

Self-Regulation of Health Behavior: The “take PRIDE” Program

Noreen M. Clark, PhD
Nancy K. Janz, PhD, MS
Julia A. Dodge, MS, RN
Patricia A. Sharpe, PhD, MPH

Social cognitive theory, in particular, the construct of self-regulation was the basis for developing an educational program for older adults with heart disease. This paper discusses the theoretical principles utilized and describes the program activities based on them. Data from an evaluation conducted with 246 older heart patients who took part in the education are used to illustrate how social cognitive theory constructs operated empirically.

INTRODUCTION

Self-management of chronic disease refers to those tasks individuals and families must undertake to maintain optimum health status and reduce the impact of disease on daily life.¹ Self-management includes the tasks entailed in handling clinical aspects of disease away from the hospital or physician's office. It also requires the ability to cope with psychosocial problems generated or exacerbated by the disease. Self-management tasks are undertaken with the collaboration and advice of the individual's health care providers. If people manage disease effectively, they are expected to function more fully physically, psychologically, and socially.

Much has been written about the need for health professionals to move from simply providing medical information to providing more sophisticated self-management interventions; ones that better enable those with chronic illness to address the complex problems associated with managing the disease. Model

The work discussed in this paper was supported by the Henry J. Kaiser Family Foundation, Menlo Park California and grant no. 1-R18-HL-28907 from the Lung Division of the National Heart, Lung, and Blood Institute. The authors wish to thank Cheryl Quinn for her assistance in the preparation of this paper.

All authors are with the Department of Health Behavior and Health Education, University of Michigan School of Public Health, Ann Arbor, Michigan.

Address reprint requests to Noreen M. Clark, PhD, University of Michigan School of Public Health, Health Behavior and Health Education, 1420 Washington Heights, Ann Arbor, MI 48109-2029.

Health Education Quarterly, Vol. 19(3): 341-354 (Fall 1992)

© 1992 by SOPHE. Published by John Wiley & Sons, Inc. CCC 0195-8402/92/030341-14\$04.00

programs based on theories of health behavior and learning have been recommended.²⁻⁴

We utilized social cognitive theory⁵ to develop education for older adults with organic heart disease because we believed its principle of self-regulation was particularly salient to learning the self-management tasks people with heart disease must perform. This paper describes the theoretical premises of program activities. It also provides relevant findings from an evaluation involving older heart patients who were referred by their physicians to take part in the education. The evaluation items to be discussed here were employed to determine if principles of social cognitive theory were operating in the program and if methods and materials utilized were appropriate and helpful.

THE THEORETICAL BASIS OF THE PROGRAM

Social cognitive theory is an eclectic theory attempting to explain the mechanisms by which people learn to behave as they do. Its basic principle is that behavior is determined by the reciprocal interaction of personal dimensions, the environment (especially the social environment), and behavior itself. In other words, each of these factors influences the other in a continuous process. According to the theory, there are two major reasons people attempt a new behavior. One is outcome expectancy, the belief that if they behave in a given way a desired outcome will result. The other is the expectation of self-efficacy, the belief that they can successfully perform the behavior at the needed level of competence. In developing these outcome and efficacy beliefs, individuals learn in a variety of ways. They learn vicariously from models in the social environment. They observe other individuals and make judgments about their behavior. They notice whether the behavior has resulted in a desired outcome and they decide whether they themselves are capable of the same behavior. They are also influenced by verbal persuasion, the convincing arguments and encouragement of credible people in the social environment who advocate the behavior.

People also learn from their own experience, the most powerful source of learning and change. This way of learning is referred to in the theory as self-regulation. By noting and adjusting ones own behavior, one learns to master new skills, perform new tasks, and reach a behavioral goal. Mastery is an important element of the process. As people become more and more able to carry out new behavior, they feel more efficacious and this feeling motivates them to perfect a task or attempt new ones. During the process of self-regulation, people are aided by feedback, information about how they are doing from others skilled in the behavior. They are also motivated to learn when there is support and reinforcement for their behavior, that is, verbal or other forms of approval or reward.

Self-regulation as discussed by Zimmerman⁶ and others⁷⁻⁹ comprises three subprocesses. The first is self-observation, using ones cognitive ability to view behavior as it is occurring or in retrospect. The second is self-judgment, comparing ones own behavior against someone else's or an ideal of behavior. The third is self-reaction, coming to conclusions about oneself and ones abilities as a result of observation and judgment. The most important self-reaction in terms

of continued behavior is the perception of self-efficacy. One responds to the experience of observing and assessing behavior by forming a perception of competence. As noted, determining that one can perform as he or she desires leads to higher levels of perceived self-efficacy and greater likelihood of performing in the same way again. Individuals who are good at self-regulating generate more information with which to form strategies to reach desired behavioral goals and achieve desired outcomes. For example, if an older woman with heart disease frequently forgets to take her heart medications, she can observe her own medicine-taking behavior and judge her behavior in relation to the ideal or behavioral goal, such as always taking medicine on time as prescribed. She can use information from self-observation to determine how to modify her own actions and the social and physical environment in order to reach the behavioral goal. She reacts to initial and continuing self-observation by deciding how competent she is to take medicines exactly as prescribed. The more self-efficacious she feels, the more likely she is to persist in attempts always to be timely using the medicine. Once she reaches the goal and if she feels better physically (i.e., achieves the desired outcome), she will be more likely to stay on her schedule to maintain the feeling of physical well being.

THE “take PRIDE” EDUCATION PROGRAM

There were two goals of the “take PRIDE” program related to self-regulation as described in social cognitive theory.⁷ The first was to make participants more conscious of the processes of self-regulation, and to enable them to engage more effectively in self-observation, judgment, and reaction regarding their heart disease. The second was to assist participants in developing strategies to modify their own actions and the social and physical environment within which they managed their heart conditions.

Managing heart disease is a highly individualistic activity. What one patient finds difficult another finds easy to do. Therefore, the decision was made to individualize the “take PRIDE” education within a group meeting format, to allow individuals to address their specific management priorities in a positive social environment. Attending four weekly group meetings of two hours duration (six to eight individuals per group) would allow participants to exchange information and ideas in a supportive climate. In addition, “good managers” in the group would be models for other less skilled people.

The role of health educators in the program was to assist participants to engage in self-observation, judgment, and reaction. They were also to introduce accurate information based on physician recommendations; suggest strategies for modifying the physical and social environment to encourage new behavior; give feedback as participants moved through the processes; and enhance feelings of self-efficacy through praise and verbal encouragement.

The subprocesses of self-regulation were embodied in the acronym *PRIDE*. Individuals in the program were encouraged to engage in: *Problem* selecting; *Researching* the daily routine; *Identifying* a heart self-management goal; *Developing* a plan to reach the goal; and *Establishing* a reward for reaching the

goal or making progress. Table 1 presents the "take PRIDE" program activities as they related specifically to the subprocesses of self-regulation.

THE FIRST MEETING

The objective of the first meeting is to enable participants to engage more effectively in self-observation and self-judgment. During the meeting participants learn vicariously the first two steps of the PRIDE process: problem selecting and researching the daily routine. They subsequently are asked to engage in the research process at home during the week preceding meeting two. Two vehicles for teaching the self-regulation subprocesses are a videotape and a workbook.

In the first section of the videotape, a model self-manager, "Margaret," describes how she previously experienced fear and anxiety about her heart condition, was uncertain about how to manage, and found physicians' recommendations difficult to follow. This segment of the film is used to trigger a discussion about the group members' concerns. The health educator encourages participants to describe their strategies for dealing with or overcoming the fears and anxieties they have faced. The health educator also suggests that the "take PRIDE" program will help individuals to manage better and that mastery over the regimen will likely reduce the anxiety they feel.

The second segment of the videotape presents "Margaret" selecting a heart disease management problem to address. She discusses with the health educator the various aspects of her regimen as the physician has prescribed it, considers which area is causing her trouble, and deliberates about which she would like to improve. She finally decides to work on medicine taking—the videotape illustrates that from time to time she forgets to take her medicine as scheduled. After participants have viewed the videotape, the health educator provides each with a personalized "health recommendation form" and engages the group in discussion of the regimens the physicians have asked them to follow. The goal is to be sure participants understand their physician's prescriptions. The "take PRIDE" workbook is then introduced. It is a loose-leaf folder containing simple-to-use forms for noting information gleaned from the processes of self-observation, judgment, and reaction. Participants are asked to work in pairs to discuss problems they face in trying to comply with the regimen, and to help each other decide the problem each will select to address. A statement of the target problem is then written into the workbook on the relevant form.

Standard Setting

In social cognitive terms this segment of the program engenders standard setting by the participants, that is, deciding what the desired behaviors are and what level of performance will be acceptable to individuals. There are three program elements constituting standard setting. First, the physician's recommendations provided to the patient on the "health regimen form," the set of behaviors that the doctor believes are necessary for the individual to "do well"

Table 1. The Subprocesses of Self-Regulation and Activities of the “take PRIDE” Program Designed to Address the Subprocess

Subprocesses of Self-Regulation	Program Activity Addressing the Subprocess
Observation	<p>Viewing the video model carry out the steps of self-regulation in meetings one and two.</p> <p>Receiving instruction in the steps from the health educator in meetings one and two.</p> <p>Selecting a problem area as the target for self-observation in meeting one.</p> <p>The required week between meeting one and two of at home “research” or self-observation of one’s own behavior in relation to the target problem area using the “take PRIDE” workbook.</p> <p>Continuing use of the workbook over the 4-week period and notation of actions taken and their effectiveness.</p>
Judgment	<p>Discussion in meeting one of heart management behavior as recommended by the physician and desired by the participant.</p> <p>Comparison with the ideal of one’s own pattern of behavior as discerned through self-observation (1) using the workbook at home and (2) in group discussion in meeting two.</p> <p>Consideration of one’s own behavior as discerned through self-observation in light of common reasons for noncompliance (1) using the workbook at home and (2) in group discussion in meeting two.</p> <p>Identifying a behavioral goal in meeting two that will help to resolve the target management problem.</p> <p>Developing a plan in meeting two based on self-observation information that will modify personal, social, and environmental factors so the behavioral goal might be reached.</p> <p>Continuing use of the workbook which requires judgments about the effectiveness of the plan.</p>
Reaction (Self-Efficacy)	<p>Seeing the video model successfully carry out the self-regulatory process in meetings one and two.</p> <p>Identifying a behavioral goal in meeting two that is manageable and achievable.</p> <p>Establishing a reward in meeting two as explicit acknowledgment of making progress, that is, being self-efficacious.</p> <p>Writing a contract in meeting two that is a public statement of one’s confidence to reach the behavioral goal.</p> <p>Noting progress in meetings three and four, being persuaded by the health educator that one is able to achieve the goal, and receiving encouragement from others in the group.</p> <p>Seeing the video model in meeting four recognize successes and abilities.</p>

clinically. The second is the social role model "Margaret," an individual like the group participants, who becomes an active and successful self-manager. "Margaret" is not idealized. Her level of self-management appears reachable and her behavior becomes a standard against which individuals can measure their own self-management skills. Third, is the individual's own vision of what ideal self-management entails. Social cognitive theory posits that one reason individuals engage in behavior is the belief that the behavior will result in the desired outcome (outcome expectancy). In this case, for example, "Margaret" believes that taking medicines as prescribed will make her feel and function better. The physician's medical opinion and the health educator's reassurances are important ingredients in helping group members see how to improve their management skills and believe that by doing so they will realize important benefits.

Self-Observation

The "take PRIDE" videotape instructs participants on how to self-observe or research their routines to discover the factors contributing to the problem they have targeted. Self-observation enables individuals to determine how close to the standard they are. "Margaret," who has chosen as her target problem "forgetting her medicines," goes through a week of observing and recording the events in the physical and social environment that influence her medicine-taking behavior. She keeps a record in her "take PRIDE" notebook and uses worksheets in the book to identify the potential causes of her problem and to discover patterns in her behavior. Subsequent to the group viewing of the videotape, the health educator reviews with group members the procedure for researching their own routines during the week prior to the next meeting.

The "take PRIDE" process is a systematic way to review daily activities, note the times when the target problem occurs (e.g., the occasions when medicines were forgotten), and describe the events and circumstances surrounding the event. Participants are asked to keep records at home for 7 days. At the end of the period of observation, before returning for the second meeting, they are to review their notes and look for themes or patterns of behavior (e.g., in the model case participants have viewed in the videotape, "Margaret" habitually misses her noontime medication). Included in the "take PRIDE" notebook is a worksheet listing categories of factors contributing to compliance problems compiled from the research literature. Group members are asked to use the list and to decide if their own experience fits any of the categories explaining non-compliance. They are also asked to think about how their behavior compares to ideal behavior that would resolve the target problem.

Self-observation refers to participants' systematic attempts to be aware of their actions and to understand the reasons for doing them.^{10,11} In Bandura's⁵ words, in the "flow of transactions with the environment, many factors compete for attention." If people want to exert some influence over behavior they must be aware of what they are doing. This requires focused effort.^{12,13}

Attending to a specific behavior enables participants to become aware of aspects that have become habitual. It serves as a self-diagnostic device⁵ for

gaining a better sense of what conditions lead to certain behaviors and lays open the possibility of varying things in daily life to effect change. During the week of observing their behavior, participants also begin to make self-judgments. They compare the information generated through self-observation against their own standard for self-management. They decide what level of competence is needed to resolve the target problem informed by what the physician has recommended, the verbal persuasion of the health educator, and the model in the videotape. Is one's behavior at the level one wishes, given the standards?

THE SECOND MEETING

The objectives of meeting two are to enable participants to identify a behavioral goal to work towards as a result of researching their target problem during the previous week, to develop a step-by-step plan to meet the behavioral goal, and to establish a reward for making progress or accomplishing the goal. This group meeting attempts to increase the potential for self-judgment and to encourage the third subprocess of self-regulation, self-reaction. In this session, the group members view another segment of the videotape. In role model "Margaret's" case, the behavioral goal identified is taking medications at the prescribed time every day. She evolves a plan that includes scheduling a time in the morning to organize her pills in a pillbox that indicates the order of doses, and posting reminders on the phone, near the table, and other key places to trigger her memory about the need for medication—especially the noontime pill. She decides that her reward is to treat herself and a friend to a night at the movies when she goes for a full week without missing a dose.

After showing the videotape, the health educator asks one group member to share his or her results of the week of self-observation with the group. The health educator and group members help the individual state a specific behavioral goal, and to work out a step-by-step scheme for reaching it. Group members also discuss the concept of rewarding themselves and brainstorm a variety of rewards that they might find reinforcing. Using this experience as a guide, group members work with a partner to identify a behavioral goal, develop a plan, and choose a reward for themselves. The health educator emphasizes that the goal should be manageable and realistic, one where progress might be measurable in a few weeks. The reward may be external or an internal one, for example, for some individuals self-congratulation may be sufficient reward. Throughout the session, the health educator verbally encourages and praises group participants as they develop their plans, provides needed information, and works with individuals to ensure the plans made are feasible.

The final activity is writing a contract. The concept of contracting is discussed, specifically, the idea that making public participants' intentions often increases motivation to achieve a goal and is a statement of their level of confidence. Members are offered the opportunity to develop a contract. They challenge themselves in written form to meet their goals (or some aspect of them) by a certain date and to ask the health educator or another group member to sign the contract as a witness to the self-challenge. Members are encouraged by the health educator to try out their plans during the week prior to the third meeting.

Self-Judgment and Reaction

Meeting two emphasizes self-judgment, coming to conclusions about the effectiveness of participants' actions as a result of self-observation. It entails assessing a situation or problem, their responses to it, and the physical and social context in which it occurs. Participants use their personal standards to judge their performance related to the target problem. They form their standards in light of the recommendations provided by the physician, the ideas of their partners in the "take PRIDE" program, and the information presented by the health educator.

Meeting two also introduces the concept of self-reaction. Self-reactions¹⁴ are responses to observations, and judgments about personal behavior and the impact of the behavior on the desired outcome. Reactions can be behavioral, for example, modifying a behavior. They can be personal and psychological, for example, concluding that one is pretty good at the behavior. They can be environmental, for example, reorganizing some aspect of the home, work, or social environment. Reactions can also include self-reward for successful behavior,⁷ which is reinforcing and can lead to repetition of the behavior. A sense of efficacy or mastery over the behavior is a strong reinforcer and is frequently more compelling than external rewards.⁵

Goal Setting

Meeting two is also based on the assumption that self-observation alone does not ensure behavior that will move towards goal attainment. Bandura⁵ has noted that the results of self-observation sometimes increase the behavior being noted, sometimes decrease it, and sometimes have no effect. Setting goals helps people to direct their efforts and energy. The kind of behavioral goals people set and their commitment to them are determined by individuals' perceptions of their capabilities.¹⁵ Using strategies to reach the goal is basic to problem solving.¹⁶⁻¹⁸ For participants in the "take PRIDE" program, reaching the behavioral goal (e.g., always taking medicines as prescribed) is expected to produce the desired outcome, for example, feeling better. The stronger the outcome is desired and the stronger the feeling of self-efficacy, the greater is the effort expended to enact the plan to reach the goal.

The "take PRIDE" activities guide participants step-by-step through the cognitive processes of self-regulation. Parallel to that process, the program provides verbal persuasion, exercises, and written materials. All underscore the benefit to be derived from better self-management, suggest strategies for reaching goals, and provide assurances that the achievement of the goal is within the grasp of the individual.

THE THIRD MEETING

The objectives of meeting three are to enable participants to determine if they are making progress towards their goals, to assess difficulties and successes

in carrying out their plans, and to obtain feedback and support. This session also emphasizes self-judgment and reaction. Individuals share information about their progress or lack thereof. Difficulties in working towards their goals are discussed. Plans are reviewed and finetuned. The health educator also introduces specific information regarding medications, diet, exercise, and stress reduction for older heart patients as the information is pertinent to the participants' behavioral goals and action plans.

Helping group members to identify indicators of progress is an important element of the program. Being able to discern that one is achieving mastery over a complicated behavior is essential to continued efforts. If one who habitually forgets to take her heart medicine develops a reminder system and sees that she is missing doses less often, she is more likely to feel efficacious and make further efforts to take heart medicine on time.

THE FOURTH MEETING

The objectives of the fourth meeting are to review further progress in reaching the behavioral goal, and to determine if the "take PRIDE" process has led to new or different goals and desired outcomes. The final meeting of the group, held 1 week after meeting three, intends to foster feelings of self-efficacy. The last video segment is shown in which "Margaret" reflects that once having mastered medicine taking, she has made further progress in managing her heart condition. She makes the point that she has set new behavioral goals for herself (e.g., getting out more with her friends), and has been able to reach them. She feels greater mastery over her situation. The videotape is used as a trigger for discussion by group members. The emphasis in discussion is the level of efficacy each feels in meeting the stated behavioral goal. The health educator provides praise and encouragement and asks members to identify other management problems they may wish to target using the PRIDE process. The meeting ends with a review of the contract each member initially wrote in light of the progress that has been made. The intention is to recognize some level of achievement and improved competence on the part of every participant. It is hoped that, based on their experience of self-observation and judgment as guided by the educational program, group members are able to put their behavior and heart management goals into perspective. The program asks that participants not set goals that are too broad, unrealistic, or complicated. They are encouraged to recognize all indicators of change. Noticing even small amounts of progress leads to stronger belief that the desired behavior can be ultimately achieved. This heightened self-efficacy in turn leads to more effort to achieve an objective.

EVALUATION OF THE "take PRIDE" PROGRAM

The design of the "take PRIDE" evaluation and preliminary findings related to program impact and outcomes are discussed elsewhere.¹⁹ The "take PRIDE" program was expected to enhance the functional capacity of older adults and was initially evaluated with 246 individuals. In brief, when individuals randomly

assigned to the control group were compared to those assigned to receive the program, statistically significant differences were realized on several important dimensions of individual functioning. For example, improvements were found in scores on the Sickness Impact Profile (SIP),²⁰ a highly regarded inventory of the impact of illness on the day-to-day functioning of individuals experiencing chronic disease. The measure provides a total score, a physical dimension score, a psychosocial dimension score, and subscores for a series of 12 categories. Data collected 12 months following the program demonstrated that the overall psychosocial functioning of participants as measured by the SIP was significantly better than that of the control group. On the SIP categories for emotional behavior and alertness (which refers to the impact of illness on the clarity of reasoning and logical thought of respondents), intervention group members also scored significantly better. Differences were found as well between program and control groups in frequency and severity of symptoms. Program participants reported significantly less impact of symptoms on functioning.

For purposes of this paper, we are interested primarily in aspects of program processes. Several items in the evaluation attempted to discover if participants used the steps to strengthen self-regulation as presented in the program. These items were not intended to test the efficacy of the theory in reaching program outcomes but were included to see if processes espoused by the program were utilized by participants once they completed the four "take PRIDE" meetings.

Evaluation data related to program processes were collected in two ways. First, at the end of the four "take PRIDE" meetings, each participant was asked to complete a self-administered, anonymous, questionnaire regarding various elements of the program. Second, as part of the larger evaluation, individuals in both the control and experimental groups were interviewed by telephone at baseline, 2 months, and at 12 months follow-up. During the 2-month follow-up interview, those in the program group were asked an additional set of questions about their participation in the education.

PROGRAM ATTENDANCE AND USE OF PROGRAM PROCESSES

Participants reported that they liked the program. At the 2-month follow-up, 94% said they would recommend it to a friend with a heart problem. Attendance at the group meetings was reasonably high with 88% of the program group members attending meetings one and two, and 78% attending meetings three and four. Absences were generally attributed to ill health or prior commitments (the health educator provided "make-up" sessions, usually in the hour before each group meeting). Eighty-one percent of those taking part in the program decided to work on a problem during the intervention period with the following range of problem areas selected: 39% chose to work on their diets; 33% chose exercise; 8% chose medicine-taking; 6% psychological health (e.g., stress reduction); 3% smoking; and 11% other areas, for example, social relationships.

Theoretically, using self-regulation to successfully reach a behavioral goal and achieve a desired outcome leads to further use of the processes. Two months following the program 19% of the 89% of "take PRIDE" participants who had set a behavioral goal (e.g., using less salt, getting more exercise, etc.), had

accomplished their objective, 76% were making progress towards the goal, while 5% had made no headway towards change. Since the end of the program, 17% had selected a new problem to address. Almost all of this group (95%) had utilized the self-regulatory step of self-observation, 81% had identified a specific behavioral goal to work towards, and 67% had developed a plan for reaching the goal. A smaller number (45%) had established a reward for themselves if they reached the goal. Twenty percent of those selecting a new problem claimed to have already accomplished the new objective, 77% were making progress, and 3% had made no headway.

SELF-EFFICACY

Bandura⁵ has noted ways by which self-efficacy is instilled. These include mastery and influences in the social environment, especially having models who provide vicarious learning. We wanted to determine if these factors operated in the "take PRIDE" program, and first decided to examine data that could tell us if mastery of a management task was associated with higher levels of self-efficacy.

While some individuals elected not to address a problem (19%), as noted above most individuals in the program chose to work on a troublesome area. At baseline and at the 2-month follow-up, program participants were asked about the levels of their self-efficacy to follow various aspects of their health regimen. They rated their level of confidence on a scale from 1 to 10, where "1" was not at all confident and "10" was very confident. Table 2 presents the mean self-efficacy scores regarding diet at baseline and at 2 months for the following three groups: those who chose not to work on any problem; those who chose a problem other than diet; and those who chose diet (the numbers choosing any other problem, e.g., exercise or medicine-taking were too small to permit statistical analysis). Table 2 illustrates that there was a significant change in diet self-efficacy scores among those program participants who chose to work on their diet, and none in those who worked on other problem areas. According to social cognitive theory, mastery, that is, succeeding in a task,

Table 2. Change in Diet Self-Efficacy between Baseline and 2 Months by Problem Selection

Participants by Problem Selection	Diet Self-Efficacy			SD (Difference)	p-Value (Difference)
	Baseline Mean	Two-Month Mean	N ^a		
No problem selected	8.22	8.19	27	1.99	.92
Problem selected other than diet	8.26	8.31	85	2.07	.83
Diet selected as problem	7.93	8.52	54	1.90	.03 ^b

^a Only cases complete at both baseline and 2-month data collection points are included in the analysis.

^b $p \leq .05$ as determined by pairwise *t*-tests.

produces a higher level of self-efficacy than not attempting new behavior or attempting and failing.

We also asked program participants if they had made progress in reaching their behavioral goals. To determine if higher self-efficacy scores for those who specifically worked on their diets were associated with successful attempts at change, a correlation was computed between "diet self-efficacy" and "making progress toward one's goal." The association was significant at the $p < .01$ level ($r = .44$).

We then considered dimensions of the social environment and modeling in the program. Evaluation data collected at the end of the four educational meetings ($N = 232$) indicated that a majority of participants felt they were effective in managing their heart conditions. Sixty percent considered themselves better managers than others in their groups. Thirty-eight percent said they managed at the same level as others, and 2% said their management was worse. We wanted to determine if perceptions of superior self-management were related to the social environment, that is, to (1) aspects of comfort and verbal encouragement available in the group (the comfort one felt in talking about health problems, having others listen to one's problems, being encouraged or reassured by others, or by providing encouragement to others) and (2) elements of modeling evident in the group (the extent to which others had health problems similar to one's own, whether or not others served as role models for one's own behavior, and whether or not one served as a model for others). We conducted a regression analysis in which one's ability to manage the heart condition compared to others in the group was the dependent variable and aspects of social comfort and modeling in the group were the predictor variables. Table 3 presents the results of the least squares regression. The belief that one had served as a role model for others in the group was a significant predictor of judging oneself as better than others at self-management tasks ($p = .04$). Providing encouragement and reassurance to others in the group was a marginally significant predictor of the belief that one was a superior manager ($p = .07$).

The self-regulation process entails self-reaction following self-observation and evaluation. The majority of program group members reacted at high levels of self-efficacy. They judged themselves not only to be better self-managers, but

Table 3. Multiple Regression of Ability to Self-Manage the Heart Problem Compared to Others on Social Environment and Modeling Predictors ($N = 158$)

Independent Variables	b	p Value
Comfort discussing health concerns	-.084	.16
Others had similar concerns	.080	.25
Others willing to listen	.055	.49
Others encouraged/reassured me	-.019	.79
I encouraged/reassured others	.114	.07
Others were role models	-.087	.33
I was a role model	.193	.04 ^a
$R^2 = .11$ F statistic = 2.65 $p = .01$		

^a $p < .05$.

good enough to serve as models for others with heart disease and to persuade them that they too could manage the problem.

CONCLUSIONS

The intention of the project was to develop an educational program using social cognitive theory as a source of behavioral approaches that might help individuals to manage their heart disease more effectively. The evaluation is a test of the effectiveness of the program in aiding older adults to function more fully. The design does not allow a test of the principle of self-regulation. It may be that by using another theory, the same or similar outcomes may have been reached.

There are three conclusions about self-regulation, however, that may be drawn from our experience. First, it is feasible to use self-regulation as the basis for education that older adults find valuable and helpful. Second, using self-regulation processes as the basis of the program is an efficient way to individualize activities within a group format. The processes can be taught to groups and individuals can tailor them to fit their particular priorities and learning interests. Third, there are indications that emphasis on self-regulatory processes contributed to program effectiveness. These indications suggest that the principle deserves assessment in comparison to other important theoretical constructs such as social support, behavior modification, and the like.

REFERENCES

1. Clark NM, Becker MH, Janz NK, Lorig K, Rakowski W, Anderson L: Self-management of chronic disease by older adults: A review and questions for research. *J Aging Health* 3(1):3-27, February 1991.
2. Clark NM, Rakowski W, Ostrander L, Wheeler JR, Oden S, Keteyian S: Development of self-management education for elderly heart patients. *Gerontologist* 28(4):491-494, 1988.
3. Clark NM, Feldman C, Freudenberg N, Millman EJ, Wasilewski Y, Valle I: Developing education for children with asthma through study of self-management behavior. *Health Educ Q* 7(4):278-297, 1980.
4. Green LW, Kreuter MW, Deeds SG, Partridge KB: *Health Education Planning: A Diagnostic Approach*. Palo Alto, CA, Mayfield Publishing Co., 1980.
5. Bandura A: *Social Foundations of Thought and Action: A Social Cognitive Theory*. Englewood Cliffs, NJ, Prentice-Hall, Inc., 1986.
6. Zimmerman BJ: Development of self-regulated learning: Which are the key sub-processes? *Contemp Educ Psychol* 16:307-313, 1986.
7. Clark NM, Zimmerman BJ: A social cognitive view of self-regulated learning about health. *Health Educ Res* 5(3):371-379, 1990.
8. Thoresen CE, Mahoney JJ: *Behavioral Self-Control*. New York, Holt, Rinehart and Winston, 1974.
9. Mace FC, Kratchowill TR: Theories of reactivity in self-monitoring: A comparison of cognitive-behavioral and operant models. *Beh Modif* 9:323-343, 1985.
10. Schunk DH: Goal difficulty and attainment information: Effects on children's achievement behaviors. *Hum Learning* 2:107-117, 1983a.

11. Schunk DH: Progress self-monitoring: Effects on children's self-efficacy and achievement. *J Educ Psychol* 51:89-93, 1983b.
12. Kazdin AE: Self-monitoring and behavior change, in Mahoney MJ, Thoresen CE (eds.), *Self-Control: Power to the Person*. Monterey, CA, Brooks/Cole, 1974, pp. 218-246.
13. Nelson RO: Assessment and therapeutic functions of self-monitoring, in Hersen M, Eisler RM, Miller PM (eds.); *Progress in Behavior Modification*. New York, NY, Academic Press 1977, Vol. 5, pp. 263-308.
14. Seligman MEP: *Helplessness: On Depression Development and Death*. San Francisco, CA, Freeman, 1975.
15. Bandura A, Cervone D: Self-evaluative and self-efficacy mechanisms governing the motivational effects of goal systems. *J Pers Soc Psychol* 45:1017-1028, 1983.
16. Anderson JR: *Cognitive Psychology and Its Implications*. San Francisco, CA, Freeman, 1980.
17. Spivack G, Platt JJ, Shure MB: *The Problem-Solving Approach to Adjustment*. San Francisco, CA, Jossey-Bass, 1976.
18. Brim OG, Jr, Glass DC, Lavin DE, Goodman N: *Personality and Decision Processes*. Stanford, CA, Stanford University Press, 1962.
19. Clark NM, Janz NK, Becker MH, Schork MA, Wheeler J, Liang J, Dodge JA, Keteyian S, Rhoads KL, Santinga J: Impact of self-management education on functional health status of older adults with heart disease. *The Gerontologist* (in press, 1992).
20. Bergner M, Bobbitt RA, Carter WB, Gilson BS: The Sickness Impact Profile: Development and final revision of a health status measure. *Med Care* 19:787-805, 1981.