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# Efficacy of a Self-Directed Behavioral Health Change Program: Weight, Body Composition, Cardiovascular Fitness, Blood Pressure, Health Risk, and Psychosocial Mediating Variables

P. Andrew Clifford,[1] Siang-Yang Tan,[1,2] and Richard L. Gorsuch[1]

*This study assessed the efficacy of a comprehensive behavioral health program designed to promote self-initiated change in overweight healthy middle-aged adults (M = 49 years). Three treatment groupss (total n = 25) differing in type of social support provided (i.e., group plus professional versus group plus peer versus group only) received 13 treatment sessions and 6 maintenance sessions scheduled over a full year. A self-directed change intervention taught several cognitive-behavioral techniques as they applied to exercise adherence, weight reduction/maintenance, and stress management. Combined treatment groups (n = 25) improved significantly more than an assessment only control group (n = 9) in weight, percentage body fat, cardiovascular fitness, exercise adherence, health-risk appraisal, chronic tension (MBHI, scale A), and systolic and diastolic blood pressure at both post-treatment and 6-month follow-up assessments. Self-motivation, group treatment attendance, and health-risk appraisal significantly related (r's = .30-.56) to several posttreatment and follow-up measures of behavioral health change. No significant differences were found among the three treatment groups on any of the outcome measures.*

**KEY WORDS:** behavioral health; self-directed change; weight loss; body composition; cardiovascular fitness.

# INTRODUCTION

A consistent problem observed with behavioral health interventions is the low adherence or maintenance rates that occur following treatment (e.g., Foreyt et al., 1982; Oldridge, 1984). Relapse or the failure to maintain exercise and weight management behaviors developed during treatment periods may be impacted by psychosocial factors such as inadequate motivation or commitment, negative emotional states, vulnerable coping styles, and lack of social support (Brownell et al., 1986). While cognitive-behavioral interventions appear to be useful in effecting short-term change, low posttreatment adherence levels for both exercise and weight management interventions invite the exploration of intervention methods which focus on self-control or self-directed change strategies associated with relapse resistance and long-term maintenance of behavioral health practices.

## Self-Directed Change

Matarazzo's (1980, 1982, 1984) paradigm of behavioral health calls for interdisciplinary interventions designed to promote individual responsibility and personal initiative in developing and maintaining behavioral health practices that decrease morbidity and premature mortality. The process of self-directed change promotes this ideal by training and educating clients in the process and application of self-modification (e.g., Farquhar, 1979; Kendall and Shapiro, 1984; Watson and Tharp, 1981). This treatment approach focuses on facilitating personal commitment (Sensenig and Cialdini, 1984) and self-efficacy (Strecher et al., 1986) and, therefore, makes no specific behavioral health prescriptions (cf. Meichenbaum, 1985, Chap. 2). In contrast to prescriptive programs, self-directed change recommends general behavioral health objectives, reviews several applications of cognitive-behavioral techniques, and encourages clients to explore techniques which seem relevant to them based on their behavioral health assessments. Personal commitment to the process of self-contracting, reappraisal, and maintenance of personally chosen and effective behavioral health life-styles is emphasized (Farquhar, 1979; Sensenig and Cialdini, 1984). This process involves clients' learning how to think, how to solve problems, and how to make decisions regarding their own life-style and behavioral health practices (Thoresen and Eagleston, 1985, p. 70).

The efficacy of a competently administered self-directed change treatment program may be determined by several mediating variables, including self-motivation and social support. A consistent predictor of behavioral

health change and adherence is self-motivation—conceptualized as a behavioural tendency to persevere independent of situational reinforcements (Dishman et al., 1980). While self-motivation is a good indicator of short-term adherence (Dishman, 1982), some findings suggest that people very compliant at the onset of treatment may have difficulty dealing with lapses when they occur and, thus, tend to relapse more than those who struggled with adherence early in the treatment process (Wadden et al., 1983). Relapse prevention training needs to start early in treatment, with the aim of teaching clients to use problem-solving, cognitive restructuring, and active coping strategies which transform lapses and psychological resistance into opportunities for personal reappraisal, commitment, and growth (cf. Brownell et al., 1986). Self-motivation is strengthened when behaviors and social commitments are experienced as originating internally (Sensenig and Cialdini, 1984).

Social support, defined as the interpersonal exchange of emotional concern, instrumental aid, information, and interpersonal appraisal (House, 1984), can be perceived as coming from a variety of sources (family, friends, co-workers, and health-care professionals) and is a good predictor of behavioral health change and maintenance. Social support promotes exercise adherence (e.g., Godin et al., 1987) and weight control (e.g., Perri et al., 1986, 1987, 1988; Wilson, 1984), and in certain situations, social support buffers the biopsychological strain associated with stressful life events (Gentry and Kobasa, 1984).

One source of social support is the therapeutic behavioral health group (e.g., Eaker et al., 1982; Perri et al., 1988). Yalom (1975) shows that the effect of supportive group therapy increases with duration. He found that clients attending fewer than 12 sessions reported little if any long-term personality or life-style changes, but 85% of those attending 50 meetings reported making significant improvement and/or change. Both Foreyt et al. (1982) and Brownell et al. (1986) recommend the use of social support to increase posttreatment maintenance, and the former suggest that behavioral treatments be extended beyond the typical duration of 8–12 weeks to effect long-term maintenance. Extended behavioral health treatments, however, need to allow for interpersonal exchange if quality social support is to develop in these treatment settings (Yalom, 1975).

The present study was conducted to explore the efficacy of a comprehensive wellness program that employs self-directed change (SDC) strategies to facilitate the behavioral health practice of exercise adherence, prudent nutrition, weight control, human relations, stress management, and values clarification and development skills. The strategies of SDC were designed to impact self-referent thought regarding behavioral health skills

(Sensenig and Cialdini, 1984). It was predicted that behavioral health outcome or dependent measures of weight, percentage body fat, cardiovascular fitness, exercise adherence, chronic tension, health risk, anxiety, and systolic/diastolic blood pressures would improve gradually over time for the treatment group receiving the self-directed change intervention. It was hypothesized that the psychosocial mediating variables of self-motivation, life events, social support, and coping style would correlate with behavioral health change measures.

This study was also conducted to evaluate the interaction among three levels of professional and/or peer support (i.e., group plus professional support vs. group plus peer support vs. group only) with a general group administered self-directed change treatment over time. It was hypothesized that these two problem-solving support interventions (i.e., professional or peer support) would augment the impact of the standard group treatment. It was therefore predicted that the group receiving the standard group treatment plus professional support and the group receiving the standard group treatment plus peer support would do significantly better than the group receiving only the standard group treatment, on the behavioral health outcome or dependent measures already mentioned.

## METHOD

### Clients

Forty-eight YMCA members were recruited through posted publicity at a family YMCA facility. Interested members ($n = 36$) chose one of three nights of the week they preferred to meet and paid a $50 nonrefundable deposit which would be applied to their $195 fee for the year-long treatment program. An assessment-only control group ($n = 12$) was recruited from YMCA members who were interested in losing weight and willing to participate in a year-long study involving four assessments. A medical release and consent form were signed by each client and his or her physician. A space for comments was made available for the physician to list any limitations or recommendations to the therapist concerning the client's participation in an exercise and weight loss wellness program.

### Therapists

The three treatment groups and all assessments were conducted by the senior author, who was a graduate student in clinical psychology and

a YMCA director. Another therapist, who was also a YMCA director, assisted in individual problem-solving/professional support sessions employed in one of the treatment conditions. Both therapists were trained as Y's way to weight and stress management instructors (Cotterman, 1985b; Tubesing and Tubesing, 1985) and employed self-modification (Watson and Tharp, 1981), self-directed change (Farquhar, 1979), and Y's way to physical fitness strategies (Golding et al., 1982).

### Experimental Design

By selecting specific group meeting nights, clients distributed themselves into the three treatment groups which were randomly assigned to the three meeting nights. Three treatment conditions were employed to evaluate the interaction between problem-solving support and the general group treatment on behavioral health change measures over time.

### Treatment Conditions

*Treatment Group 1.* This group (initial $n = 11$) met on Monday nights and received, as did groups 2 and 3, the general SDC group intervention (i.e., group only), which included several bibliographic materials (Cotterman, 1985a; Farquhar, 1979; Tubesing, 1981). Detailed session notes were given to the clients during group meetings. The first four sessions focused on exercise adherence and related relapse prevention skills. Sessions 5–8 focused on nutritional and weight management skills, and sessions 9–13 dealt with stress management skills. Group settings followed the format of the session notes and allowed for group discussion and interaction. All groups met weekly for the first month (three sessions) and twice a month for the remaining 5 months of treatment. SDC sessions employed structured exercises, minilectures, questionnaires, case studies, and personal examples from clients as techniques to teach cognitive-behavioral skills associated with self-directed change (Tubesing and Tubesing, 1983–1986). All sessions ended with clients developing or revising their individual behavioral health self-contracts. The general SDC group treatment also included six posttreatment maintenance support group sessions which met the first week of each month (months 7–12) and followed a format similar to that of the treatment groups but focused on topics relating to relapse prevention and maintenance of behavioral health practices—values clarification/ integration, social support, problem-solving, and appraisal and maintenance of self-directed behavioral health self-contracts. The general SDC treatment involved a total

of 19 group sessions (13 treatment, 6 posttreatment) scheduled over a full year.

*Treatment Group 2.* This group (initial n = 11) met on Tuesday night and received the general SDC group intervention plus five planned individual sessions with a randomly assigned therapist (i.e., group plus professional support). Clients were encouraged to make monthly appointments with their therapist during the last 5 months of treatment (months 2–6). These 30- to 40-min sessions were standardized by a detailed protocol (following D'Zurilla and Goldfried, 1971) and focused on solving problems experienced by individuals when implementing their self-directed behavioral health change contracts. These sessions ended with a revision of the clients' behavioral health self-contracts.

*Treatment Group 3.* This group (initial n = 14) met on Thursday night and received the general SDC group intervention plus five planned individual peer problem-solving support sessions (i.e., group plus peer support). Clients were paired according to their chosen exercise modality and were encouraged to meet monthly with each other during the last 5 months of treatment (months 2–6). Peer support sessions were standardized by a detailed protocol similar to the one used with clients in group 2, but they were very poorly attended (see Results).

*Assessment-Only Control Group.* This group (initial *n* = 12) received the same assessments as the treatment groups at the same time intervals. Assessments gave immediate feedback regarding weight, body composition (percentage body fat), cardiovascular fitness, and blood pressure. Health-risk appraisals were not shown or interpreted to the assessment-only control group.

### Dependent Measures

*Fitness Appraisals.* The *YMCA's Fitness Appraisal (YFA)* (Golding et al., 1982) test battery was used. This battery assesses height, weight, 5-min resting blood pressure, body composition (skin-fold measurements at seven sites for males and females), and cardiovascular fitness [a submaximal bicycle ergometer regimen was used to estimate maximal volume of oxygen consumption (max $VO_2$ ml/kg/min)]. Assessment protocols and calculations followed *Y's Way to Physical Fitness: Fitness Assessment Software* (Cardinal Health Systems, 1985).

*Cognitive/Behavioral Measures.* Two questionnaires were employed to assess the self-agency mechanism of self-motivation and cognitive-behavioral or "self-control" coping styles.

Dishman's (1981, 1982) Self-Motivation Scale was developed to assess self-motivation—conceptualized as a behavioral tendency to persevere independent of situational reinforcements. Self-motivation is a stable trait and relatively insensitive to situational influence. Clients low in self-motivation tend to drop out of behavioral health programs three times as much as those high in self-motivation (Dishman and Ickes, 1981; Dishman *et al.,* 1980).

Rosenbaum's (1980) Self-Control Schedule was developed to assess self-control conceptualized as a person's tendency to apply self-control methods to the solution of behavioral problems. The Self-Control Schedule (SCS) assesses (a) the use of cognitions and "self-statements" to control emotional and physiological responses, (b) the application of problem-solving strategies, (c) the ability to delay immediate gratification, and (d) perceived self-efficacy.

*Behavioral Health Measures.* Two psychosocial inventories and a health risk appraisal were administered in all four assessments. The Millon Behavioral Health Inventory (MBHI) (Millon *et al.,* 1982) generates 20 scales grouped into four categories: basic coping styles, psychogenic attitudes, psychosomatic correlates, and prognostic indices. The psychogenic attitudes of chronic tension, recent stress, social alienation, and somatic anxiety were of main interest in this study. The State Trait Anxiety Inventory (STAI) (Spielberger *et al.,* 1970) was used to measure both situational and trait anxiety. The Centers for Disease Control (1984) Health Risk Appraisal (HRA) is a 38-item questionnaire, computer-assisted appraisal, which assesses specific behaviors and conditions associated with the 12 leading causes of death for adults with the same sex, race, and age.

*Credibility and Perceived Success Rating Questionnaire.* A 12-item questionnaire was constructed along the lines of Borkovec and Nau's (1972) credibility scales to assess the credibility of the program and the clients' perceived progress toward behavioral health objectives: exercise adherence, alternate food patterns, weight control, and stress management. This questionnaire was administered only at the 6-month follow-up assessment to check the assumption that all groups received a similar SDC group treatment.

### Assessment Schedule

Prior to the second SDC group meeting, all SDC treatment groups and the assessment-only control group completed the behavioral health assessment, which included all psychometric measurements and a fitness

appraisal. This assessment battery was repeated at 3-month midtreatment, 6-month posttreatment, and 6-month follow-up intervals.

## RESULTS

### Clients

An exploratory multivariate analysis of variance (MANOVA) revealed no significant differences at pretreatment on the dependent measures (Pillai–Bartlett $V = 1.04$, $\chi^2 = 43.48$, df $= 48$, $p = .3$) between treatment groups, the assessment-only control group, and clients who dropped out during initial treatment. Of the 48 YMCA members who initially signed up for the study, 14 were unable to complete treatment or the third assessment, representing an attrition rate of 29%. Four were dropped early in the study because medical conditions made fitness assessment impossible. Two clients moved out of the area, three others dropped due to extended business travel, three dropped for personal reasons, and a couple dropped after a family tragedy.

Final group sizes were as follows: Monday (group 1), $n = 10$; Tuesday (group 2), $n = 7$; Thursday (group 3), $n = 8$; and comparison/control (group 4), $n = 9$. Clients in group 1 (group treatment only) attended an average of 11 treatment sessions of 13 (85%) and 2.7 posttreatment sessions of 6 (45%); clients in group 2 (group treatment plus professional support), an average of 11 treatment sessions (85%) and 3.6 posttreatment sessions (60%); and clients in group 3 (group treatment plus peer support), an average of 8.5 treatment sessions (65%) and 1.9 posttreatment sessions (31.3%). Clients in group 2 on the average attended about 70% of the additional five individual professional support sessions with a randomly assigned therapist, whereas clients in group 3 on the average attended only about 10% of the additional five individual peer support sessions with another peer (or "buddy"). Of the 34 who completed the study, 17 were women and 17 men. The average age was 48.9 years (SD $= 11.1$ years). Six percent of the clients reported no high-school diploma; 9%, high-school diploma; 26%, some college; and 59%, college degree. There were no reported smokers at pretreatment or at follow-up assessments.

### Behavioral Health Changes

A series of separate repeated-measures analyses of variance (ANOVAs) was used to test each of the hypotheses, one for each

dependent measure. The first of these analyses compared all treatment groups combined (i.e., the general SDC treatment) versus the control group as a preplanned comparison. A further set of analyses broke the treatment group into three levels of problem-solving support (i.e., group plus professional support vs. group plus peer support vs. group only), but none of these analyses was significant.

The analyses comparing the general SDC treatment (all treatment groups combined) to the control group used pretreatment assessments as the baseline measures and revealed that all clients who received the general SDC treatment (i.e., clients from the three treatment groups combined) improved significantly more than those in the assessment-only control group in weight, percentage body fat, cardiovascular fitness (max VO$_2$), exercise adherence, chronic tension (MBHI scale A), and systolic and diastolic blood pressures at both posttreatment and follow-up assessments. A 3-month midtreatment assessment also indicated that SDC clients improved significantly more than those in the control group in percentage body fat, exercise adherence, chronic tension, and diastolic blood pressure. Resulting SDC treatment ($n = 25$) and control ($n = 9$) means and standard deviations for the four assessments are given in Table I.

### Body Weight and Body Composition

SDC treatment group clients were classified using body mass index (BMI) and body composition categories. Using Blackburn and Kanders' (1987) classifications, BMIs less than 25 and more than 22 for men and 21 for women were considered desirable (i.e., absence of medical risk). BMIs greater than 25 were labeled overweight and were associated with a slight medical risk. BMIs over 30 were considered obese and were associated with greater medical risk. Using these classifications the clients' relative risks were monitored. Of the 25 clients, 4 (16%) were within the desirable BMI range at pretreatment. Ten clients (40%) at posttreatment and 9 (36%) at follow-up had reached and maintained desirable BMI ranges. BMI classifications of overweight at pretreatment, posttreatment, and follow-up dropped and maintained from 13 (52%) to 11 (44%) and 11 (44%), respectively, and BMI classifications of obese dropped and maintained from 8 (32%) to 4 (16%) and 5 (20%), respectively. Body composition classifications of medical risk showed similar trends among clients.

BMI and body composition trends showed that SDC clients at various levels of medical risk were losing modest amounts of weight. Based on the criterion of losing and maintaining at least a 10-lb loss, 28 and 40% of the

**Table I.** Means and Standard Deviations Comparing Treatment and Assessment-Only Control Groups at Four Time Intervals

| Dependent measure | Pre | Mid | Post | Follow-up |
|---|---|---|---|---|
| **1. Weight (kg)** | | | | |
| Treatments | | | | |
| M | 84.51 | 82.92 | 81.28* | 81.64* |
| SD | 13.15 | 13.38 | 13.20 | 14.29 |
| Control | | | | |
| M | 82.06 | 81.55 | 82.00 | 82.23 |
| SD | 15.00 | 13.74 | 14.83 | 14.61 |
| **2. Percentage body fat** | | | | |
| Treatments | | | | |
| M | 29.8 | 28.4* | 26.2* | 26.4* |
| SD | 6.47 | 7.31 | 7.15 | 6.99 |
| Control | | | | |
| M | 30.4 | 31.6 | 30.0 | 29.3 |
| SD | 4.86 | 4.03 | 4.37 | 3.53 |
| **3. Exercise adherence**[a] | | | | |
| Treatments | | | | |
| M | 2.08 | 2.76* | 2.56* | 2.52* |
| SD | 0.688 | 0.512 | 0.571 | 0.574 |
| Control | | | | |
| M | 3.00 | 2.89 | 2.89 | 2.89 |
| SD | 0.00 | 0.314 | 0.314 | 0.314 |
| **4. Max $VO_2$ (ml/kg/min)** | | | | |
| Treatments | | | | |
| M | 29.2 | 30.2 | 33.0* | 32.0* |
| SD | 7.91 | 7.68 | 9.23 | 9.30 |
| Control | | | | |
| M | 32.1 | 30.6 | 30.1 | 29.7 |
| SD | 5.45 | 6.46 | 7.34 | 6.85 |
| **5. HRA (health age difference)** | | | | |
| Treatments | | | | |
| M | 3.11 | 2.07 | 1.99* | 1.90* |
| SD | 1.70 | 1.30 | 1.40 | 1.40 |
| Control | | | | |
| M | 2.03 | 2.00 | 2.64 | 2.13 |
| SD | 1.17 | 1.20 | 1.36 | 1.25 |
| **6. Self-control** | | | | |
| Treatments | | | | |
| M | 20.7 | 24.8 | 24.8 | 27.7 |
| SD | 26.0 | 27.8 | 28.9 | 25.0 |
| Control | | | | |
| M | 40.4 | 45.8 | 38.7 | 50.4 |
| SD | 13.7 | 17.0 | 18.4 | 11.4 |

*(continued)*

**Table I.** Continued

| Dependent measure | Pre | Mid | Post | Follow-up |
|---|---|---|---|---|
| **7. Self-motivation** | | | | |
| Treatments | | | | |
| M | 148.7 | 148.3 | 144.9 | 148.7 |
| SD | 24.4 | 25.3 | 25.0 | 25.1 |
| Control | | | | |
| M | 158.8 | 155.3 | 161.1 | 149.4 |
| SD | 15.3 | 16.1 | 12.8 | 17.1 |
| **8. STAI state** | | | | |
| Treatments | | | | |
| M | 33.8 | 34.3 | 32.3 | 32.7 |
| SD | 10.6 | 9.7 | 12.1 | 10.6 |
| Control | | | | |
| M | 27.3 | 23.2 | 25.4 | 31.3 |
| SD | 6.7 | 2.6 | 4.5 | 14.7 |
| **9. STAI trait** | | | | |
| Treatments | | | | |
| M | 34.4 | 36.0 | 33.6 | 33.7 |
| SD | 9.6 | 8.2 | 8.8 | 7.8 |
| Control | | | | |
| M | 27.0 | 27.9 | 26.8 | 27.0 |
| SD | 5.0 | 3.4 | 4.3 | 5.4 |
| **10. Chronic tension**[b] | | | | |
| Treatments | | | | |
| M | 54.2 | 45.2* | 49.5* | 44.6* |
| SD | 26.1 | 22.9 | 20.4 | 24.5 |
| Control | | | | |
| M | 46.8 | 47.8 | 51.3 | 50.1 |
| SD | 24.0 | 19.4 | 21.1 | 20.6 |
| **11. Social alienation**[c] | | | | |
| Treatments | | | | |
| M | 44.8 | 41.0 | 38.6 | 42.6 |
| SD | 20.7 | 23.3 | 22.4 | 22.4 |
| Control | | | | |
| M | 45.3 | 36.1 | 35.0 | 29.8 |
| SD | 19.2 | 22.3 | 25.2 | 21.8 |
| **12. Somatic anxiety**[d] | | | | |
| Treatments | | | | |
| M | 35.0 | 33.2 | 31.7 | 32.8 |
| SD | 21.2 | 22.2 | 20.3 | 22.0 |
| Control | | | | |
| M | 30.6 | 28.3 | 32.2 | 33.3 |
| SD | 24.8 | 20.2 | 23.8 | 18.3 |

*(continued)*

Table 1. Continued

| Dependent measure | Repeated assessments | | | |
| --- | --- | --- | --- | --- |
| | Pre | Mid | Post | Follow-up |
| 13. Systolic blood pressure | | | | |
| Treatments | | | | |
| M | 135.84 | 126.56 | 122.40* | 124.72* |
| SD | 12.79 | 12.23 | 12.01 | 13.31 |
| Control | | | | |
| M | 130.56 | 128.89 | 131.11 | 129.44 |
| SD | 13.24 | 9.15 | 13.03 | 14.38 |
| 14. Diastolic blood pressure | | | | |
| Treatments | | | | |
| M | 84.52 | 75.68* | 73.80* | 74.52* |
| SD | 8.43 | 7.42 | 7.46 | 8.09 |
| Control | | | | |
| M | 81.67 | 80.44 | 83.67 | 79.67 |
| SD | 7.51 | 7.21 | 6.00 | 7.88 |

*Treatment group improved significantly more than control group ($p \leq .05$) with pretreatment assessment as baseline.

[a] Exercise adherence ordinal classifications: 1, little or no physical activity; 2, occasional physical activity; 3, regular physical activity at least three times a week.

[b] Chronic tension was measured with MBHI Scale A, and corrected BR scores are shown (Millon, 1982).

[c] Social alienation was measured with MBHI Scale E, and corrected BR scores are shown (MIllon, 1982).

[d] Somatic anxiety was measured with MBHI Scale F, and corrected BR scores are shown (MIllon, 1982).

clients were successful at posttreatment and follow-up, respectively. It should be noted that, on the average, weight loss in the SDC treatment groups coincided with an increase of 0.8 kg (1.5 lb) in lean weight at posttreatment which was maintained through follow-up. Actual average adipose tissue lost can be corrected to approximately 3.89 kg (8.5 lb) at posttreatment and 3.63 kg (8.0 lb) at follow-up.

**Exercise Adherence: Cardiovascular Fitness, and Blood Pressure**

SDC clients reported significant improvement in exercise adherence. At pretreatment, five (20%) reported "little or no physical activity." At posttreatment and follow-up, only one (4%) of the SDC clients reported "little physical activity." Clients reporting regular physical activity (at least three times a week) rose from 7 (28%) at pretreatment to 15 (60%) at posttreatment and stabilized at 14 (56%) at follow-up. Cardiovascular

fitness (max $VO_2$, ml/kg/min) also increased across time. The average gain in $VO_2$ from pretreatment to posttreatment was 13%, with follow-up maintaining 74% of this gain. These increases were distributed across the various pretreatment fitness levels of clients. Systolic blood pressure (SBP) and diastolic blood pressure (DBP) measurements decreased across time. SDC clients were classified as either high-normal (SBP > 140 mm Hg; DBP > 89 mm Hg) or normal to assess the impact of treatment on clients at greater risk of developing hypertension. At pretreatment 10 (40%) of the clients showed high-normal SBP and 9 (36%) high-normal DBP. These classification rates dropped at posttreatment and follow-up to 3 (12%) for SBP and 1 (4%) for DBP.

**Chronic Tension and Trait Anxiety**

Chronic tension measured by the Millon Behavioral Health Inventory (MBHI) is a measure of coronary-prone behavior pattern (Millon et al., 1982). According to Millon, people who score high on chronic tension are disposed to psychosomatic disorders, most notably cardiovascular disease. Scores of 75 and over suggest a potentially serious risk to health. The present results revealed that average chronic tension decreased in clients 4.76 BR points at posttreatment ($p < .05$) and 9.60 at follow-up ($p = .05$). Classification ranking of potential risk for pretreatment chronic tension was 7 (28%); for posttreatment, 2 (8%); and for follow-up, 6 (24%). STAI Trait anxiety did not change across time.

**Perceived Progress (Success) Ratings**

At follow-up clients were asked to rate their self-directed change. A 6-point Likert scale was used, with the range of 1 being "a great deal of progress" and 6 being "In some ways this health practice has gotten worse." SDC group means were 3.5 (moderate to some progress) for exercise progress, 3.4 (moderate to some progress) for alternative food patterns, 4.0 (some progress) for weight reduction, and 3.2 (moderate progress) for stress management.

**Credibility Ratings**

ANOVAs indicated no significant differences between treatment groups regarding their rating of their understanding of the program; their sense of success in exercise, alternative food patterns, weight, and stress

management; their experience of the therapist as helpful, competent, sincere, likable, and interested (in them as clients); their extent of confidence in the program's long-term efficacy; and their level of recommendation of the program. In general, credibility ratings were quite high and comparable across treatment groups.

## Mediating Variables

Correlational analyses revealed several relationships between psychosocial mediating variables and behavioral health change measures. Product–moment correlations between hypothesized mediating variables and posttreatment and follow-up behavioral health measures are listed in Tables II and III, respectively.

## Self-Motivation

As hypothesized, pretreatment self-motivation predicted behavioral health change outcomes. Self-motivation consistently correlated with reduced body fat ($r = .33–.45$), reduced health risk ($r = .31–.67$), and reduced DBP ($r = .37–.56$). Pretreatment self-motivation scores also predicted posttreatment weight loss and increased cardiovascular fitness, but their relationship to long-term maintenance of these variables becomes less clear over time.

## Social Support

Social support, as assessed by low social alienation scores on the MBHI (scale E), did not prove to be a predictor of behavioral health change. Attendance at SDC group sessions, however, was modestly associated with all behavioral health changes except increased cardiovascular fitness ($VO_2$). The mediating relationship of attendance appears to be independent, showing no correlation with self-motivation or self-control (some correlations with self-control were approaching a significant negative relationship).

## Recent Stress, Health Risk, Coping Style, Body Composition

One interesting finding was that pretreatment recent stress predicted reduced chronic tension ($r = .56$) at follow-up. It was also discovered that pretreatment health-risk appraisal was a moderate predictor of post-

**Table II.** Product–Moment Correlations Between Behavioral Health Mediators and Posttreatment Behavioral Health Change Measures

| Mediator | Posttreatment behavioral health change measures[a] | | | | | | |
|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| **Pretreatment** | | | | | | | |
| Self-control | 0.24 | −0.15 | 0.32* | 0.04 | −0.08 | −0.03 | 0.07 |
| Self-motivation | 0.39* | 0.42* | 0.57* | 0.18 | 0.26 | 0.32* | 0.39* |
| Recent stress | 0.14 | 0.24 | 0.33 | 0.50* | 0.23 | 0.06 | 0.10 |
| Health risk | 0.69* | 0.61* | 0.14 | 0.09 | 0.22 | 0.73* | 0.39* |
| Body composition | −0.10 | 0.08 | −0.10 | 0.17 | −0.11 | 0.29 | 0.02 |
| **Posttreatment** | | | | | | | |
| Attendance | 0.43* | 0.36* | −0.14 | 0.32* | 0.06 | 0.47* | 0.24 |
| Self-control | 0.24 | −0.17 | 0.33* | −0.12 | 0.09 | −0.13 | −0.08 |
| Self-motivation | 0.52* | 0.38* | 0.34* | 0.01 | 0.47* | 0.31* | 0.37* |

*Significant product–moment correlations ($r$) at the ($p \le .05$) level.
[a] Posttest behavioral health measures are coded as follows: (1) weight loss; (2) reduced percentage body fat; (3) increased $VO_2$; (4) improved exercise adherence; (5) reduced chronic tension; (6) reduced health risk; (7) reduced diastolic blood pressure.

treatment weight loss ($r = .69$), reduced body fat ($r = .61$), and reduced health risk ($r = .73$) but not exercise adherence and increased cardiovascular fitness. Coping style, measured by the Schedule of Self-Control (Rosenbaum, 1980) was not a consistent predictor of behavioral health change. Body composition (percentage body fat) did not show a negative relationship with exercise adherence or increased cardiovascular fitness in this sample.

## Behavioral Health Change Intercorrelations

Correlational analyses indicated several significant associations between behavioral health change measures ($n = 25$). Table IV lists the product–moment correlations between selected pre/post behavioral health change measures.

## DISCUSSION

The present study yields several findings consistent with previous research and extends previous observations of relationships between behavioral health changes and relapse prevention strategies. SDC clients improved in weight loss, body composition, cardiovascular fitness (max $VO_2$ ml/kg/min), blood pressure, and chronic tension at posttreatment.

Table III. Product–Moment Correlations Between Behavioral Health Mediators and Follow-up Behavioral Health Change Measures

| | Follow-up behavioral health change measures[a] | | | | | | |
|---|---|---|---|---|---|---|---|
| Mediator | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| **Pretreatment** | | | | | | | |
| Self-control | 0.01 | -0.01 | -0.17 | -0.22 | 0.36* | -0.01 | 0.04 |
| Self-motivation | 0.29 | 0.41* | 0.11 | -0.20 | 0.33* | 0.38* | 0.56* |
| Recent stress | 0.31 | 0.44* | 0.31 | 0.23 | 0.56* | 0.03 | 0.06 |
| Health risk | 0.35* | 0.35* | 0.03 | 0.03 | 0.15 | 0.67* | 0.28 |
| Body composition | 0.05 | 0.08 | -0.13 | 0.37* | -0.02 | 0.21 | 0.12 |
| **Posttreatment** | | | | | | | |
| Attendance | 0.48* | 0.41* | -0.04 | 0.37* | 0.30* | 0.55* | 0.43* |
| Self-control | 0.24 | 0.09 | -0.03 | -0.29 | -0.08 | 0.30* | -0.08 |
| Self-motivation | 0.37* | 0.33* | -0.05 | -0.31 | 0.56* | 0.36* | 0.46* |
| Recent stress | -0.07 | 0.02 | -0.05 | 0.10 | 0.18 | 0.35 | -0.08 |
| **Follow-up** | | | | | | | |
| Attendance | 0.53* | 0.49* | 0.00 | 0.44* | 0.30* | 0.55* | 0.43* |
| Self-control | 0.24 | 0.20 | -0.02 | -0.09 | 0.44* | 0.19 | 0.19 |
| Self-motivation | 0.29 | 0.45* | 0.15 | -0.02 | 0.25 | 0.38* | 0.44* |

*Significant product–moment correlations ($r$) at the ($p \leq .05$) level.
[a] Posttest behavioral health measures are coded as follows: (1) weight loss; (2) reduced percentage body fat; (3) increased $VO_2$; (4) improved exercise adherence; (5) reduced chronic tension; (6) reduced health risk; (7) reduced diastolic blood pressure.

These improvements were maintained through the 6-month follow-up. In addition, self-motivation and social support in terms of attendance at group treatment sessions predicted several behavioral health changes and habits.

The results failed to support the hypothesis that adjunct peer and professional support would augment the effect of the general SDC group treatment. It should be noted that clients generally did not comply with the peer (buddy) support intervention (with an average attendance of only about 10% of the five additional peer support meetings). SDC clients reported during general group meetings that buddy appointments were difficult to arrange, and several clients publicly announced that they would not comply with the program at that point.

As predicted, the self-agency mechanism of self-motivation did mediate the effects of the self-directed change intervention. Self-motivation was the strongest predictor of behavioral health change and maintenance. It appears that Dishman's self-motivation, while known primarily for its prediction of exercise adherence, may be useful in predicting adherence to other behavioral health change habits. As in previous studies, (Dishman,

Table IV. Behavioral Health Change Intercorrelations at Posttreatment

| Posttreatment measure | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|
| 1. Weight loss | 0.71* | 0.38* | 0.26 | 0.26 | 0.41* | 0.35* | 0.73* |
| 2. Reduced percentage body fat | — | 0.34* | 0.23 | 0.21 | 0.36* | 0.32* | 0.61* |
| 3. Increased $VO_2$ | | — | 0.23 | 0.29 | 0.40* | 0.48* | 0.31* |
| 4. Exercise adherence | | | — | 0.21 | 0.12 | 0.19 | 0.03 |
| 5. Reduced chronic tension | | | | — | 0.17 | 0.28 | 0.10 |
| 6. Reduced systolic BP | | | | | — | 0.68* | 0.60* |
| 7. Reduced diastolic BP | | | | | | — | 0.56* |
| 8. Reduced health risk | | | | | | | — |

*Significant product–moment correlations ($r$) at the ($p \leq .05$) level.

1982; Dishman and Ickes, 1981), self-motivation remained relatively stable over repeated assessments.

Social support, measured by low scores on MBHI, scale E, did not predict behavioral health change. As discussed by Gentry and Kobasa (1984), social alienation or lack of social support may mediate strain and/or health status only in times of high stress. Attendance at group sessions was independently associated with all behavior health change measures except for cardiovascular fitness (max $VO_2$). Based on House's (1984) delineation of social support, group attendance can be interpreted as a critical source of support for self-directed change. Interestingly, self-motivation as a self-agency mechanism did not correlate with attendance, suggesting that both factors function independently.

The results failed to show the expected reduction in trait anxiety. This lack of effect may be due to the relatively low pretreatment anxiety scores reported by clients. Long (1984) and Romano (1984) reported outcome anxiety scores higher than or equal to scores recorded throughout this study.

Improvements in exercise adherence and cardiovascular fitness were encouraging. Self-reported exercise adherence rates were over 50% at both posttreatment and follow-up. Reported posttreatment adherence rates were not so dramatic as those reported in other studies but compared favorably, if not better, with others at follow-up (e.g., Dubbert and Wilson, 1984; Perri et al., 1986). It should be noted that the reported increases in exercise adherence did not correlate with any behavioral health change measures. This discrepancy is probably due to limited variation in exercise adherence scores among treatment clients and to individual differences in estimating aerobic training time and intensity. The reported 13% average improvement in cardiovascular fitness for SDC clients is consistent with the projected 10–20% improvement in max $VO_2$ observed in untrained subjects after aerobic training (Brooks and Fahey, 1984). Blood-pressure

improvements of 13/11 and 11/10 mm Hg at posttreatment and follow-up, respectively, are similar to or better than those reviewed by Shapiro and Goldstein (1982). These reviewers noted that exercise was most effective in improving borderline blood pressures, reporting studies showing reductions from 0/0 to 23/8 mm Hg after treatment employing exercise. This multicomponent SDC intervention showed blood-pressure reductions for both borderline hypertensive and normotensive clients.

While chronic tension scores (MBHI, scale A) decreased at posttreatment and follow-up an average of 4.76 and 9.60 in base rate (BR)-corrected scores, respectively, there was much within-group variance for SDC clients. Of critical importance are chronic tension scores on or over 75. Chronic tension classifications of serious potential risk dropped from the pretreatment rate of 28% to a posttreatment rate of 8%. This improvement did not maintain itself at follow-up, however, showing 24% of the SDC clients at serious potential risk. With the continuing debate (Krantz et al., 1988) regarding the relationship between coronary-prone behavior pattern and the development of psychosomatic disorders, it is hard to interpret the role chronic tension may play as a mediator of behavioral health. Future studies may benefit clients by assessing change in physiological reactivity as well as psychosocial assessment of chronic tension.

A major purpose of the present study was to assess the efficacy of a self-directed behavioral health change intervention. As a treatment intervention, SDC shows some promise as a method of behavioral health change. While actual weight losses in this program were modest compared to previously reported prescriptive programs (e.g., Perri et al., 1986, 1988), the actual weight lost in fat compared quite well with programs which measured or corrected for body composition changes (Bjurstorm and Alexiou, 1978; Dubbert and Wilson, 1984). A categorical analysis of actual percentages of clients who lost significant amounts of weight revealed that only 28% had lost over 4.54 kg (10 lb) during treatment. At the 6-month follow-up this percentage had increased to 40% losing over 4.54 kg, with 12% losing over 9.07 kg (20 lb). While tentative, this trend suggests that the self-directed change intervention promotes in some clients a gradual change which builds over time, as opposed to an immediate change during treatment which decreases over time. The accuracy of this observation awaits comparative outcome studies which follow clients over several years.

As clinicians develop and explore long-term maintenance intervention programs targeting obesity and behavioral health risks (e.g., Perri et al., 1986, 1988), the treatment style of self-directed change needs to be tested against more prescriptive forms of treatment over extended periods of time. The preliminary results of this study suggest that self-directed change

interventions may produce less dramatic results during a treatment course, but the behavioral health progress made may be more easily attributed by the client to his/her self-referent constructs and thus be maintained better after the treatment course.

The results of the present study should not be generalized to other populations before further research is conducted, since the subjects recruited were all from a YMCA and may, therefore, have been more health-conscious than people in general often are.

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