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Effects of a Cognitive Behavioral Treatment Package on Exercise Attendance and Drop Out in Fitness Centers

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New and returning adult exercisers were tracked to evaluate the effect of a multiple component, behavior change treatment "package" on exercise attendance and drop out, within fitness facility settings in the United States, United Kingdom, and Italy. After assessing treatment participants' propensity for early drop out, various behavioral and cognitive behavioral treatments (e.g., goal setting, relapse prevention, self-reinforcement, contracting), exercise plans tailored to produce desirable affective change, and social support recruitment methods were administered by exercise leaders. Control group participants received typical exercise counseling that centered around amounts, types, and physiological results. Exercise leader-participant contact time over the 36-week studies were matched across treatment and control groups. Results of all 3 studies demonstrated significantly ($p < .05$) higher attendance (13–30%) and less drop out (30–39%) for the treatment groups, compared to their respective controls. Discussion included future possibilities for the use of behavior change treatments for supporting ongoing exercise and promoting positive physiological and emotional well-being.

Key Words: health behavior, behavior control, exercise, motivation, public health

Key Points:

- Analyses from fitness facility samples from the United States, United Kingdom, and Italy suggest exercise adherence patterns can be improved through evidence-based treatments delivered by exercise leaders.
- Cognitive behavioral and social cognitive theory can guide selection of treatments that are associated with reduced exercise drop out and increased attendance in fitness facilities.
- Cross-culturally similar results suggest that fitness facilities are appropriate settings to administer exercise behavior change treatments.

There is little doubt that regular exercise is positively associated with physical health (75), resistance to disease (77), and emotional well-being (64, 66). Knowledge of its effects are well-documented, well-publicized, and reach a wide range of people across cultures. However, individuals' ability to initiate and maintain even

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moderate amounts of exercise is lacking (75, 76). One might expect that knowledge of its positive effects would increase exercise but, in fact, education has been demonstrated as ineffective at facilitating sustained behavior change (33). Despite volumes of exercise-benefit information delivered through mass media, educational settings, and the public health community, 40 to 65% of individuals initiating exercise programs are predicted to drop out within 3 to 6 months (4, 22, 28, 32). This rate is similar for supervised and non-supervised programs, across age and gender (34).

A number of theories have been used to explain and predict exercise behavior patterns (22, 30, 31, 80). Theoretical models applied to intervention design have included behavioral (71), cognitive behavioral (60), social cognitive theory (16, 71), and the transtheoretical model (55). Behavioral theory encompasses principles of operant conditioning, which suggest that when a behavior is paired with a positive consequence, reoccurrence under similar conditions is likely. Conversely, when a behavior is associated with punishing consequences, termination becomes likely. Within this paradigm, exercise is viewed as a behavior that may be shaped through purposeful manipulation of its consequences. Cognitive behaviorism extends orthodox behavioral theory by introducing cognitions as a mediating variable, and acknowledging that thoughts, perceptions, and feelings are central to determining behavior. Cognitive behaviorism acknowledges the individual as capable of considering, and acting reasonably, based on available information and organized planning. The theory further suggests that individuals are able to utilize self-regulatory strategies to work toward goals, and benefit from feelings of self-efficacy, or a belief that one can be successful. Within social cognitive theory, the environment, cognitions, and behavior are assumed to continually interact in a reciprocal manner. Social cognitive theory thus extends cognitive behavioral theory by accounting for the role of social influences in directing behavior. The transtheoretical model posits that there are sequential "stages of readiness" to adopt and maintain a behavior. Although it may be possible for "stage-matched" treatment to expedite movement through stages, relapses back to early stages are frequent. It assumes that when an individual has arrived at the action (ready to begin) stage, his or her self-management abilities will determine if maintenance is likely.

Researchers suggest that, in addition to theory, exercise promotion initiatives consider setting (e.g., home, worksite, school), level of intervention (e.g., one-on-one, community, societal), and target population (e.g., youth, healthy adults, cardiac rehabilitation patients; 21, 22, 54). For example, the Child and Adolescent Trial for Cardiovascular Health (CATCH) targeted children in Grades 3, 4, and 5, and used education and exercise within the classroom setting to increase overall physical activity levels (53). Project PACE (Physician-Based Assessment and Counseling for Exercise) used stage-matched materials, delivered by general practitioner physicians in health-care settings, to increase both exercise adoption and adherence (24). Project Active also utilized stage-matched, cognitive behavioral interventions to increase moderate-to-vigorous "lifestyle" physical activity amounts within a community sample (39). Worksite-based physical activity interventions, based on a number of theoretical models, are also increasing (75). The demonstrated effect on increasing exercise has, however, been small (37).

Although theories address the general role of both cognitive processes and behavioral consequences, direct assessment of an individual's ability to self-manage and self-regulate for exercise may enable evaluation of adherence/drop out

propensity on an ideographic level (27, 29). Self-report inventories such as the Self-Motivation Inventory (35, 36) have been designed to assess such self-management/self-regulatory abilities, and have had success at discriminating between exercise adherents and drop outs (35, 62, 74). Information gained from such instruments may be useful for individualizing exercise promotion treatments (2).

Consistent with the apparent need to maximize self-management abilities, comprehensive reviews (33, 45, 51) confirm individually adapted behavior modification and cognitive behavior modification treatments, which are focused on advancing self-management and self-regulatory skills, to be reliable at increasing exercise maintenance. For example, noteworthy adherence-promotion effects have been found through the use of specific goal setting and feedback methods (10, 56), behavioral contracting (67), public attendance tracking (78), relapse prevention training (18), dissociation strategies (9, 14, 68), cognitive restructuring (15), and stimulus control strategies (46). Social support–type interventions have also indicated positive effects (5, 25), as have intervention "packages" consisting of a combination of treatments (40, 46, 47, 54, 56).

The relationship of specific physical activity types, durations, and intensities to adherence has been an understudied area. Dishman and Buckworth (33) and Sallis, Haskell, Fortmann, Vranizan, Taylor, and Solomon (70) did, however, find that as exercise amounts were reduced, adherence increased. Preliminary research also indicated that exercise amounts that elicited positive after-exercise feelings (e.g., increased revitalization), and reductions in negative feelings (e.g., physical exhaustion), were associated with better adherence for those of low-to-average motivation and, thus, at-risk for early drop out (11, 12). In support of the need to attend to exercise behavior's relationship to affect and self-image, Biddle (9) stated, "How people feel during and after activity may be critical in determining whether they continue. Hence, emotion and mood may be motivational . . ." (p. 269).

Researchers have suggested that evidence-based adherence interventions which include multiple components that directly involve new participants, over time, are warranted (38, 49, 61). Behavioral skills training, supplemented by ongoing progress feedback and social support, has been advocated, and is consistent with tenets of behavioral, cognitive behavioral, and social cognitive theories. Additionally, it has been suggested that feedback provided to novice exercisers should minimize physiological outcome measures (e.g., through physiological testing), initially (2, 13). While being a departure from typical fitness facility practice (42), it was reasoned that if minimal amounts of physical activity were prescribed at the start of an exercise program (because of its adherence benefit; 33, 70), then a focus on the accompanying (often slower than desired) physical progress may be discouraging (72, 79). It was thought that feedback related to task mastery, perceived goal progress, and positive changes in emotion states and self-image would be more advantageous for supporting exercise maintenance (7, 20, 73).

Fitness facilities, YMCAs, and worksite wellness centers are appropriate venues in which to develop and evaluate exercise adherence interventions. Hundreds of thousands of individuals start, restart, and attempt to maintain physical activity programs in these venues each month. These facilities, generally, have staffing sufficient for some level of individualized treatment delivery. Unfortunately, despite published initiatives to sustain exercisers' efforts (43), fully staffed fitness facility members suffer from similar attrition as non-supervised exercisers.

Few facilities systematically use *any* evidence-based adherence promotion methods (3, 38). This creates an opportunity for treatments, often effective in controlled research, to be field tested for their utility within fitness center settings.

It is based on the knowledge that most individuals who begin exercise programs lack the self-management/self-regulatory skills and social support systems necessary to maintain them that the cognitive behavioral treatment package used within this research was developed. Drawing from the extant theoretical, determinant, and intervention literature, it was surmised that three major areas were available for interventions to increase exercise attendance and reduce drop out within fitness center settings. First was the regulation of physical activity amounts to optimize feeling, emotion, and self-efficacy change, both immediately after exercise and over time, while demonstrating progress toward personally relevant goals. Second was the use of self-regulatory and self-management techniques (e.g., relapse prevention, dissociation, cognitive restructuring, stimulus control). Third was the advancement of social support systems to promote feelings of interpersonal cohesion around the exercise environment. It was also of practical concern that the system being tested conform to the high professional-exerciser ratios that are present in most fitness centers.

It was the purpose of the present investigation, therefore, to test the present cognitive behavioral treatment protocol with new and returning adult exercisers, within fitness center settings in the United States, United Kingdom, and Italy. It was hypothesized that the treatment system tested would significantly improve both attendance and drop out.

Study 1: United States

Method

Participants. New members of four similar fitness facilities within the eastern U.S. (each maintaining a full range of cardiovascular exercise machines and resistance apparatus) served as participants. Inclusion criteria consisted of (a) age being between 21 and 60 years, (b) no regular exercise undertaken within the previous 6 months, and (c) apparently healthy (as judged through completion of the Physical Activity Readiness Questionnaire–1994 revision; 42). For both control and treatment conditions, lists of participants were randomly selected through memberships initiated within a designated 2-month period. Persons relocating or otherwise not meeting inclusion criteria were excluded. Individuals joining as couples were excluded. Informed consent for this research was obtained from participants at fitness facility initiation. Because both control and treatment protocols were part of the induction process, all new members of the designated months fulfilling the above inclusion requirements were used in the present research.

The control group consisted of 148 men and 143 women and the treatment group 157 men and 150 women. No significant between-group difference was found on age, body mass index, or number of new exercise program starts within the previous 3 years (see Table 1). Proportions of men to women were the same in both groups (51% men). Participants were primarily Caucasian and from the middle to upper-middle socioeconomic groups.

Adherence Measures. The below measures for adherence followed from previous research (4, 5, 56). Data were obtained from experimental facilities' member

Table 1 Descriptive Statistics of Study 1 Participant Characteristics By Group

Variable	Treatment (n = 307)		Control (n = 291)	
	M	*SD*	*M*	*SD*
Age (years)	39.9	11.4	39.8	11.9
Body Mass Index[a]	29.7	3.5	30.1	3.8
Previous exercise program starts (last 3 years)	4.1	2.3	4.2	2.3

[a]Body Mass (or Quetelet) Index is calculated by dividing body weight (in kg) by height (in m^2). Because male/female proportions were the same across groups, no adjustment for gender (e.g., conversion to normative percentile) was required.

usage reports, which were based on a computerized scan of a membership card at check-in. This method has previously been demonstrated to be a valid indicator of completing an exercise session through cross-checking data with self-report, physical activity logs, and instructors' attendance forms (5, 7, 9, 14).

Attendance. Each participant (treatment and control) was given an exercise plan of three sessions per week. Attendance was, therefore, expressed as an aggregate (by participant) of ratios of actual sessions attended (per week) divided by the "ideal" number of sessions (three per week). Maximum weekly attendance was limited to 100% for recording purposes. This method protected against undue weight being given to high frequencies of completed sessions just after initiation (which is common for people beginning a new exercise regimen). Means (*SD*s) of participants' attendance percentages were then calculated, by group.

Drop out. A participant was classified a drop out if 4 consecutive weeks of absences occurred during the study timeframe. Each participant was, therefore, classified dichotomously (drop out or non-drop out).

Procedure. Staffing, pricing policies, physical layout (size between 17,000 to 34,000 m^2), and exercise equipment among the four experimental facilities were similar and remained consistent throughout the 36 weeks of the study, thereby minimizing threats to internal validity. It was assumed that the application of the cognitive behavioral treatment system was the primary difference between the control and treatment conditions. To facilitate the treatment, a behavioral scientist and a fitness administrator conducted training sessions for 2 days. Present in the training were all exercise leaders that applied the treatment. Manuals that supported the training were distributed to each attendee for future reference. Brief follow-up and protocol compliance assessment was provided two to three times for each facility over the course of the study.

Cognitive Behavioral Treatment Package. The individual treatments that the exercise leaders were trained in, their theoretical and research bases, and administration guidelines are more fully described elsewhere (2, 8). Only an overview will

be provided here. Methods were intended to maximize the reinforcing effect of the exercise experience (e.g., progress toward goals, improved mood, better self-image, increased vigor), while minimizing its unpleasant (punishing) effects (e.g., fatigue, discomfort, perceived inadequacy). This was carried out through adjustment of stimuli (e.g., exercise types and amounts), provision of feedback (e.g., attention to proximal, process goal attainment; improvement in affect, self-efficacy, and energy level), facilitation of social support, and application of self-management methods (e.g., goal setting, relapse prevention, dissociation, cognitive restructuring). Each exercise leader was randomly assigned a group of new and returning (after a relapse of 6 months or longer) exercisers. Methods were applied during individual meetings 45 to 60 min in length, which were spaced by 1 to 2 months (with the exception of the initial meeting which was followed up within 2 weeks). The administration of specific treatments were organized into six "steps."

Step 1 consisted of administering of the Self-Motivation Inventory to estimate propensity for early drop out. Those participants who scored in the highest 30th percentile (based on normative data) were assumed to be less at-risk for early drop out and given three treatment administration meetings over the 8-month course of the study. All others were judged to be at higher risk for drop out, and seven meetings were scheduled.

Step 2 utilized the Personal Goal Profile (2, 8) to organize the goal setting process. The Personal Goal Profile is based on personal construct theory (23, 44, 48) and required treatment participants to self-generate exercise-related goals (e.g., "lose weight," "feel more energetic") and rate their present attainment of each specific goal on a 1 to 10 scale. Participants completed the Personal Goal Profile form during each of their meetings, discussed it with their exercise leader and, together, began to divide each self-generated long-term (e.g., 6 months or longer) goal item into documented shorter-term (e.g., 1–2 months) goals. Guidelines for optimal goal setting followed suggestions from Locke and Latham (52), which included keeping goal outcomes specific and measurable, and focused on "process" (e.g., increasing cardiovascular exercise time by 10 min/week) over "outcomes" (e.g., losing 4 kg/week). When goal areas focused on mood (e.g., stress reduction) or energy level change, corresponding scales from the Profile of Mood States–Short Form (59) were also used for feedback. As in previous research (7), positive change in goal attainment was summarized for participants in private, in graphic form, to emphasize the overall benefits of maintaining exercise.

Step 3 was development of the exercise plan. Programs of manageable intensity and duration, stressing participant choice were suggested. After having been given an orientation to the available exercise equipment and classes initially, those participants judged most at-risk for drop out (see Step 1) had their "formal" plans deferred approximately 2 weeks so that (a) they would have a better idea of the activity types and intensities that would be most appealing to them (by having time to try out various combinations), and (b) any initially inflated effort and time commitment projections would be allowed to regress to more "normal" levels. At that time, the exercise leader, along with the participant, generated an exercise plan based on participant preferences and exercise-related goals. The Exercise-Induced Feeling Inventory (41), a 12-item, validated self-report that taps feelings associated with a single bout of exercise, was used to further evaluate the acceptability of the exercise plan to the participant. Pilot research (11, 12) has indicated that when after-exercise Exercise-Induced Feeling Inventory scale scores of positive engagement,

revitalization, and tranquility heighten, and physical exhaustion declines (when contrasted with pre-exercise scores), adherence is increased. Evaluation of the suitability of the exercise plan was guided by these findings, and adjustments (usually a reduction in intensity and/or duration) were suggested when indicated. Because these results did not apply to those judged to be less at-risk for drop out, the Exercise-Induced Feeling Inventory was not used with them, and exercise planning occurred at the initial meeting. Behavioral contracting (67), in which the participant signed an agreement to maintain the documented exercise regimen, was completed to finalize the exercise planning process. Within each exercise leader-participant meeting, a revision of the exercise plan followed a similar procedure.

Step 4 facilitated tracking of exercise attendance and progress. It provided both participants and exercise leaders progress information, over time. The recording cards were either dated in advance for scheduled workouts or set up to document cumulative activity by week, whichever the participant favored. The tracking card also included a section where a participant's goal areas, and his/her corresponding short-term goals, could be documented and reviewed.

Step 5 provided guidelines for the application of various behavior change methods to strengthen participants' ability to adapt to their new exercise programs. Included for use were (a) relapse prevention training (50), to train how to anticipate high-risk (for drop out) situations and effectively deal with them, as well as recover when an interruption occurs; (b) public recognition (58), which utilized posting of individuals' exercise-related progress on an age-, gender-, and progress-adjusted basis; and (c) recruiting social support systems, such as follow fitness center members (5).

Step 6 provided guidelines for additional self-management/self-regulatory strategies. Included for use were (a) dissociation (68), which trained participants how to "distance" themselves perceptually from exercise-induced discomfort; (b) thought stopping/cognitive restructuring (15, 26), which facilitated an awareness of destructive, exercise-related self-talk, stopped potentially damaging self-dialogue, and revised internal statements to be more positive; (c) self-reinforcement (65), which provided participants suggestions in how to self-reward exercise maintenance on a regular (daily, weekly, monthly) basis; and (d) stimulus control (47), which trained participants how to manipulate antecedent conditions to prompt exercise (e.g., set out exercise clothes, schedule exercise in a daily planner).

Control Condition. Similar to the treatment group, exercise leaders were randomly assigned to a group of new and returning exercisers. Control group participants received an orientation to exercise apparatus and standard guidelines for exercise intensity, duration, and frequency (1). Meetings consisted primarily of a review of exercise completed to date and development of a revised plan for the future. As is typical within fitness facilities, most exercise leader-participant meetings centered around amounts and types of exercise and physiological results.

Treatment and control groups each had similar exercise leader–participant contact time over the study timeframe. The matching of meeting time across conditions was assumed to protect against experimenter effects (e.g., Hawthorne Effect, Rosenthal Effect) differing between groups, and potentially contaminating data and subsequent inferences of treatment effects (63).

Results

Manipulation checks included random cross-checks of computerized attendance data with information from participants' exercise tracking forms. A high degree of agreement (over 98%) was found, further validating the attendance data collection method used. Also, random checks of treatment and control protocol compliance was conducted two to three times per facility over the course of the study. A high degree of compliance was observed through use of a procedural audit form. Random inspection of participants' files further confirmed adherence to the required (treatment or control) protocols.

ANOVA indicated no significant ($p > .05$) differences between facilities on the attendance, $F_{3,519} = 1.71$, $p = .16$, or drop out, $\chi^2 (df = 3) = 5.92$, $p = .12$, measures. No significant gender differences were found on the exercise behavior measures used. Data were, therefore, merged for subsequent analyses. Alpha values were set at .05. The present cognitive behavioral treatment package was treated for analysis as a single treatment entity. The present design precluded analysis of separate treatment components for their relative effect.

Attendance and Drop out. Analysis of attendance percentage between the treatment group ($M = 47.18$, $SD = 28.43$) and the control ($M = 33.70$, $SD = 28.71$) demonstrated significantly higher attendance for the treatment group, $t_{596} = 5.77$, $p = .00$, over the 36 weeks of the investigation. The effect size, $d = 0.47$, was moderate. Chi-square analysis demonstrated a significant treatment effect for drop out, $\chi^2 (df = 1, N = 598) = 69.59$, $p = .00$. The treatment group had less participant drop out (23.8%) than the control (54.3%; see Figure 1).

Study 2: United Kingdom

Method

Participants. New members of six similar fitness centers across the United Kingdom served as participants. Inclusion criteria and conditions were similar to Study 1. The control group consisted of 271 women and 254 men and the treatment group 275 women and 265 men. No significant between-group difference was found on age (overall $M = 41.1$ years). Similar to Study 1, sampling of approximately 15% of each group's participants indicated no between-group difference on body mass index or number of exercise program starts within the previous 3 years. Proportions of men to women varied by less than 1% between groups. Participants were primarily Caucasian and from the middle to upper-middle socioeconomic groups.

Adherence Measures. Attendance and drop out were calculated in the same manner as Study 1.

Procedure. Procedures were similar to Study 1; however, the number of exercise leader-participant meetings over 8 months was reduced by two for the 70% of participants evaluated as at-risk for early drop out only. Participants in this study also had some nutrition information provided at intake.

Results

Manipulation checks were conducted similar to Study 1. The findings also validated the exercise data collection methods and compliance with the required treatment or

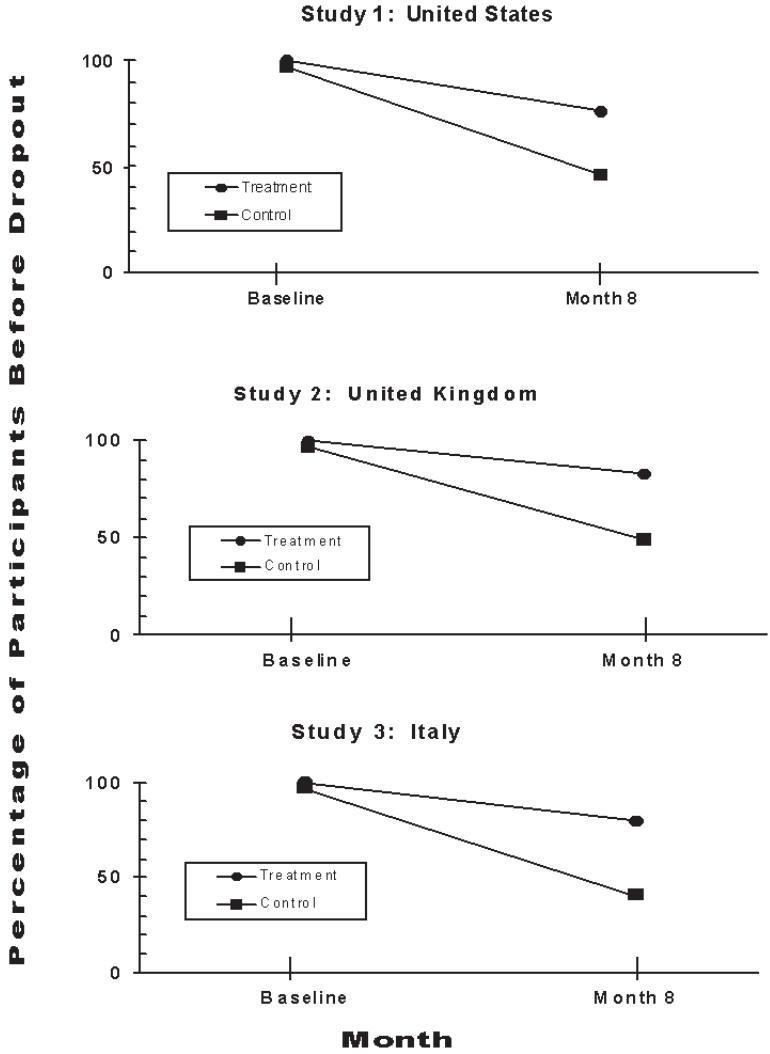

Figure 1 — Treatment and control group drop out contrasts over 8 months for Study 1 (United States sample), Study 2 (United Kingdom sample), and Study 3 (Italy sample).

control protocols. ANOVA indicated no significant ($p > .05$) differences between facilities in the attendance, $F_{5, 1059} = 1.98$, $p = .08$, or drop out, χ^2 ($df = 5$) = 9.72, $p = .08$, measures. Data were, therefore, merged for subsequent analyses.

Attendance and Drop Out. Analysis of attendance percentage between the treatment group ($M = 51.13$, $SD = 24.11$) and the control ($M = 36.42$, $SD = 25.77$) demonstrated significantly higher attendance for the treatment group, $t_{1063} = 9.61$, $p = .00$, over the 36 weeks of the investigation. The effect size, $d = 0.59$, was

moderate. Chi-square analysis demonstrated a significant treatment effect for drop out, $\chi^2(df = 1, N = 1065) = 174.06$, $p = .00$. The treatment group had less participant drop out (17.0%) than the control (50.5%; see Figure 1).

Study 3: Italy

Method

Participants. New members of a fitness center in northern Italy served as participants. Inclusion criteria were similar to Study 1 and Study 2. The control group consisted of 26 women and 23 men, and the treatment group consisted of 26 women and 24 men. No significant between-group difference was found on age (overall, $M = 40.3$ years).

Adherence Measures. Attendance and drop out were calculated in the same manner as Study 1 and Study 2.

Procedure. The procedures were similar to the previous studies reported. The number of exercise leader-participant meetings was the same as Study 1.

Results

Attendance and Drop out. Analysis of attendance percentage between the treatment group ($M = 67.61$, $SD = 19.32$) and the control ($M = 37.87$, $SD = 25.44$) demonstrated significantly ($p < .05$) higher attendance for the treatment group, $t_{97} = 6.54$, $p = .00$, over the 36 weeks of the investigation. The effect size, $d = 1.33$, was large. Chi-square analysis demonstrated a significant treatment effect for drop out, $\chi^2(df = 1, N = 99) = 13.34$, $p = .00$. The treatment group had less participant drop out (20.0%) than the control (59.2%; see Figure 1).

Discussion

The present cognitive behavioral treatment system was associated with significantly improved attendance and reduced overall drop out, when compared to typical fitness service processes, within the 11 facilities tested. Control groups were each within the drop out range predicted by earlier research (40–65%) conducted on traditionally managed new exercise regimens, while treatment groups' attrition was approximately halved. Although the present results demonstrate considerable promise, treatment groups' attendance was indicative of only 1.5 to 2.0 sessions per week. This is below recommended amounts for developing fitness (1). Although the present study design does not allow for projection of whether attendance would increase over time, or whether "lifestyle" physical activity would appreciably supplement the more structured exercise bouts, resulting physiological improvements for the noted frequency could be expected to be slow. This may be viewed as unfavorable because goals for both participants and practitioners typically include rapid improvement in fitness measures such as cardiorespiratory functioning, body fat percentage, and weight.

On the other hand, the initial 6 months after starting an exercise program typically exhibits the most drop out, after which a considerable tapering off of

attrition becomes evident (2, 8, 28). Possibly a focus upon drop out, over attendance, is warranted within this timeframe. Possibly only after these initial months of appropriately planned and supported physical activity can resilience in "adaptation" to the new stimuli (possibly facilitating increased attendance) be expected for the typical individual. This premise is supported by transtheoretical model research, which suggests that a 6-month time period is required for the action stage (i.e., exercise program initiation) to progress through the maintenance stage (69). Perhaps only at that point should exercise frequency and intensification issues come into play to best promote individuals' long-term physiological improvement and disease prevention. Direct testing will be required to clarify these issues and better evaluate how much concern should be placed on the attendance found within this research. In regard to exercise's role in positive mood and emotion change (e.g., reduced depression, reduced anxiety, reduced fatigue, increased energy), however, recent research indicates that the exercise frequencies demonstrated within the treatment group may be sufficient (7).

In comparison to treatments tested for comparable lengths and experimental rigor, the present system's results were similarly positive across samples from the three countries tested. The present package had an additional feature of initially estimating participants' drop out risk to correspondingly adjust treatment regimens. This may be an advantage in most fitness, wellness, and rehabilitation service settings, where professional staffing is in short supply and the most at-risk for drop out may warrant the most attention. The standardized, step-by-step nature of the present cognitive behavioral treatment system also appeared advantageous for the exercise leaders who, generally, had physiological, rather than behavior change, backgrounds.

This research had a number of limitations that may have impacted findings, however. Because of the novelty of the treatment approach, there may have been a motivational effect on the exercise leaders, which affected participants' results. However, equally possible may have been a distaste for the tasks required that were generally outside of the practitioners' areas of training and expertise. The effect of exercise leaders' behaviors on new participants' adherence is an area only beginning to be studied (6). Additionally, a number of factors thought to affect physical activity were not addressed. For example, degree of spouse/family support, educational level, and use of tobacco, while not likely to have substantially differed between control and treatment groups, were not directly examined.

The present research design also did not produce data concerning which specific intervention had the greatest impact, or if fewer treatments, arranged optimally, would have yielded similar (or better) results. In this regard, it is notable that Study 2 had fewer meetings than Study 1 but with similar results. It is incumbent on future research to test different treatment combinations and administrative methods for their comparative efficiency and effectiveness. Future research now also warrants more advanced experimental designs that will allow thorough analyses of select variables' mediating effect on behavior (17). It is important that theory is not only used to direct intervention selections but analysis be conducted to determine if their effect indeed confirms assumptions emanating from imbedded propositions.

While adjusting treatments *may,* ultimately, prove to be a viable method to maximize professional time, there are other options to improve efficiency. For example, computer applications designed to support exercise adherence treatment application may increase administrative efficiency. These may prove important for

applying standardized treatments across a wide range of exercise-related settings, with practitioners of varied backgrounds. Such use of technology may also facilitate ongoing testing of adherence effects across a large range of sample types, and allow physiological change to be routinely evaluated, as well. This area is currently being explored, and preliminary testing has been productive.

In summary, the cognitive behavioral treatment tested, consisting of a number of theory- and evidence-based exercise maintenance promotion methods, demonstrated promise. It suggested a possibility for physiologically trained exercise leaders to administer behavior change interventions associated with increased participant adherence. Testing is planned for worksite health initiatives, physical therapy settings, physical education classes, and with special populations such as seniors, cancer survivors, and groups that typically demonstrate high amounts of obesity. Only through continued theory-driven empirical research, and extension of studies such as the ones reported here, can treatment systems be improved and adapted to the large numbers of exercise and wellness service providers and client types that stand to benefit. Hopefully such methods will play a part in reversing the disturbing trends of increased sedentary behavior, obesity, and other physical and emotional problems occurring across North America, Europe, and beyond.

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