change from baseline*
Group	(-)	9:06 @	8:20 @	- 9%	7:48 @	-17%
Family 1	(-)	9:25 @	8:35 @	- 9%	8:10 @	-12%
Family 2	(-)	10:11 @	8:13 @	-20%	8:00 @	-21%
Family 3	(-)	8:45 @	6:36 @	-25%	6:01 @	-29%
Family 4	(-)	8:13 @	8:28 @	+ 2%	8:05 @	- 1%
Family 5	(-)	9:37 @	8:48 @	- 9%	8:57 @	- 9%
Ind 1	(-)	8:30 ^	8:10 ^	- 2%	8:01 ^	- 3%
Ind 2	(-)	10:20	9:00	-12%	8:20	-20%
Ind 3	(-)	6:00 ^	4:58 ^	-24%	4:39 ^	-27%
Ind 4	(-)	12:20	9:52	-22%	9:11	-25%
Ind 5	(-)	12:15	10:31	-15%	10:10	-17%
Ind 6	(-)	8:00 ^	5:24 ^	-35%	5:00 ^	-38%
Ind 7	(-)	9:30	7:49	-19%	7:02	-25%
Ind 8	(-)	6:20 ^	6:24 ^	+ 1%	6:09 ^	- 2%
Ind 9	(-)	10:07	10:32	+ 2%	10:01	- 1%
Ind 10	(-)	5:35 ^	5:16 ^	- 4%	5:04 ^	- 6%
Ind 11	(-)	13:40	12:44	- 7%	12:10	-10%

Ind = Individual

^ denotes adult 1/2 mile mean percentages were rounded to the nearest whole number

@ denotes combined child/adult scores on family and group sections.

* Rounded to nearest whole number

subjects, by family, and by individual for the baseline, interim, and final test administrations.

The baseline mean across all subjects on the endurance run/walk was 9:06. On the interim testing, the mean percent reduction across all subjects on the endurance run was 9%. 4 out of 5 families decreased the mean time to complete the endurance run with a range of 9% to 25%. 9 out of 11 individuals decreased the mean time to complete the endurance run with a range of 2% to 24%.

On the final test administration the mean percent reduction across all subjects was 17%. All 5 families decreased the mean time to complete the endurance run with a range of 1% to 29%. All 11 individuals decreased the mean time to complete the endurance run with a range of 1% to 38%.

Strength

Strength was measured using two variables: the number of bent-knee sit-ups performed in one minute, and the number of modified pull-ups performed at once.

Table 9 presents the baseline, interim, and final means for bent-knee sit ups performed in 1 minute across all subjects, by family, and by individual. Percent change in the interim and final means is also listed in Table 9. The baseline mean for bent-knee sit-ups performed in 1 minute

TABLE 9. Bent knee sit-ups performed in 60 seconds across all subjects, by family and, by individual for baseline, interim, and final testing.

	Desired Change	Baseline Mean	Interim Mean	% Change from baseline	Final Mean	% Change from baseline*
Group	(+)	23	32.6	+42%	36.2	+57%
Family 1	(+)	22.5	30	+33%	32.5	+44%
Family 2	(+)	31.3	39.6	+27%	43.3	+38%
Family 3	(+)	28	33	+38%	36	+29%
Family 4	(+)	28	35	+25%	36	+29%
Family 5	(+)	23.5	25.5	+ 9%	30	+28%
Ind 1	(+)	0	10		12	
Ind 2	(+)	45	50	+11%	53	+18%
Ind 3	(+)	25	30	+20%	35	+40%
Ind 4	(+)	36	43	+19%	46	+28%
Ind 5	(+)	33	46	+39%	49	+48%
Ind 6	(+)	21	21	0%	23	+10%
Ind 7	(+)	35	45	+29%	49	+40%
Ind 8	(+)	11	18	+64%	20	+82%
Ind 9	(+)	45	52	+16%	52	+16%
Ind 10	(+)	25	26	+ 4%	29	+16%
Ind 11	(+)	22	25	+14%	31	+41%

Ind = Individual

* Rounded to nearest whole number

was 23 with a range from 22.5 to 31.3 across all subjects. From the interim testing the mean sit-ups performed across all subjects immediately increased to 32.6 for an increase of 42%. All 5 families increased the mean sit-ups performed with a range of 9% to 38%. 10 out of 11 individuals increased the mean sit ups performed with a range of 4% to 64%.

In the final testing, the mean sit ups performed across all subjects was 36.2, an increase of 57%. All 5 families increased the mean sit ups performed with a range of 28% to 44%. All 11 individuals increased the mean sit-ups performed with a range of 16% to 82%.

Modified pull-ups performed at one time was the second strength variable. Table 10 presents the means for modified pull-ups from the baseline, interim, and final testing administrations. Percent change was also included. The baseline mean across all subjects on modified pull-ups was 9.1. The interim testing mean on modified pull-ups performed across all subjects increased to 13.42 an increase of 47%. All 5 families increased the mean modified pull-ups performed with a range of 9% to 81%. All individuals increased the mean modified pull-ups performed with a range of 9% to 100%.

TABLE 10. Modified pull-ups performed across all subjects, by family, and by individual for baseline, interim, and final testing.

	Desired Change	Baseline Mean	Interim Mean	% Change from baseline	Final Mean	% Change from baseline*
Group	(+)	9.1	13.4	+47%	15.3	+68%
Family 1	(+)	6.5	10	+53%	12	+85%
Family 2	(+)	8.7	15.6	+79%	17.3	+99%
Family 3	(+)	15.5	17	+ 9%	19.5	+26%
Family 4	(+)	7	10	+42%	11	+57%
Family 5	(+)	8	14.5	+81%	15.5	+94%
Ind 1	(+)	0	3		4	
Ind 2	(+)	13	17	+30%	20	+54%
Ind 3	(+)	6	12	+100%	14	+133%
Ind 4	(+)	5	11	+120%	12	+140%
Ind 5	(+)	15	24	+60%	26	+73%
Ind 6	(+)	10	11	+10%	14	+40%
Ind 7	(+)	21	23	+ 9%	25	+19%
Ind 8	(+)	9	12	+33%	12	+33%
Ind 9	(+)	5	8	+60%	10	+100%
Ind 10	(+)	7	11	+57%	13	+86%
Ind 11	(+)	9	18	+100%	18	+100%

Ind = Individual

* Rounded to nearest whole number

The final testing mean percent change across all subjects was 15.3, an increase of 68%. All 5 families increased the mean modified pull-ups performed with a range of 26% to 99%. All 11 individuals increased the modified pull-ups performed with a range of 19% to 140%.

Personal Health Indices

Personal health was measured using 3 dependant variables (indices): body mass index (BMI); resting heart rate; and the sit and reach test of flexibility from baseline through interim and final testing. These are common measures of health-related fitness.

Body mass index (BMI) was calculated using the following formula (WT in Kg/ HT in M^2). Table 11 presents means for BMI across all subjects, by family, and by individual from baseline through the interim and final testing administrations. Percent change was also included. The baseline mean for BMI across all subjects was 23.8. The final mean for BMI across all subjects decreased to 22.9 for a reduction of 3.5%. All 5 families decreased the mean for BMI with a range of 2% to 5%. 9 out of 11 individuals decreased the mean for BMI with a range of 1.5% to 9%.

TABLE 11. Body mass index across all subjects, by family, and by individual for baseline and final testing.

	Desired Change	Baseline Mean	Final Mean	% Change from baseline
Group	(-)	23.8	22.9	-3.5%
Family 1	(-)	31.2	30.2	-3 %
Family 2	(-)	19.8	19.1	-3.5%
Family 3	(-)	20.9	20.5	-2 %
Family 4	(-)	23.2	22	-5 %
Family 5	(-)	23.9	22.7	-5 %
Ind 1	(-)	35.7	34.8	-2.5%
Ind 2	(-)	26.7	25.6	-4 %
Ind 3	(-)	22.1	21.2	-4 %
Ind 4	(-)	17	16.2	-4.7%
Ind 5	(-)	20.3	20	-1.5%
Ind 6	(-)	23.1	21.7	-6 %
Ind 7	(-)	18.6	19.3	+4 %
Ind 8	(-)	21.9	20.9	-4.6%
Ind 9	(-)	24.5	23.1	-5.7%
Ind 10	(-)	22.4	22.4	0
Ind 11	(-)	25.3	23	-9 %

Ind = Individual

Resting blood pressure was measured with a standard mercury sphygmomanometer and stethoscope by the author, after the subjects had been seated for 30 min, and at least 3 hours since their last meal. Three readings were taken within 10 mins, with the highest and lowest readings discarded. Table 12 presents the means for blood pressure across all subjects, by family, and by individual from baseline testing through the interim and final test administration. Percent change for interim and final means are also included. The baseline mean for resting blood pressure across all subjects was 118 / 70.

The interim testing mean for resting blood pressure across all subjects decreased to 112 / 67 for a decrease of 5% / 4% . All 5 families decreased mean resting blood pressure with a range of 3% / 11% to 14% / 4%. All 9 individuals tested decreased mean resting blood pressure with a range of 0% / 3% to 8% / 3%.

The final testing mean resting blood pressure across all subjects decreased to 111/66 for a decrease of 6% / 6%. All 5 families decreased mean resting blood pressure with a range of 3% / 11% to 14% / 4%. All 9 individuals tested decreased mean resting blood pressure with a range of 0% / 3% to 19% / 0%.

TABLE 12. Resting blood pressure across all subjects, by family, and by individual for baseline, interim, and final testing.

	Desired Change	Baseline Mean	Interim Mean	% Change from baseline	Final Mean	% Change from baseline*
Group	(-)	118/70	112/76	-5%/-4%	111/66	-6%/-6%
Family 1	(-)	139/78	134/74	-4%/-5%	130/74	-6%/-5%
Family 2	(-)	100/60	100/58	-0%/-3%	100/58	-0%/-3%
Family 3	(-)	122/70	108/70	-11%/-0%	105/67	-14%/-4%
Family 4	(-)	112/72	108/65	-4%/-10%	109/64	-3%/-4%
Family 5	(-)	119/72	110/69	-8%/-4%	110/68	-8%/-6%
Ind 1	(-)	154/92	144/88	-6%/-4%	140/88	-10%/-4%
Ind 2	(-)	124/62	124/60	-0%/-6%	120/60	-3%/-6%
Ind 3	(-)	100/60	100/58	-0%/-3%	100/58	-0%/-3%
Ind 4	(-)	No data for this subject				
Ind 5	(-)	No data for this subject				
Ind 6	(-)	120/80	110/78	-8%/-3%	110/74	-7%/-8%
Ind 7	(-)	124/60	106/62	-15%/+3%	100/60	-19%/0%
Ind 8	(-)	120/80	120/74	-0%/-8%	120/72	-0%/-10%
Ind 9	(-)	104/64	96/56	-8%/-13%	98/56	-6%/-12%
Ind 10	(-)	120/80	110/78	-8%/-3%	110/76	-8%/-5%
Ind 11	(-)	118/64	110/60	-7%/-6%	110/60	-7%/-6%

Ind = Individual

* Rounded to nearest whole number

Resting heart rate was measured radially for one full minute. Table 13 presents the means for resting heart rate across all subjects, by family, and by individual from baseline through the interim and final testing administrations. Percent changes from the interim and final means are included.

The baseline mean for resting heart rate was 78. The interim testing mean resting heart rate across all subjects decreased to 72, a change of 8%. All 5 families decreased mean resting heart rate with a range of 4% to 10%. 10 out of 11 individuals decreased mean resting heart rate with a range of 5% to 16%.

The final testing mean for resting heart rate decreased to 71, a change of 9%. 3 out of 5 families decreased mean resting heart rate with a range of 1% to 4%. All 11 individuals increased mean resting heart rate with a range of 3% to 16%.

Sit and Reach was measured in centimeters using a standard sit and reach box. Table 14 presents the means for sit and reach across all subjects, by family, and by individual from baseline through the interim and final testing administrations. Percent change is included for the interim and final means.

TABLE 13. Resting heart rate across all subjects, by family, and by individual for baseline, interim and final testing.

	Desired Change	Baseline Mean	Interim Mean	% Change from baseline	Final Mean	% Change from baseline*
Group	(-)	78	72	- 8%	71	- 9%
Family 1	(-)	81	76	- 6%	73	- 4%
Family 2	(-)	86	75	-10%	74	- 1%
Family 3	(-)	66	63	- 4%	61	- 3%
Family 4	(-)	75	68	- 9%	68	- 9%
Family 5	(-)	84	78	- 7%	78	- 7%
Ind 1	(-)	84	80	- 5%	76	-10%
Ind 2	(-)	78	72	- 8%	70	-10%
Ind 3	(-)	78	70	-10%	70	-10%
Ind 4	(-)	90	78	-13%	76	-16%
Ind 5	(-)	90	76	-16%	76	-16%
Ind 6	(-)	72	66	- 8%	64	-11%
Ind 7	(-)	60	60	0	58	- 3%
Ind 8	(-)	78	70	-10%	70	-10%
Ind 9	(-)	72	66	- 8%	66	- 8%
Ind 10	(-)	84	78	-7 %	78	- 7%
Ind 11	(-)	84	78	-7 %	78	- 7%

Ind = Individual

* Rounded to nearest whole number

TABLE 14. Sit and reach means across all subjects, by family, and by individual for baseline, interim, and final testing.

	Desired Change	Baseline Mean	Interim Mean	% Change from baseline	Final Mean	% Change from baseline*
Group	(-)	27.8	31.4	+13%	31.7	+14%
Family 1	(-)	30.5	31.7	+ 4%	32.8	+8%
Family 2	(-)	25.5	29.3	+15%	29.7	+16%
Family 3	(-)	26.4	31	+17%	31	+17%
Family 4	(-)	28	30.2	+ 8%	30.3	+ 8%
Ind 1	(+)	30.5	31.5	+ 3%	31.5	+ 3%
Ind 2	(+)	30.5	32	+ 5%	34	+11%
Ind 3	(+)	25.5	27	+ 6%	28	+10%
Ind 4	(+)	25.5	31	+21%	31	+22%
Ind 5	(+)	25.5	30	+18%	30	+18%
Ind 6	(+)	27	34	+26%	34	+26%
Ind 7	(+)	25.5	28	+10%	28	+10%
Ind 8	(+)	25.5	28	+10%	28	+10%
Ind 9	(+)	30.5	32.5	+6.6%	32.5	+7%
Ind 10	(+)	37	41	+11%	41	+11%
Ind 11	(+)	23	31	+35%	31	+35%

Ind = Individual

* Rounded to nearest whole number

The baseline mean for sit and reach across all subjects was 27.8. The interim mean for sit and reach across all subjects was 31.4, an increase of 13%. All 5 families increased mean sit and reach distance with a range of 4% to 20%. All 11 individuals increased mean sit and reach with a range of 3% to 35%.

On the final test administration the mean sit and reach across all subjects was 31.7, an increase of 14%. All 5 families increased mean sit and reach distance with a range of 8% to 20%. All 11 individuals increased mean sit and reach distance with a range of 3% to 35%.

Summary

This chapter presented the Fit Family Program results. Results were presented in the following 6 areas; dietary measures, physical activity measures, knowledge test measures, cardiovascular endurance measures, strength measures, and personal health indices.

Participants showed improvement in the direct goals of the program: reduced red food consumption and increased physical activity. Also, indirect improvements were reported in the areas of knowledge, cardiovascular endurance, strength, and personal health. Overall, the Fit Family Program seems to have been effective in improving the dietary and exercise patterns of the 11 participants.

Chapter V

Discussion

The following section presents a discussion of the results from the Fit Family Program.

The first research hypothesis, that parents and children participating in the ten-week health-related Fit Family Program would eat high-fat foods less frequently, was supported by the results. The intervention group significantly decreased their consumption of high-fat foods over the five intervention phases as a result of their participation in Fit Family Program. It is important to note that the reductions occurred immediately after the intervention was implemented and continued across all 5 intervention phases. Parents and children within families showed similar reductions in red food consumption as well. These findings are similar to those of Gillium et al. (1981), who found that family-oriented interventions were effective in changing eating behaviors. Through nutrition education and self-monitoring of food consumption, sodium intake was reduced by 40%, although blood pressure was not reduced as the researchers had anticipated.

The second research hypothesis, that parents and children participating in the 10-week health-related Fit Family Program would increase physical activity levels, was supported by the results. Mean activity points earned in

the Olympic Medal Activity System showed an immediate and significant increase in Phase 1, and was maintained across 3 of the 4 remaining intervention phases as a result of participation in the Fit Family Program. Parents and children within 4 of the 5 families showed similar increases as well. These findings contradict those of another family-oriented study which utilized a multiple-baseline design (Coates et al., 1981). That study focused on the eating and exercise behaviors of fourth and fifth grade students. Through direct observation of activity on the playground, observations of foods eaten during school lunches, and by self-reports of the families concerning dietary habits, those researchers found that it was more difficult to change physical activity habits than it was to change eating habits.

The hypothesis that parents and children will improve their knowledge of fitness and nutrition, as measured by the written test, was partially supported by the results. Only small and inconsistent increases in the knowledge percent change scores could reflect the fact that the test information was not directly taught to the subject. By design, it was intended that scores would improve as a result of the training sessions, and through regular contact with the Fit Family Program Staff. The test content might not have reflected the types of information received by the

participants since the test content was determined before the intervention began. Participants' concerns were the basis for the information they received during the intervention and may not have been related to the test items.

Another study found that nutrition education was relatively ineffective (Epstein et al., 1980). These researchers compared nutrition education with behavioral modification techniques for effectiveness in eliciting weight loss in 13 families with overweight children. From the 7-week intervention and 3-month follow-up, they found that nutrition education alone was not very effective in eliciting weight loss among those families. It would seem that more emphasis needs to be put on the education component of such interventions if the desired improvements are going to be realized.

Improvements in cardiovascular endurance and strength were important, but indirect, outcomes since no intervention was designed for this area. The only aspect of the program which may have influenced changes in these areas was the fitness testing itself. It was hoped that the high-fat food reduction and increased activity would indirectly result in improved scores on the fitness tests. Because tests of health-related physical fitness are all relative to a person's age and gender, means for the group and across

families can not be generalized. However, the mean percent change of scores showed that the group achieved changes in the desired directions on the endurance run, sit and reach, bent-knee sit-ups, and modified pull-ups. Thus, the hypothesis that parents and children participating in the Fit Family Program would improve scores on the health-related fitness test was partially supported by the results. No test for significant differences was performed on these data. Other researchers have found similar improvements on health-related fitness criterion (Duncan et al., 1983). Duncan and associates assigned 34 fifth grade students to their usual physical education classes or to an intervention consisting of 30 minutes per day of aerobic exercise (rope jumping, ball handling, walking, jogging, and running). The intervention group improved their times in the 1 mile run compared to the control group. While the Duncan study provides evidence of the ability of aerobic exercise to elicit improvements in cardiovascular and muscular endurance, it is important to note that it was a training effects study. The Fit Family Program was able to achieve similar improvements in several health-related fitness measures without any direct physical conditioning.

Changes in personal health indices (resting blood pressure, resting heart rate) which are cardiovascular disease risk factors was another intended, but indirect,

outcome of the Fit Family Program. Again, it was hoped that the carry-over effect of the high-fat food reduction and the increased activity would result in reductions in the personal health measures. Indeed, changes in the desired direction were reported for resting blood pressure and resting heart rate. However, no statistical test for significant differences was performed. Thus, the hypothesis that parents and children participating in the Fit Family Program would improve measures related to cardiovascular disease was partially supported by the results.

It seems that the participants experienced the desired changes as a result of reduced red food consumption, and increased physical activity. The length of the program may have allowed the changes in eating and exercise behavior to be maintained long enough for improvements in the health-related fitness and personal health measures to be achieved. Similar improvements in the area of personal health were found in a 3-year study of 400 families of hypertensive children (Morisky et al., 1985). Morisky and colleagues distributed an educational pamphlet designed to teach families to adhere to treatment guidelines. They found significant improvements in weight control, blood pressure, and keeping doctor's appointments for the families who received the pamphlet compared to those who did not. These findings are similar to those of the Fit Family Program, but

it is important to note that the reductions in resting heart rate and resting blood pressure were not a main focus of the Fit Family Program. Rather, they were probably an indirect result of the reduction in high-fat food consumption, and the increase in physical activity levels.

In a separate application of the Fit Family Program, Williams (1991) found many similar improvements reported here. The subjects in Williams' study improved by reducing red food consumption, increasing activity points, improving on measures of health related fitness, and increased knowledge of health concepts. These similar findings utilizing a different subject group seem to lend support to the effectiveness of the Fit Family Program in eliciting desirable changes in exercise and eating patterns.

Conclusions

In conclusion, the results of this study support many of the stated hypotheses, either wholly or partially. However, due to problems with external validity, generalizations concerning other populations or types of families cannot be made.

The results of this study provides support for the changing of eating and exercise lifestyle behaviors using a health-related, home-centered family fitness program. In most families, parents and children both made similar changes on most of the dependent measures.

In addition, utilization of the social learning theory principles of self-monitoring, modeling, social support, incentives, and goal setting appeared to have had the desired effects of high-fat food reduction and activity point increase. The goal setting, counseling, diet logs, and activity logs were mentioned by participants as being very important in changing behaviors as well as awareness.

While this study provides insight into the effectiveness of family-oriented, home-based, health-related fitness programs in changing lifestyle eating and activity behaviors in the short term (ten weeks), it also reveals many questions which could be answered with further research. For example: How would a program like this work in combination with a school physical education program? How could the logging process be simplified? Would the program be more effective by focusing on just diet or just activity behavior? How well will changes made during the course of the program be maintained over time?

Summary

In summary, this study reported that parents and children participating in the home-centered, health-related, family fitness program ate fewer high-fat foods and increased their activity levels. Parents and children also made changes in the desired directions for measures of cardiovascular endurance, strength, and personal health.

The changes in high-fat food consumption and activity points occurred immediately and were maintained throughout the Fit Family Program. The changes in cardiovascular endurance, strength, and personal health measures were more gradual, but maintained throughout the program. It seems likely that these changes occurred due to participation in the Fit Family Program, and not other outside factors. The immediate nature of the changes right after the implementation of the intervention gives support to this observation.

Overall, the results of the implementation of the Fit Family Program are encouraging. Participants made improvements in the direct goals of the program, reduced high-fat food consumption, and increased physical activity, as well as the indirect goals such as health-related fitness measures, and personal health measures.

The potential of the results of this study for reducing the incidence of certain cancers, cardiovascular disease, and certain hypokinetic diseases are promising. Considering that these diseases are believed to be rooted in childhood; implementation of this program where it can reach more young people would seem warranted. This could be one means of reducing the incidence of these diseases in the future.

Implications for Further Research

The following list contains some possible suggestions for future applications of this study:

- Implementation of this program as part of a company wellness program where the incentive for adherence could be job-related.
- Implementation of this program through local health departments so that lower income families could have access to the benefits.
- Implementation of the program as part of family counseling for prospective parents so they could apply the knowledge early in the lives of their children.
- Implementation of the program using pre-programmed pocket computers to aid in logging food consumption, and activity levels.
- Implementation of this program focusing on only one behavior change at a time to increase the effectiveness in that area for specific groups.
- Implementation of this program in conjunction with a school physical education and health program to enhance the effects of both.

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Appendix A

VIRGINIA TECH

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Fit Family Program Announcement

Dear parent and family members,

As you are probably aware, we are in the midst of a crisis of sorts regarding the fitness levels of American children. Even as many adults take part in the current "fitness boom," their children show a declining trend on indicators of health-related fitness. Health-related fitness is that kind which allows a person to function well through a normal day's activity, and to resist many common health disorders in our society: fatigue, lower back pain, overweight, and high blood pressure.

We used to want our children to be fit for participation in sports and recreation. Now, it is critical to help them become fit for the everyday activities of their lives, today and as they grow into adults.

It is becoming more commonly accepted that our children's poor fitness is a result of many factors, not any single one. Too many of them adopt an unhealthy life style early, and begin to show dangerous signs of poor health related fitness at very young ages. For many years, it was assumed that school physical education programs alone could reverse this trend and lead children to healthier lifestyles. We are now realizing that the brief time spent in physical education, even if all of it were devoted to fitness, could not accomplish this important task.

Therefore, we have designed a totally new program to help children and parents improve their fitness together. The FIT FAMILY program is based upon the idea that healthy lifestyles should begin in the home, and be a regular part of every family's daily activities. It also works on the idea that healthy lifestyles can be a family "team effort," with each member helping and supporting one another.

The third feature of the program is that it takes a long term approach. It is not one of those popular programs that promises to help you "lose 15 pounds in two weeks" and then see that weight (and more) return in another two weeks. We have designed the program to last nearly six months under our supervision. After that, you and your family will be able to continue the program on your own without our help.

Finally, the FIT FAMILY program is not just a diet program. It is a comprehensive approach to changing parents' and children's entire lifestyle, to one of healthy eating, regular exercise, improved fitness, and weight control.

The FIT FAMILY Program is supported jointly by the Health and Physical Education Division at Virginia Tech, the Virginia Tech 4-H Extension Office, and your local 4-H office. It is starting as a small field program. If this first program is successful, the FIT FAMILY will become a regular part of the 4-H curriculum across the state.

Virginia Polytechnic Institute and State University

Appendix B

FIT FAMILY PROGRAM MEDICAL SELF-SCREENING

Please read this carefully before you begin:

All participants in the FIT FAMILY Program must pass a medical screening for a general exercise program. All parents and children will be screened at the first meeting. Parents can use this preliminary self-screen to determine whether they will need a physician's approval before fully entering the program.

Directions: Listed below are five indicators for increased chances of risk during exercise. Check all the ones that apply to you. If you check two or more of these indicators as "yes," you will need a physician's reference to participate in the program. That reference can be made prior to the first meeting, with a letter from your physician that you are able to participate in a general fitness program.

If you do not pass the screening at the first meeting, you must then get a physician's reference before the second meeting. Parents and children who do not pass the screening and do not get a physician's reference by the second meeting will not be accepted into the FIT FAMILY Program. There will be no exceptions.

<u>Indicator</u>	<u>YES</u>	<u>NO</u>	<u>DON'T KNOW</u>
1. Age 40 or over	___	___	
2. Blood pressure (140/90 or higher)	___	___	___
3. Total blood cholesterol (250 or higher)	___	___	___
4. Cigarette/cigar smoking in last 2 years	___	___	___
5. Medically diagnosed symptoms that limit exercise (if yes, please indicate)	___	___	___

Appendix C

Fit Family Program Participant's Informed Consent

Please read this carefully:

It is important that all participants in the Fit Family Program are aware of their rights and obligations regarding that participation. Because the project involves children under the age of 18, parents and/or legal guardians will be asked to sign this consent form on their behalf. We have designed the consent form on the basis of family membership, with each participating parent initializing each item to acknowledge that he/she has been adequately informed regarding that part of the project.

1. Family name _____
2. Participating members _____
and ages _____

3. We have read the Fit Family Program Information materials
4. We have read and completed the preliminary Medical Self Screening
5. We understand that all participant's must either:
 - a. Pass the initial health screening, or
 - b. Secure a physician's clearance for a general exercise program
6. We understand that our participation is voluntary and that we can terminate that participation at any time during the project. However, at least one parent and one child must remain in the project to continue family participation.
7. It has been explained that specific benefits may result from our participation. For example, improved fitness and dietary habits, individual and family satisfaction from goal achievement.
8. It has also been explained that certain minor risks are involved in our participation. For example, minor injuries related to exercising.

Signature of participating parent(s): _____

a:\consent

Appendix D

Fit Family Health Inventory

Your name _____

Date _____

Directions:

Please complete this entire self-administered health screening inventory on your own. If you have questions, please ask the person in charge of this station. When you have completed the inventory, give it to that person, who will review it. If you do not pass this screening you must get a physician's approval to participate in a general exercise program before the next group meeting on _____.

-A. MEDICAL HISTORY

1. Indicate the nature of any heart disease/condition of which you are aware for male members of your immediate family. Comment briefly on the age at which the disease was found by a doctor and if the disease caused serious illness or early death.

Yourself _____

Grandfather:

Maternal _____

Paternal _____

Father _____

Brother(s) _____

Uncle(s) _____

2. Have you ever experienced any of the following (please check the circumstances in which they occur)

___ chest pain	___ at rest	___ exertion	___ cold weather
___ chest pressure	___ at rest	___ exertion	___ cold weather
___ pain in jaw	___ at rest	___ exertion	___ cold weather
___ pain in teeth	___ at rest	___ exertion	___ cold weather
___ pain in throat	___ at rest	___ exertion	___ cold weather
___ pain in elbow	___ at rest	___ exertion	___ cold weather
___ pain in wrist	___ at rest	___ exertion	___ cold weather
___ palpitations or	___ at rest	___ exertion	___ cold weather
skipped beats			

___ faintness/dizzy ___ mild, rarely ___ moderate, sometimes
 ___ severe, frequently

___ breathlessness
after mild exercise ___ rarely ___ sometimes ___ frequently

3. Have you ever had an exercise or fitness evaluation? _____
If yes, please explain _____

Are you taking any medications on a regular basis? Yes No

If yes, please list any and all medication you are taking. List both prescription and non-prescription drugs.

Name of medication	Dosage	Doses per day
_____	_____	_____
_____	_____	_____
_____	_____	_____

Do you feel that you have any current discomforts or illness that would affect your ability to exercise? If so, please comment:

Do you smoke or use other tobacco products: Yes No

If you circle yes, please complete a, b and c below

What kind and how much tobacco product do you use?

Average number of cigarettes per day _____

Average number of cigars per day _____

Average number of pipes per day _____

Average number of oral uses per day _____

How many times have you used a tobacco product today? _____

If you smoke, what are your inhaling patterns?

Depth	Frequency
_____ deep in chest	_____ every puff
_____ partly in chest	_____ few puffs per cigarette, pipe or cigar
_____ back in throat	_____ I rarely inhale
_____ mouth only	

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B. EXERCISE/ACTIVITY HISTORY

1. Do you currently exercise at least 3 times a week? Yes No
2. Do you regularly walk or run 1 or more miles continuously? Yes No

If yes, what is the average number of miles you cover? _____

If yes, what is your average time per mile? _____ Don't know

3. Please check the following sports/activities in which you have regularly participated over the past 6 months.

Activity	Days/week	Min/day	Intensity		
			Light	Moderate	Vigorous
aerobics	_____	_____	_____	_____	_____
basketball	_____	_____	_____	_____	_____
bicycling	_____	_____	_____	_____	_____
calisthenics	_____	_____	_____	_____	_____
dancing	_____	_____	_____	_____	_____
chopping wood	_____	_____	_____	_____	_____
golf (walking)	_____	_____	_____	_____	_____
handball/ racquetball	_____	_____	_____	_____	_____
climbing or hiking	_____	_____	_____	_____	_____
stretching for exercise	_____	_____	_____	_____	_____
swimming	_____	_____	_____	_____	_____
tennis	_____	_____	_____	_____	_____
walking for exercise	_____	_____	_____	_____	_____
weight training	_____	_____	_____	_____	_____
Other _____	_____	_____	_____	_____	_____

Place an (*) on those you regularly do with your children/parents

a:\hlthscrn

Appendix E

Fit Family Data Summary Form

DATE _____ ID # _____
Your name _____ Circle: Male Female

STATION 1: (to be completed before all other stations)

BP _____ / _____ Resting Heart Rate _____

Height _____ Weight _____

Total cholesterol _____

Completion of health screening: Yes Reviewed by: _____

Physician's referral: Yes N/A Reviewed by: _____

PLEASE COMPLETE STATIONS 2, 3 AND 4 IN ANY ORDER

STATION 2: Sit and reach _____ cm.

If 100 people the same age and gender as you took this test,
how many of them would have a lower score than you?

0 10 20 30 40 50 60 70 80 90 100

STATION 3: Sit ups (60 sec.) _____

If 100 people the same age and gender as you took this test,
how many of them would have a lower score than you?

0 10 20 30 40 50 60 70 80 90 100

STATION 4: Modified pull ups _____

If 100 people the same age and gender as you took this test,
how many of them would have a lower score than you?

0 10 20 30 40 50 60 70 80 90 100

DISTANCE RUN: 1-mile .5 mile Time: _____

If 100 people the same age and gender as you took this test,
how many of them would have a lower score than you?

0 10 20 30 40 50 60 70 80 90 100

Appendix F

Name _____

Date _____

Directions

Please read each statement carefully twice. Circle TRUE if you think the statement is true, DON'T KNOW if you don't know the answer, and FALSE if you think it is false.

1. People with strong muscles also have strong hearts.
TRUE DON'T KNOW FALSE
2. Regular aerobic exercise (for example, jogging, swimming, walking, biking) causes your heart to beat slower when you are resting.
TRUE DON'T KNOW FALSE
3. Your heart gets weaker when you stop exercising regularly.
TRUE DON'T KNOW FALSE
4. Your heart can get stronger by just exercising once in a while.
TRUE DON'T KNOW FALSE
5. Your muscles turn into fat if you don't exercise them.
TRUE DON'T KNOW FALSE
6. Regular exercise can help make your bones stronger.
TRUE DON'T KNOW FALSE
7. Regular exercise can help keep you from getting lower back pains.
TRUE DON'T KNOW FALSE
8. A person can lose weight faster by dieting and exercising than by dieting alone.
TRUE DON'T KNOW FALSE
9. The amount of weight you lose by exercising depends a lot on what kind of exercise you do.
TRUE DON'T KNOW FALSE
10. A heavier person burns more calories than a lighter person during the same exercise.
TRUE DON'T KNOW FALSE

- | | | | | |
|-----|---|------|------------|-------|
| 11. | Regular aerobic exercise (for example, jogging, swimming, biking, walking) helps your heart beat stronger. | TRUE | DON'T KNOW | FALSE |
| 12. | A person who does aerobic exercise (for example, jogging, swimming, biking, walking) regularly is less likely to have a heart attack than a person who doesn't do aerobic exercise regularly. | TRUE | DON'T KNOW | FALSE |
| 13. | Exercise helps to reduce stress. | TRUE | DON'T KNOW | FALSE |
| 14. | Doing stretching exercises regularly helps keep body parts moving easily and freely. | TRUE | DON'T KNOW | FALSE |
| 15. | Stretching can help keep muscles from becoming sore after exercising. | TRUE | DON'T KNOW | FALSE |
| 16. | Exercising too hard can cause injuries. | TRUE | DON'T KNOW | FALSE |
| 17. | Doing a vigorous (hard) exercise once a week will help your heart and muscles get stronger. | TRUE | DON'T KNOW | FALSE |
| 18. | Aerobic exercise (for example, jogging, biking, walking, swimming) must be done for at least 20 minutes at a time to make your heart and lungs stronger. | TRUE | DON'T KNOW | FALSE |
| 19. | Some problems like sore backs and being tired a lot may be caused by not getting enough exercise. | TRUE | DON'T KNOW | FALSE |
| 20. | Balance, speed, and agility are important to being physically fit. | TRUE | DON'T KNOW | FALSE |
| 21. | Jogging, swimming, tennis, and soccer are all equally good for your heart and lungs. | TRUE | DON'T KNOW | FALSE |

22. A person can lose weight even if that person has been overweight for a long time.

TRUE

DON'T KNOW

FALSE

23. Exercising one part of your body (tummy, for example) trims fat from that part.

TRUE

DON'T KNOW

FALSE

24. Being physically fit means having enough energy for work and play each day.

TRUE

DON'T KNOW

FALSE

25. People should not drink liquids when exercising.

TRUE

DON'T KNOW

FALSE

26. Exercising has to be painful to do any good.

TRUE

DON'T KNOW

FALSE

27. Exercise makes people feel hungrier than if they hadn't exercised.

TRUE

DON'T KNOW

FALSE

28. High blood cholesterol can cause heart disease.

TRUE

DON'T KNOW

FALSE

29. Cholesterol is found in foods like bread and most vegetables.

TRUE

DON'T KNOW

FALSE

30. The best way to reduce blood cholesterol is to eat foods low in cholesterol.

TRUE

DON'T KNOW

FALSE

Appendix G

Daily Eating Log

Name _____ Start Monday _____ End Sunday _____

MONDAY:		Green	Yellow	Red
-BREAKFAST	Items _____	_____	_____	_____
-LUNCH	_____	_____	_____	_____
-DINNER	_____	_____	_____	_____
-SNACKS	_____	_____	_____	_____
				Total Red _____

TUESDAY:		Green	Yellow	Red
-BREAKFAST	Items _____	_____	_____	_____
-LUNCH	_____	_____	_____	_____
-DINNER	_____	_____	_____	_____
-SNACKS	_____	_____	_____	_____
				Total Red _____

WEDNESDAY:		Green	Yellow	Red
-BREAKFAST	Items _____	_____	_____	_____
-LUNCH	_____	_____	_____	_____
-DINNER	_____	_____	_____	_____
-SNACKS	_____	_____	_____	_____
				Total Red _____

THURSDAY:		Green	Yellow	Red
-BREAKFAST	Items _____	_____	_____	_____
-LUNCH	_____	_____	_____	_____
-DINNER	_____	_____	_____	_____
-SNACKS	_____	_____	_____	_____
				Total Red _____

FRIDAY:		Green	Yellow	Red
-BREAKFAST	Items _____	_____	_____	_____
-LUNCH	_____	_____	_____	_____
-DINNER	_____	_____	_____	_____
-SNACKS	_____	_____	_____	_____
				Total Red _____

SATURDAY:		Green	Yellow	Red
-BREAKFAST	Items _____	_____	_____	_____
-LUNCH	_____	_____	_____	_____
-DINNER	_____	_____	_____	_____
-SNACKS	_____	_____	_____	_____
				Total Red _____

SUNDAY:		Green	Yellow	Red
-BREAKFAST	Items _____	_____	_____	_____
-LUNCH	_____	_____	_____	_____
-DINNER	_____	_____	_____	_____
-SNACKS	_____	_____	_____	_____
				Total Red _____

Weekly Total for Reds _____

Appendix H

Daily Activity Log Sheet

Name _____ Start Monday _____ End Sunday _____

MONDAY Activity	Medal Color	Minutes	X	'Factor'	=	Points
_____	B S G	_____	_____	1 2 4	=	_____
_____	B S G	_____	_____	1 2 4	=	_____
_____	B S G	_____	_____	1 2 4	=	_____
Day's Total						= _____

TUESDAY Activity	Medal Color	Minutes	X	'Factor'	=	Points
_____	B S G	_____	_____	1 2 4	=	_____
_____	B S G	_____	_____	1 2 4	=	_____
_____	B S G	_____	_____	1 2 4	=	_____
Day's Total						= _____

WEDNESDAY Activity	Medal Color	Minutes	X	'Factor'	=	Points
_____	B S G	_____	_____	1 2 4	=	_____
_____	B S G	_____	_____	1 2 4	=	_____
_____	B S G	_____	_____	1 2 4	=	_____
Day's Total						= _____

THURSDAY Activity	Medal Color	Minutes	X	'Factor'	=	Points
_____	B S G	_____	_____	1 2 4	=	_____
_____	B S G	_____	_____	1 2 4	=	_____
_____	B S G	_____	_____	1 2 4	=	_____
Day's Total						= _____

FRIDAY Activity	Medal Color	Minutes	X	'Factor'	=	Points
_____	B S G	_____	_____	1 2 4	=	_____
_____	B S G	_____	_____	1 2 4	=	_____
_____	B S G	_____	_____	1 2 4	=	_____
Day's Total						= _____

SATURDAY Activity	Medal Color	Minutes	X	'Factor'	=	Points
_____	B S G	_____	_____	1 2 4	=	_____
_____	B S G	_____	_____	1 2 4	=	_____
_____	B S G	_____	_____	1 2 4	=	_____
Day's Total						= _____

SUNDAY Activity	Medal Color	Minutes	X	'Factor'	=	Points
_____	B S G	_____	_____	1 2 4	=	_____
_____	B S G	_____	_____	1 2 4	=	_____
_____	B S G	_____	_____	1 2 4	=	_____
Day's Total						= _____

Total Points this Week: _____

Appendix I

FIT FAMILY PROGRAM PROTOCOL FOR TESTING

Informed Consent/Biographical Data/Risk Stratification

Equipment: Packets for each family with pencils, name tags, Informed Consent forms, Biographical Data sheet, Score sheets, Process Questionnaire, Diet/Activity Logs, stamped return envelope, memo with training date and contact phone number.

All participants will first be given an overview of the entire Fit Family Program, including benefits to be gained, potential hazards, and requirements for participation. They will be advised that the program is totally voluntary, that they will not be paid for participation, and that they can decide to drop out at any time. They will be allowed to ask questions before signing an informed consent. Parents will be asked to sign an informed consent for each child participating in the program. One parent in each family will also be asked to complete a biographical data sheet for the family as a whole. Both the informed consent and the biographical data sheet will then be collected by the staff.

The staff will then explain the stations and the testing process. The need for physician's approval if two or more risk factors (age 40 or over, smoked in last 2 yrs., cholesterol of 250 or above, BP of 140/90 or above, or other diagnosed signs/symptoms limiting exercise) are present will be emphasized. Adults with one known risk factor (as defined above) will be asked to undergo the cholesterol testing before those without such risk factors.

Participants will be asked to take their Score sheets with them to each station. It will be explained that staff will record results of tests, but participants will be asked to circle the number of people their age out of 100 (on their score sheets) they believe they could outperform on the fitness tests.

Participants will be reminded of the training date, the contact phone number, and asked to return the Process Questionnaire regarding the testing session itself along with their completed logs in the envelope provided.

Height/Weight

Equipment: Balance beam scale

Subjects should remove shoes before taking height and weight measurements. Height should be recorded in feet and the last whole inch. Weight should be recorded to the last whole pound on the score sheet by the tester.

Diet/Activity Logs

Equipment: Diet/Activity logs and stamped return envelopes.

Staff will explain the procedure for completing 6-day diet and activity logs. Each participant will complete a diet/activity log for that day. Participants will be asked to return the forms at the end of the six days in the envelope provided.

Resting Heart Rate and Blood Pressure/Knowledge Test

Equipment: Mercury sphygmomanometer, aneroid sphygmomanometer, 2 stethoscopes, 1 child and 1 adult-sized cuffs, 2 watches with second hands, 2 calculators, Knowledge tests.

Mercury sphygmomanometer should be used for adults, and the aneroid for children.

Subjects should take the Knowledge test or should be sitting quietly for 3 - 5 minutes before taking the pulse and blood pressure. Measurements should be taken in the dominant arm.

Pulse should be palpated with the index, middle and ring fingers on the radial artery, inside the patient's wrist, while the subject's arm rests extended but slightly flexed on a table at his side (heart level). The pulse should be counted for a full minute.

Blood pressure should be taken in this same position using the appropriate sized cuff (width of the cuff about 40% of the circumference of the mid-point of the arm). Position the cuff approximately one inch above the

natural crease of the elbow with the center of the bladder directly over the inner arm. The diaphragm of the stethoscope should be centered over the brachial artery where the strongest beats can be heard. The cuff should be inflated to 160 for adults, 120 for children, or to between 10 and 20 beats above the level of the last audible sound heard. The cuff should then be deflated no faster than 5 mmHg/second. Record the level at which sound is first and last heard (systolic/diastolic). If sounds can be heard as the gauge falls to zero (common in children), record the level at which the sound is muffled.

Deflate the cuff completely, wait one minute, and repeat the procedure to confirm the reading. If the second reading is very different (difference of 20 systolic/10 diastolic), repeat the procedure a third time after a 1 minute rest, and record the average of the three readings.

Staff should collect the Knowledge tests.

Medical Information/Review

Equipment: Medical Information Sheets

Participants will be asked to fill out the medical information sheets. Reviewers will read the form to participants if needed. Reviewers will review the completed forms. For adults, reviewers should ask questions if necessary to determine if two or more risk factors are present:

Age 40 or over

Blood pressure 140/90 or more

Total blood cholesterol 250 or higher

Cigarette/cigar smoking in last 2 yrs.

Medically diagnosed symptoms that limit exercise

If the reviewer suspects two or more, the participant should be asked to obtain a physician's approval before the training session. Advise them that the fitness test can be done before the training session with a physician's approval.

If the participant is a child, or if no or only one risk factor (or none and the cholesterol testing is still blank) is present, the reviewer should initial the Score sheet and advise the participant to go on to the fitness testing stations.

The reviewer should collect the Medical Information forms.

Modified Sit-ups

Equipment: Floor mats

Explain the procedure to the subjects and give them a few minutes to practice one sit-up. Advise them not to hold their breath while performing the

sit-ups. Also advise them that they may rest between sit-ups, but that the goal is to do as many sit-ups as possible in 60 seconds. Advise them that sit-ups done incorrectly will not be counted.

Each participant should choose a partner (preferably parent and child).

Subjects should begin lying on their backs with knees flexed, feet on the floormat, with the heels between 12 and 18 inches from their buttocks. The arms should be crossed on the chest with the hands on opposite shoulders. The subjects' feet should be held by a partner. Sit-ups are performed by curling to a sitting position maintaining arms on chest, chin tucked to the chest, until elbows touch the thighs. To complete sit-ups subjects return to the down position (midback in contact with mat).

The timer gives the signal "Ready? Go!" and the sit-up performance is started on the word "Go." Performance is stopped on the word "Stop." Staff should record the number of correctly executed sit-ups performed in 60 seconds on the score sheet. Tester should ask the participant to circle how many people out of 100 their age they feel they could outperform on this particular test.

Sit and Reach

Equipment: Sit and reach apparatus.

Explain the procedure and allow a few moments for practice. Advise subjects that the test will be repeated if the knees flex or hands reach unevenly during the trial.

The test apparatus should be placed against the wall. Subjects should remove their shoes and sit with legs extended. Feet should be shoulder-width apart and flat against the end board. The arms should be extended forward with the hands placed on top of one another. The subject reaches directly forward, palms down, along the measuring scale four times and holds the position of the maximum reach on the fourth trial. The position of maximum reach must be held for one second. The tester should place one hand on the subject's knees to ensure that they remain extended. Record on the score sheet the most distant line reached by the fingertips of both hands to the nearest centimeter. Tester should then ask the participant to circle the number of people out of 100 their age they could outperform on this test.

Modified Pull-Up Test

Equipment: Special apparatus

Explain the procedure and allow a few moments practice. Advise subjects that the goal is to complete as many pull-ups as possible.

The subject is positioned on his back with the shoulders directly below a bar that is set at a height one or two inches beyond his reach. An extension is suspended from the bar about seven to eight inches below the bar. The subject starts with the buttocks off the floor, legs and arms extended in a "hanging"

position. Only the heels remain in contact with the floor. An overhand grip (palm away from body) is used and thumbs are placed around the bar. A pull-up is completed when the chin touches the extension (7-8 inches below the bar). The movement should be accomplished using only the arms; the body must be kept straight. Record the number of pull-ups the subject completes on the score sheet. Ask the participant to circle the number of people their age out of 100 they could outperform on this test.

Distance Run/Walk

Equipment: Stopwatches

Each participant should be assigned to a recorder who will keep that participant's folder and score sheet during the test.

Explain the entire procedure before starting. Advise subjects to avoid providing motivation to others being tested. Also advise subjects that timers will call out times at each quarter mile so that they can "pace" themselves. Inform subjects that walking is allowed, but that the goal is to complete the mile (children) or 1/2 mile (adults) as fast possible.

Subjects should begin on the signal, "Ready, Start." Timers call out elapsed times at each quarter mile and at the end for each runner/walker. The recorders should record the total elapsed time on the score sheet for the participants assigned to them. The recorder should also ask the participant to circle how many people their age out of 100 they could outperform on this test.

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Virginia Tech
Fit Family Program
Manual for
Stop Light Diet
&
Olympic Medals

THE STOPLIGHT DIET SYSTEM
GUIDE TO
RED, YELLOW, AND GREEN FOODS

STOPLIGHT DIET SYSTEM

This is a guide to help you group foods into Red, Yellow, and Green according to the amount of fat it contains. All the Red foods (on pink paper) are high in fat and are to be avoided whenever possible. The Green foods (green paper) have no (or almost no) fat in them, and you can eat them to your heart's content. The yellow foods (yellow paper) are somewhere in between, better than red, but not as good for you as green foods.

Whenever you have a "mixed" food, such as, casserole or soup, that can't be easily broken apart into Reds, Yellows, and Greens, count it as the food in it that contains the highest fat (Red). For example, if you have vegetable-beef soup, you would count it as Red because the highest fat food, beef, is Red. On the other hand, if the soup was plain vegetable soup with NO beef, you would count it as green, since all the vegetables and pasta are Green foods.

If you eat a food that can be easily taken apart, like a sandwich, count the individual items. For example, a ham and cheese on rye would count as 3 Reds (ham, cheese, mayonnaise), and 3 Greens (2 slices of bread, lettuce/tomatoe). A serving of a vegetable, like a potatoe or beans, would count as one green, but if you add margarine, butter or sour cream, you would count the one green plus one red for the additional fat.

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GREEN FOODS

PROTEINServing Size CaloriesLegumes, Lentils, Beans

Without added fat, butter, margarine, or oil	1/2 cup	L
--	---------	---

Fish

Nonfried, unbreaded, without added fat, butter, margarine, or oil	3 oz. or 1/2 cup	L
--	------------------	---

Other

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

GRAINSBreads (all plain, without added butter, margarine, or oil)

Bagel	1	M
-------	---	---

English Muffin	1	M
----------------	---	---

Sliced	1 slice	L
--------	---------	---

<u>Cereals</u> (non-sugar-coated, without added sugar)	1/4 - 3/4 cup	M
--	---------------	---

Crackers

Rye Crisp, Saltines, Melba Toast	3-8	L
----------------------------------	-----	---

Pasta

Without added fat, margarine, butter, oil	1/2 cup (cooked)	L
---	------------------	---

Green Foods continued

Grains

Rice

Without added fat, margarine, butter, oil	1/2 cup	L
---	---------	---

Other

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

FRUITS AND VEGETABLESVegetables and Fruits

Nonfried, without added fat, oil, butter, or margarine.	1/2 - 1 cup	L
---	-------------	---

Juices without added sweetner	1 cup	L
-------------------------------	-------	---

Other

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

DAIRYMilk

Skim	1 cup	L
------	-------	---

Buttermilk	1 cup	L
------------	-------	---

YELLOW FOODS

PROTEINPoultry

Without skin, nonfried, unbreaded, without added fat, butter, margarine, or oil	3 ounces	M
--	----------	---

Shellfish

Without skin, nonfried, unbreaded, without added fat, butter, margarine, or oil	3 oz or 1/2 cup	L
--	-----------------	---

Veal

Nonfried, unbreaded, without added fat, butter, or margarine	3 ounces	M
---	----------	---

Other

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

GRAINSBreads

Muffin	1	M
Pancake	1	M

Cereals

Granola	1/4 cup	H
With added sugar or sugar-coated	1/4 cup	M

Yellow Foods continued

Grains

CrackersRitz, Triscuit, others not listed as
"green"

3

M

Other

FRUITS AND VEGETABLES

Avocado

1/4 cup

M

DAIRYCheese

Cottage

1/2 cup

M

Low-fat, part skim

3 ounces

M

Yellow Foods continued

Dairy

Milk

Chocolate milk made with skim milk	1/2 cup	M
One percent	1 cup	M
Ice milk	1/2 cup	M
Pudding with skim milk	1/2 cup	M
Sherbert	1/2 cup	M

Yogurt

Low-fat, frozen	1/2 cup	M
Low-fat, flavored	1/2 cup	M

Other

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

OTHERCakes, Cookies, Candy

Angelfood (no icing)	1 piece	M
Animal crackers	10	M
Gingersnaps	2	M
Graham crackers	2	M
Gumdrops	5	M
Hard candy	6	M
Jelly beans	10	M

Yellow Foods continued

Other

Lollipop	1	M
Marshmallows	3	L
Mints	8	L
Vanilla wafers	4	M

Drinks

Alcoholic beverages (except cream-based cocktails) - NOT TO EXCEED 2 PER DAY	1	M
Broth		L
Club soda		L
Coffee, tea		L
Soda pop (non-diet)	8 oz.	M
Soda pop (diet)	8 oz.	L
Kool-Aid, lemonade, Hi-C, etc.	1 cup	M

Snacks

Popsicle	1	L
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Salad Dressing

Low-fat, reduced calorie	1 tablespoon	M
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Sugars and Syrups

Jam, jelly, honey, etc.	1 tablespoon	M
Sugar	1 tablespoon	M

Other

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

RED FOODS

PROTEIN

Any green or yellow protein fried		H
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Bacon	2 slices	H
-------	----------	---

Beef, Lamb, Pork	3 ounces	H
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Eggs

Without added fat, butter, margarine, or oil	2	L
--	---	---

Hot dog	1	H
---------	---	---

Kielbasa	3 ounces	H
----------	----------	---

Luncheon meat	2 slices	H
---------------	----------	---

Nuts

Peanut butter	2 tablespoons	H
---------------	---------------	---

Nuts	8-12	H
------	------	---

Organs	3 ounces	M
--------	----------	---

Salad

Tuna, chicken, ham salad made with mayonnaise	1/2 cup	H
---	---------	---

Sausage	3 ounces	H
---------	----------	---

Other

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Red Foods continued

Grains

GRAINS

Any grains listed in "green" or "yellow"
fried

H

Breads and Pastries

Biscuit	1	H
Cornbread	1	H
Croissant	1	H
Danish pastry	1	H
Doughnut	1	H
French toast	1 slice	H
Sweet roll	1	H
Toaster pastry	1	H
Waffle	1	H

Pasta

Chow-main noodles	1 cup	H
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Rice

Rice-A-Roni	1/2 cup	H
-------------	---------	---

Other

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Red Foods continued

Fruits & Vegetables

FRUITS AND VEGETABLESAny green or yellow fruit or vegetable fried
or creamed

H

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

DAIRYCheese (those not listed as "green" or "yellow")

1/2 cup

H

Ice cream

1/2 cup

H

Milk

Two percent or whole

1 cup

H

Pudding with whole milk

1/2 cup

H

Yogurt

Made with whole milk

1/2 cup

H

Other

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Red Foods continued

Other

OTHER

Cake (those not listed as "yellow")	1 piece	H
Candy (those not listed as "yellow")	1	H
Cookies (those not listed as "yellow")	1	H

Dairy fats

Butter, margarine	1 tablespoon	H
Cream	1 tablespoon	H

Fats

Oil	2 teaspoons	H
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Pie

1 slice	H
---------	---

Pizza

1 slice	H
---------	---

Salad Dressing

Mayonnaise	1 tablespoon	H
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Other than reduced calorie, low-fat	1 tablespoon	H
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Snacks

Corn chips, potato chips, etc.	1 ounce	H
--------------------------------	---------	---

Popcorn with butter	1 cup	H
---------------------	-------	---

Soup

Cream soups	1 cup	H
-------------	-------	---

With red meat	1 cup	H
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Other

_____	_____	_____
_____	_____	_____
_____	_____	_____

**Olympic Medal System for
Personal Activity**

Introduction

Many people want to increase their levels of daily activity, in order to feel better, reduce weight, increase fitness, or learn life-long sports. All of these are good goals, and possible for most people to reach within a reasonable amount of time. Meeting those goals, however, requires more than the desire to do so. People need some assistance and a system, like the one outlined in this manual. The Olympic Medal System is designed to help you monitor your daily activity over-and-above your work-related levels, and to help you reach some personal goals set by you and the Fit Family Program Staff.

The Olympic Medal System operates on a simple plan for placing activities into three categories, corresponding to the three colors of Olympic medals: BRONZE, SILVER, and GOLD. When you participate in one of the activities listed under each color, you note the amount of time you spent in that activity and multiply the minutes by the 'factor' for each color. The following pages will cite many examples under each color category and provide you with a chance to calculate points. Later on, the Fit Family Staff will show you how to enter your daily points in your personal and family logs, and how to monitor your personal goals.

Bronze

Activities in the lowest level are represented by the color BRONZE. They signify a tendency to participate in some activity, which is a lot better than none--being a "couch potato!" For mostly sedentary people, BRONZE is a good place to start a program of increased activity, so that the risks of injury or extreme fatigue are small.

Activity under BRONZE can happen in two ways, through things done in and around the house (over and above your regular routines) and recreational/sports involvement. Some examples under each category are:

'Around the house'

Auto repair
Light woodworking
Washing the car by hand
Mowing lawn (riding)
General repair
Clipping hedges/pruning trees

Recreational/Sports

Slow walking
Slow bicycling
Bowling
Billiards
Golf (riding)
Horseback riding
(slow)
Canoeing (slow)
Shuffleboard
Playing in yard
(easy)

Calculating BRONZE points:

The factor for BRONZE points is simple, it's "1". You get one point for each minute of BRONZE activity you have each day.

BRONZE activity	Minutes		Factor		Logged Points
Washing the car	75	X	1	=	75
Slow walking	45	X	1	=	45
Installed shelves	90	X	1	=	90
Ride bike (slow)	20	X	1	=	20

Silver

SILVER activities are moderate in intensity, and signify a somewhat advanced level of participation. They tend to make you sweat lightly or experience some degree of muscle fatigue from participation. Some examples from the same two categories are:

'Around the house'

Hanging wall paper
Cleaning windows
Plastering walls
Laying bricks
Pushing power mower
Digging in garden
Raking leaves

Recreational/Sports

Moderate walking
Moderate cycling
Golf (walking)
Ping pong
Tennis (doubles)
Slow jogging
Stretching
Light Calisthenics
Volleyball (Rec)
PE class (if sweat)
Level hiking
Badminton
('backyard')
Ice/roller skating
Moderate dancing
Playing in yard
(hard)
Skateboarding

***** Calculating SILVER points:

The 'factor' for SILVER points is "2". That means you multiply each minute in SILVER activity by 2 to calculate your credit for those minutes.

SILVER activity	Minutes		Factor	Logged Points
Roller skating	60	X	2	= 120
Planting the garden	100	X	2	= 200
Stretch, then slow jog	35	X	2	= 70
Moving lawn (walking)	60	X	2	= 120

Gold

GOLD activities include high-intensity participation, only for those ready for that level. They involve heavy exertion, lots of sweating, and some 'recovery time.' It is possible to be in GOLD through 'around the house' and recreational/sports activity. Here are some examples.

'Around the house'	Recreational/Sports.
Shoveling heavy snow	Fast walking
Carrying/pushing heavy objects	Fast cycling
Heavy carpentry	Moderate/fast
	Jogging
Hard digging	Competitive team
	sports
Splitting wood	Competitive
	individual sports
'Hand' lawn mowing	Horseback riding
	(gallop)
Moving heavy furniture	Steep hiking
	Tree or rope
	climbing
	Heavy callisthenics
	Fast dancing

Calculating GOLD points:

Due to their high intensity, GOLD activities have a 'factor' of "4". You get to multiply each GOLD minute of activity by 4 when you log them.

GOLD activity	Minutes		Factor		Logged Points
Tennis singles	90	X	4	=	360
Moving furniture	60	X	4	=	240
Full court basketball	30	X	4	=	120
Baling hay	120	X	4	=	480

Weekly Fitness Self Testing

Your and your family members will get fitness tested by the Fit Family Staff two more times during the program. So that you can have some more frequent feedback, we would like to you conduct a few simple "self tests" each Saturday or Sunday. This section will describe how to do the tests. The results from each week will be reported on the back of the Family Weekly Summary form.

1. Sit ups

Find a soft area on the floor or use flat cushions. Lay on the floor with your back touching the floor and your knees bent. Your feet should be flat on the floor, and your arms crossed on your chest. Ask someone to hold your feet and to help you count.

Count the number of situps you can do in 60 seconds. We recommend that you do no more than two sets, and record the highest of the two on your sheet.

2. Modified Pull ups

Use a chin-up bar secured in a door frame, or devise your own setup. Be sure the bar will not move, and that it is set up just above your arms' reach when on the floor. Lay flat on the floor, back down. Reach up and grab the bar with your palms facing forward. Keep your heels on the floor and lift your chin to the bar. No fair touching your backside on the floor! See how many you can without stopping.

3. Sit and reach

You will need one of the rulers provided in your packet, and a wall space. Remember to do this test with your shoes off.

A. If you can't reach past your toes

Sit on the floor with your legs flat on the floor and your feet flat against a wall (or other surface). Put one hand over the other (left palm on the back of the right), and put the ruler in your right hand. Make sure the 'printed' side is up and the "12" is toward you. Touch the end of the ruler to the wall just above your toes and slide your hands as far up the ruler as possible, without bending your knees. When you have gone as far as you can, look at the ruler to see how many inches you covered. That is your measure. The object is to decrease your score--getting closer to zero at the end of the ruler. Do three tries and record your "shortest" distance.

B. If you can reach past your toes

Sit on the floor with your legs flat on the floor and your feet flat against a surface that's about as high as your toes (a firm box will do nicely). You will need someone's help with this. Have your helper hold the ruler on top of the box, with the "1" nearest you, and the "12" pointed straight away. Placing one hand over the other, try to slide up the ruler as far as you can, and have your helper record that distance. Do not bend your knees. Your objective is to increase your score by going up the ruler. Do three tries and record your longest distance.

4. Timed Walk/Run

First, pick a set route on a course you wish to cover. It can be around the block, to a certain neighbor's house, to a store, or the same path in the woods. The distance is up to you, but start by picking a route you know you can complete. At your "usual" pace (walking slow, walking fast, jogging, etc.) complete the route and record the time in minutes and seconds. Complete this same route each weekend and record your time. The objective is to improve your time each week, but be careful not to exceed a safe pace.

Daily and Weekly Directions for Logs

Reminder:

The Fit Family "Week" starts on Monday and ends on Sunday

DAILY:

1. Complete your Daily Food Log for each meal.
2. Note the number of Green, Yellow and Red foods for each meal.
3. Write the number of REDS (only) for each day
4. Record your daily RED foods on the Family Summary chart
5. Add up TOTAL RED foods for the week
6. Complete your daily activity log. Write "None" if none.
7. Write in each activity, circle the correct color (B S G)
Indicate the number of minutes it took
Circle the correct factor (1 Bronze, 2 Silver, 4 Gold)
Multiple the minutes by the factor and write
Add total points for each day
8. Record your daily activity points on the Family Summary chart

WEEKLY:

1. Make sure each person has 7 Daily Diet and Activity logs completed
2. Make sure each person has recorded his/her information on the Family Summary chart
3. Place all the Daily logs and the Family Summary sheets in one of the addressed envelopes and mail on MONDAY.

APPENDIX K

Summary ANOVA Table for Mean Red Foods

Source of variation	SS	DF	MS	F	Sig.of F
SUBJECTS	1597.89	50	31.96		
PHASES	2132.06	5	426.41	13.34	.000

Appendix L

Summary ANOVA Table for Mean Activity Points

Source of Variation	SS	DF	MS	F	Sig.of F
SUBJECTS	4398553.18	50	87971.06		
PHASES	2318199.11	5	463639.82	5.27	.001

VITA

Raymond Vance Blevins Jr

Academic Experience

- 1991 M.S., Exercise Physiology, Virginia Tech,
Blacksburg, VA.
- 1986 B.A., Health and Physical Education (K-12), Emory
and Henry College, Emory, Virginia.
- 1981 Marion Senior High School, Marion, Virginia.

Licenses/Certificates:

Public school teacher, Health and Physical
Education (K-12), Virginia, North Carolina,
Tennessee.

American Red Cross CPR certification

American Red Cross First Aid certification

American Red Cross Lifeguarding certification

Virginia Real Estate Sales License

Employment Experience:

- 1/91-Present Teacher 8, 9, 10 Health
- 8/91-11/91 Football Coach, Fort Chiswell High School
Max Meadows, Virginia.
- 12/89-1/91 Teacher 6, 7, 8 Health and Physical
Education, Northwest Middle School,
Charlotte, North Carolina.
- 8/90-10/90 Football Coach, Northwest Middle School,
Charlotte, North Carolina.
- 1/89-6/89 Substitute teacher, Montgomery County
Schools, Montgomery County, Virginia.
- 8/87-5/89 Cardiac Rehabilitation Intern, Virginia Tech
Cardiac and Intervention Center, Blacksburg,
Virginia.
- 10/87-1/89 Strength training instructor, Montgomery
Regional Hospital (Fitness Connection)
Blacksburg, Virginia.
- 8/86-1/87 Head teacher, Mountain CAP Head Start Center,
Marion, Virginia.