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Benefits of Recruiting Participants With Friends and Increasing Social Support for Weight Loss and Maintenance

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To determine the benefits of social support for weight loss and maintenance, this study recruited participants ($N = 166$) either alone or with 3 friends or family members and then randomly assigned them to a standard behavioral treatment (SBT) or SBT with social support strategies. Participants recruited with friends had greater weight losses at the end of the 4-month treatment and at Month 10 follow-up. Both recruitment strategy and the social support manipulation affected treatment completion and weight-loss maintenance. In those recruited alone and given SBT, 76% completed treatment and 24% maintained their weight loss in full from Months 4 to 10. Among those recruited with friends and given SBT plus social support, 95% completed treatment and 66% maintained their weight loss in full.

Behavioral treatment programs have become increasingly effective in producing initial weight loss, but long-term maintenance remains more problematic. Participants typically regain one third of their initial weight loss in the year following treatment (Wing, 1997). Efforts to prevent or reduce this weight regain have been largely unsuccessful.

One variable that has frequently been associated with long-term adherence to diet and exercise is social support. Correlational studies have shown that supportive activities of both family and friends are related to long-term changes in diet and exercise behavior (Heinzelmann & Bagley, 1970; Sallis, Grossman, Pinski, Patterson, & Nader, 1987; Treiber et al., 1991). Experimental studies of the effect of natural social support on weight loss or maintenance have been more limited but appear promising. Epstein, in his research with overweight children, has shown that treatments involving overweight children and their parents are more successful through 10 years of follow-up than programs targeting the children alone (Epstein, Valoski, Wing, & McCurley, 1990). In the treatment of adult obesity, social support is often manipulated by involving (or not involving) the spouse in the program. Spouse-support interventions have had inconsistent results; a meta-analysis of this literature showed an overall positive effect on weight loss through 2 to 3 months of follow-up but not thereafter (Black, Gleser, & Kooyers, 1990).

Other studies have tried to create social support among groups of strangers and thereby improve exercise adherence or weight loss. King and Frederiksen (1984) found that participants (strangers) who were randomly assigned to a social support intervention in which team-building activities were emphasized (e.g., picking a name for their exercise group and completing activities as a group) had better exercise adherence than a usual-care control condition. Group contingency contracts, in which participants in a weight-loss program received refunds based on the average weight loss of all members in their treatment group, have likewise been shown to be more effective than individual contingency contracts, where refunds were dependent on the individual participant's weight loss only (Jeffery, Gerber, Rosenthal, & Lindquist, 1983). Although in this study the contracts were used only during the initial 15-week treatment program, their effectiveness was observed both at the end of the 15-week treatment and at 1-year follow-up. Perri et al. (1988) found that a maintenance intervention involving both monetary group contingencies and other social support strategies improved weight loss through 18 months compared with a control group given no contact during the maintenance phase.

To date, there have been no studies that have compared the effectiveness of natural social support between participants and their friends or family with that of experimentally created social support, where strangers are encouraged to support each other. Moreover, in the studies discussed above, the social support manipulation has typically involved either intragroup activities or intergroup competitions, not the combination. Finally, most of the support strategies have been used during the initial phase of the intervention, whereas the major problem facing weight-control programs is in the post-treatment or maintenance phase.

The present study evaluated the effectiveness of a more comprehensive social support condition, which included both intragroup cohesiveness activities during the initial phase of treatment and intergroup competitions with group contingencies focused on prevention of weight regain during a 6-month maintenance period. The social support manipulation was evaluated among participants recruited with a group of 3 friends and among participants recruited alone, who were teamed with 3 other people who they had not previously met. Thus, this study extends sources of natural social support beyond the spouse or parent to include any friends

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or family members and uses groups of 4, rather than dyads, to potentially increase the amount of social support received.

Method

Participants

Participants (N = 166) were recruited through advertisements placed in the major newspapers in Pittsburgh, Pennsylvania, and Minneapolis, Minnesota. The advertisements asked potential applicants whether they and their friends would like to lose weight but also indicated that it was possible to join the program either alone or with 3 other people (friends, coworkers, or family members). All participants and friends were required to be aged 25–55 years, 15–70 lb (6.8–31.8 kg) over ideal body weight (using Metropolitan Life Insurance norms), to be in generally good health, and to provide informed consent. The 82 men and 84 women who entered the study averaged ($M \pm SD$) 42.5 ± 8.5 years and had a body mass index (BMI) of 31.2 ± 3.7 and a body weight of 84.9 ± 12.2 kg.

Orientation

Participants who expressed interest in joining the program with 3 friends were invited as a small group (referred to as a "team") to an orientation meeting to learn more about the study. Participants who expressed interest in joining alone attended a comparable orientation on a different evening. It was explained to all participants that they would receive 4 months (16 sessions) of a standard behavioral treatment (SBT) program, including diet, exercise, and behavior modification, with follow-up meetings at Months 7 and 10. Likewise, all participants were informed about the various treatments being compared in the study and that they would need to deposit $50 at the start of the study. The contingencies for return of this money were dependent on the treatment condition (see below).

Design

Participants were randomly assigned either alone or with the other members of their team to one of two experimental conditions: a standard intervention condition or an intervention that focused on social support and included a financial contingency for weight maintenance. Thus, the study had four conditions: In Group 1, participants were recruited alone and given SBT; in Group 2, participants were recruited alone and given SBT plus the social support intervention; in Group 3, participants were recruited with their 3 friends and given SBT; and in Group 4, participants were recruited with their 3 friends and given SBT plus the social support intervention.

Assessments were held at baseline, at posttreatment (Month 4), and at Months 7 and 10. The primary dependent measures were overall weight loss (Months 0 to 10) and weight maintenance from Months 4 to 10. The latter was defined by both absolute weight change from Months 4 to 10 and by the percentage of patients with a 0-lb (0-kg) weight regain from Months 4 to 10. Subsequent to completing the Month 10 follow-up, a decision was made to add a 16-month follow-up. Participants were notified of the follow-up, and only those who expressed interest were asked to participate.

Common Treatment Components

All four groups attended weekly group meetings for 16 weeks. These group meetings included the 20 participants per condition at each center. Meetings were led by a behavior therapist, a nutritionist, or both and included an individual weigh-in, review of self-monitoring records, and a lecture or discussion period. All participants were given a goal for energy intake and for fat (in grams). Participants weighing less than 200 lb (90.7 kg) were instructed to eat no more than 1,000 kcal/day, with 22 grams of fat (20% fat diet), whereas those who weighed more than 200 lb (90.7 kg) were instructed to eat no more than 1,500 kcal/day, with 33 grams of fat. Specific meal plans at the assigned kilocalorie level and grocery lists were distributed each week throughout the 16-week program on the basis of prior studies showing that such structure improves weight loss (Wing et al., 1996). Participants were encouraged to follow the meal plans as exactly as possible. The exercise goal was prescribed in gradual increments until participants reached a level of 1,000 kcal/week, which can be achieved by walking 2 miles (3.2 km) on each of 5 days in the week. Participants self-monitored their intake (total energy and fat) and their exercise (in kilocalories) throughout the 16-week program; these diaries were reviewed by treatment staff. Behavioral lessons focused on such topics as problem solving, assertion, stimulus control, developing social support, dealing with high-risk situations, cognitions, and strategies for long-term maintenance.

Differences Between Conditions

Group 1 (recruited alone and SBT). This group received the SBT program described above. The room used for the sessions was arranged in rows or as a semicircle, and participants sat wherever they chose. Class lists were distributed, but no effort was made to increase communication among class members between the weekly sessions. Participants in this condition were refunded $25 of their deposit for attending each of the follow-up assessments (Months 7 and 10).

Group 2 (recruited alone and SBT plus social support). At the first meeting of this group, each participant was assigned to a team of 4 members. An effort was made to try to group people according to the area of town in which they lived or worked, but such efforts were only partially successful. Group 2 received all of the lesson material given to Group 1. It also was given a social support intervention involving intragroup activities and an intergroup competition, which is described below.

Group 3 (recruited with friends and SBT). Although participants in this condition signed up as teams of 4, the relationships among and between teams were not acknowledged during the treatment program. All aspects of the program were identical to Group 1.

Group 4 (recruited with friends and SBT plus social support). In this treatment condition, 4 people who signed up together became a natural team. They received lesson materials identical to the other groups and the same social support manipulations as Group 2.

Social Support Manipulations Given to Groups 2 and 4

Intragroup activities. Both Groups 2 and 4 participated in treatment activities during each session and between some of the lessons that were designed to increase social support. Members of each team were asked to sit together around a small table at each of the lessons. During the initial weeks of the program, they selected names for their teams and these names were prominently displayed at their assigned table. A list was compiled of the phone numbers and addresses of the members of their team. The homework assignment for Week 2 was for 1 member of each team to call the 2nd member to provide social support; the 2nd member called the 3rd, and so on. On subsequent weeks of the program, a lecture was presented (identical to what was given to Groups 1 and 2). Following the lecture, each team was given an assignment to work on together, and at the end of the lesson, each team reported

back to the full group. For example, following a lecture on eating away from home, each team was asked to identify several restaurants where they had eaten that had good low-fat, low-calorie menu choices and to report back on this information to the full group; another time, a similar team activity focused on identifying interesting new locations for walks and other physical activities. Other weeks, the teams were asked to have each member identify a particular problem situation and together brainstorm solutions for their other team members. Finally, toward the end of the 16-week program, each team became responsible for one aspect of the group party to be held the final week.

In addition to these in-class activities, the teams were specifically asked to eat a meal together outside of class for 1 week of the program and to exercise together outside of class on one occasion.

Intergroup competition. At the end of the 16 weeks, all participants in Groups 2 and 4 who had lost at least 5 lb (2.7 kg) could become participants in an intergroup competition for weight maintenance. A jackpot consisting of $25 of each participant's pretreatment deposit, including all participants in both Minneapolis and Pittsburgh, was given to the team(s) in Group 2 and the team(s) in Group 4 that had the greatest proportion of its members retaining their weight loss in full from Months 4 to 7. Thus, an individual who lost 10 kg at Week 16 was required to maintain a weight loss of at least 10 kg at Months 4 and 7 to be considered successful. A similar competition was held at Month 10 for the team(s) with the greatest proportion of members retaining their weight loss in full from Months 4 to 10. An extra $25 per participant was awarded from study funds to any team in which all 4 of the members retained their weight loss in full.

Participants who had lost 5 lbs (2.3 kg) or fewer were not eligible for the competition (because they had little weight loss to try to maintain). They were returned $25 of their deposit for attending the 7- and 10-month follow-up (as in Groups 1 and 2).

All social support manipulations ended at Month 10.

Measures

We obtained measures of weight at Months 0, 4, 7, 10, and 16 using a balance beam scale, with participants in light street clothes and no shoes. Height was measured with a stadiometer and used to calculate BMI. Participants provided demographic information at baseline. In addition, at baseline only, participants completed the Sallis Social Support Scales for Eating and Exercise Behavior (Sallis et al., 1987). These questionnaires, originally developed for heart-healthy eating and modified to be appropriate for weight control, yield subscores for positive and negative support from family and friends. At Months 4, 7, and 10, participants were asked to indicate how supportive other study participants had been of their weight-loss efforts on a scale ranging from 1 (*not at all supportive*) to 5 (*very supportive*) and the frequency with which they spoke to other group members, exercised with them, ate out with them, or shared information related to weight control outside of the group (1 = *never*, 2 = *occasionally*, 3 = *frequently*).

Data Analyses

We conducted all analyses using general linear modeling programs of Statistical Analysis System. Primary analyses compared the four treatment groups on changes in weight from Months 0 to 4, from Months 4 to 10, and from Months 0 to 10. In these analyses, the natural or experimentally created teams were used as a nested factor within treatment group. Because Group 1 (participants recruited alone and given SBT) had no teams, 4 participants were randomly assigned to each team in this condition. Planned orthogonal contrasts were used to specifically test for effects that were due to recruitment (with friends vs. alone), treatment intervention (SBT alone or SBT plus social support), and their interaction. Initial weight, center, gender, employment status, and prior experience with organized weight-loss programs were used as covariates. Weight loss from Months 0 to 4 was also included in weight-maintenance analyses. Chi-square analyses were conducted to compare the proportion of participants who successfully maintained their weight loss versus those who regained weight. We conducted analyses by using all participants who attended the follow-up session and also by using an intent-to-treat approach, in which participants with missing data were assumed to have returned to their baseline weight.

Results

Participant Characteristics

Table 1 shows the participant characteristics in the four treatment groups. Although no differences were observed in gender, age, or weight, those participants who entered the study with a group of friends were more likely to be employed outside the home, χ^2 (1, N = 166) = 10.9, $p < .002$, and less likely to have previously participated in an organized weight-loss program, χ^2(1,

Table 1
Participant Characteristics

Variable	Recruited alone		Recruited with friends		p
	SBT	SBT + social support	SBT	SBT + social support	
n (male:female)	38 (18:20)	48 (26:22)	40 (18:22)	40 (20:20)	*ns*
Age (years)[a]	41.8 ± 9.2	43.5 ± 7.8	40.6 ± 8.3	43.8 ± 8.6	*ns*
Weight (kg)[a]	82.9 ± 11.3	85.1 ± 11.1	88.3 ± 13.1	83.0 ± 12.9	*ns*
BMI[a]	30.6 ± 3.7	31.8 ± 3.1	32.1 ± 3.7	30.3 ± 4.0	*ns*
% with college or graduate degree	40	63	48	58	*ns*
% employed outside of home	84	88	100	98	.01[b]
% Caucasion	95	96	90	93	*ns*
% married	58	65	70	73	*ns*
% never dieted	5	6	0	7	*ns*
% never in organized weight-loss program	21	19	30	40	.03[b]

Note. SBT = standard behavioral treatment; BMI = body mass index.
[a] $M \pm SD$. [b] Contrast between participants recruited alone versus participants recruited with friends was significant.

$N = 166) = 4.9, p < .03$. There were no differences between participants who entered the study alone or with a group of friends on any of the baseline measures from the Sallis Social Support Questionnaires (data not shown).

Experimental Manipulation of Social Support

Figure 1 presents data on the level of social support that participants reported receiving from others in their treatment group. The effect of recruitment strategy, $F(1, 119) = 52.2, p < .0001$, and social support intervention, $F(1, 119) = 14.4, p < .0002$, were both significant. However, the interaction was also significant, $F(1, 119) = 5.9, p < .002$, indicating the effect of the experimental manipulation of social support was most apparent among participants recruited alone. Perceived social support decreased significantly over time in all four treatment conditions, $F(2, 238) = 65.1$, $p < .0001$. The effect of Time × Recruitment × Social Support Intervention was significant, $F(2, 238) = 6.4, p < .002$; participants recruited alone and given SBT reported the greatest decreases in support over time.

Analyses were also conducted on the ratings of the frequency of calling others, eating or exercising with them, and receiving diet-related information from them. On all measures, there was a significant effect of recruitment strategy (all $ps < .0001$) and social support strategies (all $ps < .01$). For phone calls, $F(1, 119) = 9.0, p < .004$, and eating, $F(1, 119) = 7.6, p < .007$, the interaction was also significant, with those participants recruited alone and given SBT reporting less social interaction than seen in the other three conditions. The time effect was also significant on all variables ($ps < .05$), showing decreased sharing of activities over time.

Initial Weight Loss

Ninety percent of the participants ($n = 149$) completed the initial 4-month treatment program (see Table 2). Those participants who were recruited alone and received SBT had the poorest completion rate (79%), whereas those who were recruited with friends and received the social support intervention had the highest completion rate (98%). A Fisher's exact test comparing the completion rate in the four groups approached significance ($p = .068$).

Weight losses from Months 0 to 4 are shown in Table 2. Initial body weight was significantly associated with weight loss ($p = .008$). In addition, for participants recruited with friends and given the social support intervention, the intraclass correlation coefficient (ICC) for initial weight loss was high (ICC = .35); participants recruited with friends and given SBT had an ICC of .09, whereas the other groups had ICCs of .00. We conducted subsequent analyses using team as a nested variable. These analyses showed a significant effect of recruitment strategy on initial weight loss, $F(1, 102) = 9.7, p < .003$; after adjusting for the team effect, we found that the mean weight loss for participants recruited with friends was 8.8 kg versus 6.7 kg for those recruited alone. None of the other variables (gender, center, employment status, past participation in programs, or social support intervention) were related to initial weight loss.

Overall Weight Loss

Eighty-two percent of the initial cohort completed the 10-month assessment. The completion rate was 95% for those participants who were recruited with friends and received the social support intervention compared with 75% to 83% for the other three conditions (Fisher's exact test, $p = .048$); in addition, the intraclass

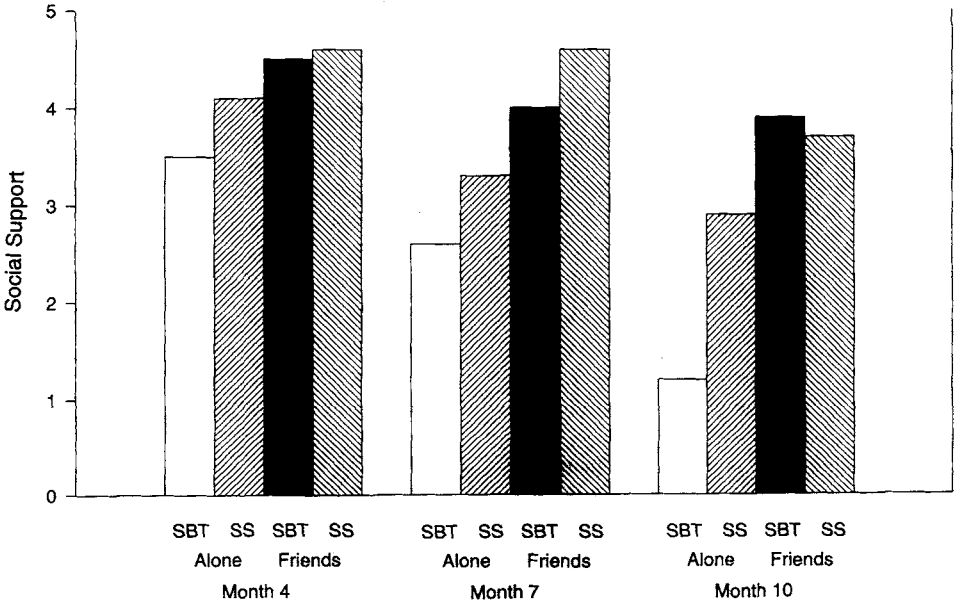

Figure 1. Ratings of social support from others in the group (1 = *not at all supportive*; 5 = *very supportive*). Alone = recruited alone; Friends = recruited with friends; SBT = standard behavioral treatment; SS = standard behavioral treatment plus social support manipulation.

Table 2
Study Completion and Weight Loss (in Kilograms) at Months 4 and 10

	Baseline to Month 4				Baseline to Month 10				Months 4 to 10			
			Weight loss[a]				Weight loss				Weight loss	
Treatment	*n*	%	*M*	*SD*	*n*	%	*M*	*SD*	*n*	%	*M*	*SD*
					Recruited alone							
SBT	30	79	−7.0	3.8	29	76	−5.3	6.8	29	76	1.6	4.0
SBT + SS	44	92	−6.9	3.5	36	75	−6.1	4.7	36	75	0.8	2.6
					Recruited with friends							
SBT	36	90	−8.6	4.3	33	83	−8.8	6.6	33	83	0.1	3.5
SBT + SS	39	98	−9.3	4.0	38	95	−8.7	6.3	38	95	0.5	3.7

Note. $N = 166$. SBT = standard behavioral treatment; SS = social support.
[a] Adjusted for baseline weight.

correlation was very high in this condition (ICC = .59). Using a nested analysis, we found again that overall weight losses differed according to recruitment strategy, $F(1, 94) = 7.9$, $p < .007$; participants recruited with friends had an overall weight loss of 8.7 kg versus 5.8 kg for those recruited alone. None of the other variables considered (e.g., gender, center, baseline weight, employment, prior experience in weight-loss program, or the social support intervention) affected overall weight loss. Moreover, the difference in overall weight loss resulted from the initial differences in weight loss (0–4 months); if these initial differences are removed, there were no significant differences among the four treatment conditions for overall weight loss.

Using an intent-to-treat analysis, in which dropouts are considered to have returned to their baseline weight, we found that the differences that were due to recruitment strategy continued to be significant, $F(1, 124) = 16.3$, $p < .001$; participants recruited with friends averaged a 7.7-kg weight loss, and those recruited alone averaged a 4.3-kg weight loss. Again, this effect was removed by adjusting for initial weight loss, but adjusting for other covariates did not influence the outcome. The effect of the social support intervention was not significant (5.6 kg vs. 6.2 kg for participants in SBT alone and SBT plus social support, respectively).

Maintenance of Weight Loss

We used two approaches to analyze maintenance of weight loss. First, we compared the mean weight change over Months 4 to 10 in the four treatment conditions. Mean weight changes ranged from 0.1 kg to 1.6 kg, with no significant differences among the four groups. None of the planned contrasts were significant. The only variable affecting maintenance of weight loss was initial weight loss, with better maintenance seen in those participants who initially lost the most weight ($r = .39$, $p < .0001$). Again, the ICC was very high for participants recruited with friends and given the social support intervention (ICC = .58) and very low in the other groups (.00–.04). Using an intent-to-treat analysis, we found that there was a trend for participants recruited with friends to regain less weight than those recruited alone (0.56 kg vs. 1.64 kg), $F(1, 107) = 3.4$, $p < .07$. None of the covariates were related to weight maintenance.

We also analyzed maintenance as a dichotomous variable, comparing those who gained weight from Months 4 to 10 with those who maintained or lost additional weight from Months 4 to 10. Figure 2 shows the percentage of participants who maintained their weight losses. There was a highly significant chi-square for the four-group comparison, $\chi^2(3, N = 136) = 11.7$, $p < .009$. Both the effect of recruitment approach, $\chi^2(1, N = 136) = 4.4$, $p < .04$, and the effect of the social support intervention, $\chi^2(1, N = 136) = 7.1$, $p < .009$, were significant. For participants who were recruited alone and received SBT, 24% maintained their weight loss in full; in contrast, for participants recruited with friends and given the social support intervention, 66% maintained their weight loss in full. Although it is not possible to analyze the effect of the contracting procedure separate from other aspects of the social support manipulation, it should be noted that 8 participants in Groups 2 and 4 (the groups given the social support intervention) remained at exactly the same weight over the 6-month follow-up compared with 0 participants in Groups 1 and 3. The discrepancy between the results of this dichotomous analysis and the continuous analysis described above was due in part to this difference in occurrence of zero weight change. It also resulted from the fact that among participants recruited with friends and given social support, those who gained weight gained more than in other groups and those who lost weight lost less. The opposite trend was seen for those recruited alone and given SBT. Finally, if the dichotomous analyses are repeated and participants with missing data are considered to have gained weight, the effect of both recruitment strategy ($p = .006$) and social support intervention ($p = .006$) become even more significant; only 18% of the initial cohort of Group 1 were successful maintainers compared with 35% in Groups 2 and 3 and 63% in Group 4.

The data presented thus far are based on all participants in the four groups. As noted in the Method section, participants in the SBT and social support conditions were required to meet a 5-lb (2.7-kg) weight-loss criterion at Month 4 to enter the financial competition. All but 3 participants (all in the recruited alone group) met the contingency; 2 of these 3 participants completed the study. Analyses omitting these participants did not yield different conclusions from those reported above.

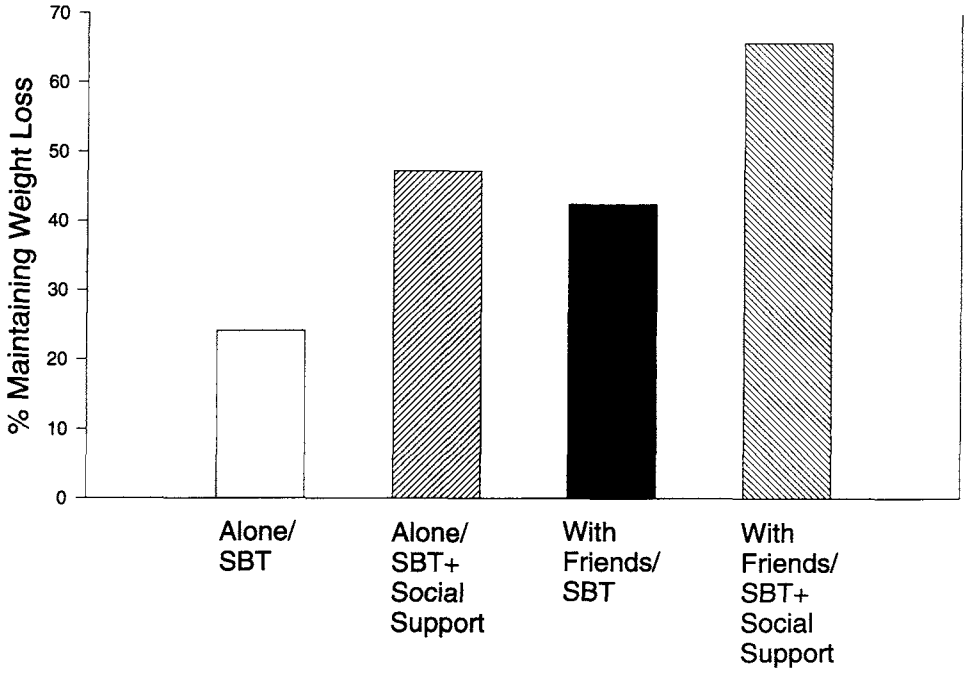

Figure 2. Percentage of participants who maintained their weight loss in full from Months 4 to 10 ($p = .008$). Alone = recruited alone; SBT = standard behavioral treatment.

Predictors of Weight Loss at Months 0 to 10

The Sallis Social Support Questionnaire completed at baseline was unrelated to subsequent weight loss in Groups 1, 2, or 3. In Group 4, there was a modest association, but surprisingly, higher positive family support for healthy eating ($r = .36, p < .03$) and exercise ($r = .32, p < .05$) were related to poorer weight loss from baseline to Month 10. In contrast, higher perceived social support from others in the group (averaged over Months 4, 7, and 10) was related to greater weight losses from baseline to Month 10 in Groups 2 ($r = -.50, p < .003$), 3 ($r = -.59, p < .001$) and 4 ($r = -.42, p < .01$) but not significantly in Group 1 ($r = -.23, p > .10$).

16-Month Follow-Up

After the completion of the 10-month study, a decision was made to try to recontact participants for a further follow-up assessment at Month 16. Participants received no additional treatment, and no contingency contracts were used during these final 6 months. Only 90 of the initial 166 (54%) participated in the 16-month assessment. Attendance was again significantly different across the four conditions, with better attendance for those recruited with friends than for those recruited alone (65% vs. 44%), $\chi^2 (1, N = 166) = 7.2, p < .008$. For weight loss from Months 0 to 16 and weight change from Months 4 to 16, there continued to be high intraclass correlations for participants recruited with friends and given the social support intervention (ICC = .63 and .34, respectively). Thus, nested analyses were again used. Overall weight losses from Months 0 to 16 ranged from 6.2 kg to 7.9 kg, with no significant differences between treatments. Participants recruited with friends regained slightly more weight from Months 4 to 16 (2.7 kg vs. 1.2 kg), $F(1, 53) = 3.64, p = .06$.

Given the large and differential dropout rate, additional analyses used an intent-to-treat approach with dropouts assumed to have returned to baseline weight. In these analyses, no differences were seen in weight regain; however, overall weight losses were greater in participants recruited with friends (4.7 kg vs. 3.0 kg), $F(1, 124) = 5.43, p < .03$.

Discussion

The main finding in this study was that recruiting participants with a team of 3 friends and treating them with a strong social support intervention decreased the number of dropouts and markedly increased the percentage of participants who maintained their weight loss in full over a 6-month follow-up period when the social support intervention was still in effect. Ninety-five percent of participants recruited with friends and given the social support manipulation completed the 10-month study. Sixty-six percent of these participants maintained their weight loss in full. Both being recruited as a group and being given the social support intervention contributed significantly to the high success at weight-loss maintenance. However, recruitment strategy had greater impact than the social support manipulation on the average weight losses achieved initially (0–4 months) and over the 10-month program. Participants recruited with friends had a 33% greater weight loss at Month 10 than those recruited alone. Although high loss to follow-up limited our ability to properly evaluate long-term weight losses, particularly among participants recruited alone, it appeared that recruiting participants with friends still provided some benefit at 16-month follow-up.

The positive effects of recruiting participants with their friends are of interest and deserve further attention. In the present study, participants were given the opportunity to enroll alone or with friends (rather than being randomly assigned to these approaches). Although covariates were included in the analyses to adjust for observed baseline differences, the benefits attributed to recruitment strategy may reflect differences in the types of participants recruited. Future studies should examine this variable with participants randomized to be treated alone or with friends. The fact that neither center had difficulty obtaining the required number of participants in the with-friends condition suggests that such a study would be feasible. An added advantage of this approach is that it appears to attract a new group of individuals who have not previously participated in structured weight-loss programs. Although overall minority recruitment in this study was limited, the fact that 64% of the minority participants were recruited with friends suggests that this may also be a useful approach to increasing minority participation. Further research is needed on the mechanisms by which recruiting participants with friends improves weight loss.

The social support manipulation was also somewhat effective in this study and improved the maintenance of weight loss for both participants recruited alone and those recruited with friends. In each case, the social support manipulation increased the percentage of treatment completers who had perfect maintenance by 22 or 23 percentage points. Results from the measure of perceived social support from others in the group suggests that the social support intervention had more impact on those recruited alone than on those recruited with friends. This finding may reflect the fact that participants recruited with friends already provided high levels of support and phone contact to each other at baseline, and thus no further increases could be seen on these measures. The evidence that weight losses were most similar among the 4 members of a team for those recruited with friends and given the social support intervention suggests that the social support manipulation was clearly effective for these participants as well. In fact, the very high ICC for weight loss and maintenance in this condition, seen at all phases of the program, is of interest and deserves further investigation.

The social support manipulation used in this study involved both intragroup support and intergroup competition. It is not clear whether both are important contributors to the effectiveness of this intervention. Because the most significant effect of the social support manipulation was on the dichotomous variable of maintaining versus not maintaining weight loss from Months 4 to 10, it appears that the contingency contracts, which were in effect during this period and specifically required maintenance of weight loss in full, were the most important component of this intervention.

Finally, it is notable that the poorest attendance and smallest percentage of participants who maintained their weight loss was observed among those participants recruited alone and given SBT. Because this represents the standard way that behavioral interventions are conducted, investigators might want to consider incorporating some additional social support strategies into the SBT program.

This study suggests the potential positive impact of recruiting participants with friends and increasing social support during the program. However, these findings are preliminary and must be interpreted with caution for the following reasons: First, participants in the study were not randomly assigned to a recruitment condition. Thus, the differences seen between participants recruited with friends and participants recruited alone may have been due to differences in the type of individuals who participated in these two conditions. A second concern is that the social support intervention included several different strategies, with both intragroup cohesiveness activities and an intergroup competition with financial prizes. Thus, it is not possible to reach conclusions about the key components of this intervention. Because no measures of intake or physical activity were included, we were unable to determine if those participants recruited with friends or assigned to social support were more similar to others on their team in the extent of their behavior changes or whether these strategies improved their adherence to the behavioral goals of the program. Finally, the study was designed to provide only 6 months of follow-up data. An additional follow-up, held 12 months after treatment, was added late to the protocol and consequently was attended by only 54% of the participants. Conclusions reached about the long-term impact of these strategies are therefore only suggestive. Despite these significant limitations, this study suggests an interesting new approach to the problem of maintenance. The impact of social support interventions on long-term weight loss deserves further investigation.

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