Self-Efficacy
Thought Control of Action

Edited by Ralf Schwarzer
Self-Efficacy
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SELF-EFFICACY:
THOUGHT CONTROL
OF ACTION

Edited by
Ralf Schwarzer
Freie Universität Berlin
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PREFACE

Human functioning is facilitated by a personal sense of control. If people believe that they can take action to solve a problem instrumentally, they become more inclined to do so and feel more committed to this decision.

While outcome expectancies refer to the perception of the possible consequences of one's action, self-efficacy expectancies refer to personal action control or agency. A person who believes in being able to cause an event can conduct a more active and self-determined life course. This "can do"-cognition mirrors a sense of control over one's environment. It reflects the belief of being able to control challenging environmental demands by means of taking adaptive action. It can be regarded as a self-confident view of one's capability to deal with certain life stressors.

Self-efficacy makes a difference in how people feel, think and act. In terms of feeling, a low sense of self-efficacy is associated with depression, anxiety, and helplessness. Such individuals also have low self-esteem and harbor pessimistic thoughts about their accomplishments and personal development. In terms of thinking, a strong sense of competence facilitates cognitive processes and academic performance. When it comes to preparing action, self-related cognitions are a major ingredient of the motivation process. Self-efficacy levels can enhance or impede motivation. People with high self-efficacy choose to perform more challenging tasks. They set themselves higher goals and stick to them. Actions are preshaped in thought, and people anticipate either optimistic or pessimistic scenarios in line with their level of self-efficacy. Once an action has been taken, high self-efficacious persons invest more effort and persist longer than those low in self-efficacy. When setbacks occur, they recover more quickly and maintain the commitment to their goals. Self-efficacy also allows people to select challenging settings, explore their environments, or create new environments.

Self-efficacy is considered to be specific, that is, one can have more or less firm beliefs in different domains of functioning. A sense of competence can be acquired by mastery experience, vicarious experience, verbal persuasion, or physiological feedback. Self-efficacy, however, is not the same as positive illusions or unrealistic optimism. Since it is based on experience and does not lead to unreasonable risk taking. Instead, it leads to venturesome behavior that is within reach of one's capabilities.

Self-referent thought has become an issue that pervades psychological research in many domains. It has been found that a strong sense of personal efficacy is related to better health, higher achievement, and better social integration. This concept has been applied to such diverse areas as school achievement, emotional disorders, mental and physical health, career choice, and sociopolitical change. It has become a key variable in clinical, educational, social, developmental, health, and personality psychology.
The present volume, organized in five sections, covers a broad range of studies that deal with self-efficacy. The first section refers to self-efficacy and human functioning.

In his introductory chapter, Albert Bandura outlines the role of self-efficacy as part of his Social Cognitive Theory. Self-efficacy does not simply reflect the perception of accomplishments; instead, it is based on subjective inferences from different sources of information. Perceived self-efficacy has been shown to exert an effect on performance, independent of actual ability levels. For example, self-beliefs that were induced experimentally led to subsequent behavioral change. A sense of efficacy is considered to influence different processes of human functioning: cognitive processes, motivation, affect, and selection of environments.

William McCarthy and Michael Newcomb focus their chapter on the distinction of perceived self-efficacy either in terms of thought control or in terms of actual performance. This parallels the common distinction between cognitive coping ability and behavioral coping ability. In some situations, people may feel competent to regulate themselves by reappraising the demands or by controlling their emotions, whereas in other situations they may feel competent to change the stressful encounters instrumentally. The authors studied the perceptions of a large sample of young adults and found that issues such as purpose in life or loss of control were only related to the cognitive control dimension, whereas social stress issues such as assertiveness, leadership, and dating were only related to the behavioral control dimension. These results may stimulate further research on one's beliefs about self-regulation in cases where no explicit action is desired.

Social support has been found to buffer stress under certain circumstances. Ralf Schwarzer, Christine Dunkel-Schetter, Bernard Weiner, and Grace Woo have experimentally investigated conditions under which social support is extended. Victims who suffer from uncontrollable life events and invest high coping efforts are more likely to receive support, in contrast to those who experience controllable events and do not cope well. Outcome expectancies and self-efficacy expectancies emerged as mediators in the cognition—emotion—behavior process. If the victim's condition was judged as changeable, and if the provider felt competent to extend support, then the intent to help was most likely. This research points to the possibility that people often do not behave in a supportive way because they believe they are not capable of taking appropriate action.

The following three chapters add a developmental perspective in the second section. Ellen Skinner reviews research on competence motivation and perceived control in children and establishes a connection to the self-efficacy construct. Self-efficacy expectancies are labeled "capacity beliefs" in her theoretical model, as opposed to "strategy beliefs" or outcome expectancies, which are perceptions of the behavioral causes of success or failure. Human beings are supposed to strive for mastery and control over their environments and to attempt to generate desired events. A need for competence, that may be innate and pervasive, motivates behavior across the life span. Loss of perceived control can lead to coping deficits and helplessness, particularly if this is due to self-efficacy impairment.
However, this is not so much the case if it is due to the interference of powerful others.

Jutta Heckhausen explores the psychological mechanisms that alter and maintain self-efficacy, particularly the role of information from social comparison processes. Self-efficacy expectancies have to be realistic in order to translate into successful actions and to avoid high risk-taking. On the other hand, positive illusions set the stage for venturesome behavior and for an optimistic approach toward life’s challenges. The self-serving bias in beliefs about one’s capabilities and coping skills conveys motivational benefits but can be counterproductive when the appropriate action either fails or is not available. Strategic social comparison can balance these conflicting demands. Age groups provide a frame of reference for such comparisons. Goals that are congruent with those of one’s reference group can be seen as realistic, whereas those that transcend this norm can be considered as self-enhancing.

Jochen Brandtstätter states that individuals contribute actively to shaping their personal development and circumstances of living. This chapter focusses on developmental implications of self-efficacy by using a large cohort study to examine perceived control and coping preferences across the life-span. Specifically, Brandtstätter studies how people deal with their perceived gains and losses over the life span and how these are actively constructed. Personal self-regulation changes with increasing age, reflected by a decline in tenacious goal pursuit and an increase in flexible adjustment of developmental goals. This is in line with a shift from a more instrumental or active-assimilative coping mode to a more accommodative mode of coping.

Self-efficacy expectancy is inversely related to anxiety and depression and can represent a powerful stress resource factor. This resource factor also allows one to deal better with uncertainty, distress, and conflict. The third section of this volume gathers articles that deal with stress and emotions and the way self-efficacy interacts with them. S. Lloyd Williams reviews the literature on self-beliefs as causal factors in phobia and finds that self-efficacy judgments are the best predictors of therapeutic change. No other available theory provides such strong evidence. He presents empirical research on severely phobic patients who underwent psychological treatment. Those who were trained to master threatening situations and, by this, to build up a sense of competence, were more successful than those exposed to other psychotherapeutic procedures.

David Kavanagh extends the scope of self-efficacy theory to the development of depression and explores the predictive and causal influence that self-beliefs have on the occurrence of depressive episodes. There appears to be a reciprocal relationship between emotions and self-related cognitions. Depressive mood is triggered by cognitions; emotions represent one source of information, among others, to shape self-efficacy. On the other hand, low self-efficacy deepens sadness and increases vulnerability toward depressive episodes. This issue has been examined by manipulating emotions experimentally. People in an induced sad mood were reporting lower self-efficacy than those in a happy mood. In addition,
performance is related to both emotions and self-related cognitions. All three constructs exert a direct effect on each other but also serve as mediators between one another.

Matthias Jerusalem and Ralf Schwarzer attempt to integrate transactional stress theory with social cognitive theory. They regard generalized self-efficacy as one of the personal resource factors that counterbalance taxing environmental demands in the stress appraisal process. Stress can be cognitively appraised as either a challenge, threat, or harm/loss. In a laboratory experiment, subjects who were confronted with difficult tasks under time pressure received fictitious performance feedback. Those with high trait self-efficacy made more favorable interpretations of the stressors compared to their low self-efficacy counterparts. The authors conclude that dispositional self-efficacy not only facilitates coping with stress but is already operating at an earlier phase of the stress process, namely at the cognitive appraisal stage.

The fourth section relates self-beliefs to health behaviors. The intention to adopt a specific health behavior such as exercise, dieting, or condom use depends on, among other things, the perception of one’s ability to acquire the necessary skills to change one’s habits. Ralf Schwarzer discusses health behavior theories that explain and predict behavior change and maintenance. In recent years, the major theories have been revised by including a self-efficacy factor in the set of predictor variables because, in many studies, self-efficacy has emerged as the single best determinant for adopting precaution strategies, abandoning detrimental health habits, and preventing relapse. It is not yet clear, however, how this dimension interacts with perceived risks, outcome expectancies, previous experience, situational constraints, and other interfering variables. A new model is presented that may stimulate further inquiry.

Gerjo Kok and his co-workers provide a good example of advanced research in this field. They studied people’s attitudes, perceived social norms, and self-efficacy toward risk behaviors. They also measured the intention to abstain from these risk behaviors in the future. It turned out that all three factors predicted intentions, and that the model would be much less powerful without the self-efficacy factor. In addition, self-efficacy succeeded in directly influencing actual behavior. This suggests that low self-efficacy should be conceived as a personal barrier to the process of adopting appropriate health behaviors. If the individual has good intentions but feels incompetent to perform the desired action, health promotion efforts should aim at skill improvement and guided mastery experience to boost a sense of self-efficacy.

Martin Covington and Carol Omelich have studied the relationship between the temptation to smoke and the intention to smoke in several thousand high-school students. They looked at potential mediators that might influence this relationship. Although a strong direct effect of temptations on intentions emerged, there were also a number of mediating effects by outcome expectancies and self-efficacy expectancies. The outcome expectancies were differentiated into affective consequences and needs consequences, while self-efficacy expectancies were
distinguished as decision-making strategies, interpersonal strategies, and self-peer strategies. These cognitions altered the levels of temptation for the students. Smoking decisions in teenagers, therefore, may be seen as dependent on their perceived problem-solving capabilities.

The last section deals with applications of self-efficacy theory to physical symptoms, coping with illness, and rehabilitation of chronic disease. It is assumed that self-related cognitions exert an effect on illness controllability and on biological systems that mediate health and illness. The first three chapters of this section focus on psychological mechanisms in rehabilitation of coronary heart disease, arthritis, and pulmonary disease.

Craig Ewart investigates the role of self-appraisals in the rehabilitation of myocardial infarction patients. Convalescence can be prolonged far longer than desirable by unwarranted fears of a reinfarct when resuming one's normal activities. An improvement of self-efficacy accelerates progress in exercise and enhances mood and well-being. Self-efficacy responses to treadmill exercise testing predict activity levels better than medical data. Pretraining self-efficacy levels predict posttraining gains in terms of perseverance in demanding exercise regimens. It is also of interest that spouses tend to overprotect the patients, but spouse participation in exercise programs leads to more realistic assessments of the patients' capabilities.

Halsted Holman and Kate Lorig have launched an arthritis self-management program to teach patients how to cope with the consequences of their chronic disease. They found that patients' perceived self-efficacy to cope with their ailment was mediating the outcomes of this program. This was particularly true for pain and depression. The more self-efficacious the patients had become during the training, the better they were able to tolerate pain and the less depression was reported. Beneficial effects were maintained even at a four-year follow-up.

Michelle Toshima, Robert Kaplan and Andrew Ries apply self-efficacy theory to the rehabilitation of chronic obstructive pulmonary disease and examine changes in self-appraisals from different sources such as mastery experience and physiological feedback. The patients reported their self-efficacy expectancies while undergoing an exercise regimen. Physiological feedback from pulmonary tests and from treadmill endurance walk tests had a strong influence on self-efficacy, but mastery experience did not. It is argued that, under certain circumstances, information from one source can attenuate information from another. This may stimulate further research on the joint effects of multiple-source information on changes in self-beliefs.

In conclusion, Albert Bandura provides an overview of self-efficacy mechanisms in psychobiological functioning and points to empirical evidence for biochemical effects of self-efficacy in coping with stress, such as autonomous, catecholamine, and opioid activation. Research on pain control as well as on immunocompetence demonstrates that people with optimistic self-beliefs are better off and cope well. They are also at an advantage in the self-management of
chronic disease and in the rehabilitation process. Self-efficacy improves changes in health behaviors and thus helps to minimize health risks.

The idea to publish this book arose when the Freie Universität Berlin bestowed upon Albert Bandura an honorary doctorate in 1990, at which time a scientific workshop was organized. The speakers agreed to write up their presentations, and these papers were supplemented by some invited chapters. I would like to thank the authors for their excellent contributions. The entire technical composition of this volume was skillfully accomplished by Mary Wegner. Her meticulous copy editing and proficient desktop publishing are gratefully acknowledged.

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Los Angeles, September 1991

Ralf Schwarzer
SELF-EFFICACY AND HUMAN FUNCTIONING
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EXERCISE OF PERSONAL AGENCY THROUGH THE SELF-EFFICACY MECHANISM

Albert Bandura

The present chapter analyzes the influential role of perceived self-efficacy in agent causality. The construction of a sense of personal efficacy involves a complex process of self-persuasion that relies on cognitive processing of diverse sources of efficacy information conveyed enactively, vicariously, socially, and physiologically. Convergent evidence from diverse lines of research reveals that self-beliefs of efficacy function as important proximal determinants of human motivation, affect, thought and action. Self-beliefs of efficacy exert their affects on human functioning through motivational, cognitive and affective intervening processes. Some of these processes, such as affective states and thinking patterns, are of considerable interest in their own right, as well as serve as intervening influencers of action. Self-efficacy beliefs also shape developmental trajectories by influencing choice of pursuits and selection of environments. Self-efficacy theory adopts a nondualistic but nonreductional conception of human agency that operates within a model of triadic reciprocal causation.

The recent years have witnessed a resurgence of interest in self-referent phenomena. One can point to several reasons why self processes have come to pervade the research in many areas of psychology. Self-generated activities lie at the very heart of causal processes. They not only give meaning and valence to most external influences, but they function as important proximal determinants of motivation and action. People make causal contributions to their own psychosocial functioning through mechanisms of personal agency. Among the mechanisms of agency, the most focal and pervading one involves people’s beliefs about their capabilities to exercise control over events that affect their lives. Self-beliefs of efficacy influence how people feel, think, and act. This chapter analyzes the causal function of self-efficacy beliefs and the different psychological processes through which they exert their effects.

SELF-EFFICACY CAUSALITY

A central question in any theory of cognitive regulation of motivation, affect and action concerns the issue of causality. Do self-efficacy beliefs operate as
causal factors in human functioning? This issue has been investigated by a variety of experimental strategies. Each approach tests the dual-causal link in which instating conditions affect efficacy beliefs, and efficacy beliefs, in turn, affect motivation and action. In one strategy, perceived self-efficacy is raised in phobics from virtually non-existent levels to preselected low, moderate, or high levels by providing them with mastery experiences or simply by modeling coping strategies for them until the desired level of efficacy was attained (Bandura, Reese, & Adams, 1982).

As shown in Figure 1, higher levels of perceived self-efficacy are accompanied by higher performance attainments. The efficacy-action relationship is replicated across different dysfunctions and in both intergroup and intrasubject comparisons, regardless of whether perceived self-efficacy was raised by mastery experiences or solely by vicarious influence. The vicarious mode of self-efficacy induction is especially well-suited for demonstrating the causal contribution of perceived self-efficacy to performance. Individuals simply observe models' performances without executing any actions, make inferences from the modeled information about their own coping efficacy, and later behave in accordance with their self-judged efficacy. Microanalysis of efficacy-action congruences reveals a close fit between perceived self-efficacy and performance on individual tasks.

Another approach to the test of causality is to control, by selection, level of ability but to vary perceived self-efficacy within each ability level. Collins (1982) selected children who judged themselves to be of high or low mathematical efficacy at each of three levels of mathematical ability. They were then given difficult problems to solve. Within each level of mathematical ability, children who regarded themselves as efficacious were quicker to discard faulty strategies, solved more problems (Figure 2), chose to rework more of those they failed, and did so more accurately than those of equal ability who doubted their efficacy. Perceived self-efficacy thus exerted a substantial independent effect on performance. Positive attitude toward mathematics was better predicted by perceived self-efficacy than by actual ability. As this study shows, people may perform poorly because they lack the ability, or they have the ability but they lack the perceived self-efficacy to make optimal use of their skills.

A third approach to causality is to introduce a trivial factor devoid of information to affect competency, but that can bias self-efficacy judgment. The impact of the altered perceived self-efficacy on level of motivation is then measured. Studies of anchoring influences show that arbitrary reference points from which judgments are adjusted either upward or downward can bias the judgments because the adjustments are usually insufficient. Cervone and Peake (1986) used arbitrary anchor values to influence self-appraisals of efficacy. Self-appraisals made from an arbitrary high starting point biased students' perceived self-efficacy in the positive direction, whereas an arbitrary low starting point lowered students' appraisals of their efficacy (Figure 3). The initial reference points in a sequence of performance descriptors similarly biased self-efficacy appraisal (Peake & Cervone, 1989). In a further study, Cervone (1989) biased self-efficacy appraisal
Figure 1  Mean performance attainments as a function of differential levels of perceived self-efficacy. The two left panels present the relationship for perceived self-efficacy raised by mastery experiences; the two right panels present the relationship for perceived self-efficacy raised by vicarious experiences. The intergroup panels show the performance attainments of groups of subjects whose self-percepts of efficacy were raised to different levels; the intrasubject panels show the performance attainments for the same subjects after their self-percepts of efficacy were successively raised to different levels (Bandura, Reese, & Adams, 1982).
Figure 2 Mean levels of mathematical solutions achieved by students as a function of mathematical ability and perceived mathematical self-efficacy. Plotted from data of Collins, 1982.

Figure 3 Mean changes induced in perceived self-efficacy by anchoring influences and the corresponding effects on level of subsequent perseverant effort (Cervone & Peake, 1986).
by differential cognitive focus on things about the task that might make it troublesome or tractable. Dwelling on formidable aspects weakened people's belief in their efficacy, but focusing on doable aspects raised self-judgment of capabilities. In all of these experiments, the higher the instated perceived self-efficacy, the longer individuals persevere on difficult and unsolvable problems before they quit. Mediational analyses reveal that neither anchoring influences nor cognitive focus has any effect on motivation when perceived self-efficacy is partialled out. The effect of the external influences on performance motivation is thus completely mediated by changes in perceived self-efficacy.

A number of experiments have been conducted in which self-efficacy beliefs are altered by bogus feedback unrelated to one's actual performance. People partly judge their capabilities through social comparison. Using this type of efficacy induction procedure, Weinberg, Gould, and Jackson (1979) showed that physical stamina in competitive situations is mediated by perceived self-efficacy. They raised the self-efficacy beliefs of one group by telling them that they had triumphed in a competition of muscular strength. They lowered the self-efficacy beliefs of another group by telling them that they were outperformed by their competitor. The higher the illusory beliefs of physical strength, the more physical endurance subjects displayed during competition on a new task measuring physical stamina (Figure 4). Failure in a subsequent competition spurred those with a high sense of self-efficacy to even greater physical effort, whereas failure further impaired the performance of those whose perceived self-efficacy had been undermined. Self-beliefs of physical efficacy illusorily heightened in females and illusorily weakened in males obliterated large preexisting sex differences in physical strength.

Another variant of social self-appraisal that has also been used to raise or weaken beliefs of self-efficacy relies on bogus normative comparison. Individuals are led to believe that they performed at the highest or lowest percentile ranks of the reference group, regardless of their actual performance (Jacobs, Prentice-Dunn, & Rogers, 1984). Perceived self-efficacy heightened by this means produced stronger perseverant effort (Figure 5). The regulatory role of self-belief of efficacy instated by unauthentic normative comparison is replicated in a markedly different domain of functioning, namely pain tolerance (Litt, 1988). Self-efficacy beliefs were altered by having individuals appear as strong or weak pain tolerators compared to the capabilities of an ostensibly normative group. The higher the instated belief in one's capabilities, the greater the pain tolerance.

Still another approach to the verification of causality employs a contravening experimental design in which a procedure that can impair functioning is applied, but in ways that raise perceived self-efficacy. The changes accompanying psychological ministrations may result as much, if not more, from instilling beliefs of personal efficacy as from the particular skills imparted. If people's beliefs in their coping efficacy are strengthened, they approach situations more assuredly and make better use of the skills they have. Holroyd and his colleagues (Holroyd
Figure 4  Mean level of physical stamina mobilized in competitive situations as a function of illusorily instated high or low self-percepts of physical efficacy (Weinberg, Gould, & Jackson, 1979).

Figure 5  Mean changes in perceived self-efficacy induced by arbitrary normative comparison and the corresponding effects on level of subsequent perseverant effort (Jacobs, Prentice-Dunn, & Rogers, 1984).
et al., 1984), demonstrated with sufferers of tension headaches that the benefits of biofeedback training may stem more from enhancement of perceived coping efficacy than from the muscular exercises themselves. In biofeedback sessions, they trained one group to become good relaxers. Unbeknownst to another group, they received feedback signals that they were relaxing whenever they tensed their muscles. They became good tensers of facial muscles, which, if anything, would aggravate tension headaches. Regardless of whether people were tensing or relaxing their musculature, bogus feedback that they were exercising good control over muscular tension instilled a strong sense of efficacy that they could prevent the occurrence of headaches in different stressful situations. The higher their perceived self-efficacy, the fewer headaches they experienced. The actual amount of change in muscular activity achieved in treatment was unrelated to the incidence of subsequent headaches.

The findings of the preceding experiments should not be taken to mean that arbitrary persuasory information is a good way of enhancing self-efficacy beliefs for the pursuits of everyday life. Rather, these studies have special bearing on the issue of causality because self-efficacy beliefs are altered independently of a performance modality and, therefore, cannot be discounted as epiphenomenal by-products of performance. They demonstrate that changes in self-beliefs of efficacy affect motivation and action. In actual social practice, personal empowerment through mastery experiences is the most powerful means of creating a strong, resilient sense of efficacy (Bandura, 1986, 1988). This is achieved by equipping people with knowledge, subskills and the strong self-belief of efficacy needed to use one's skills effectively.

The final way of verifying the causal contribution of self-efficacy beliefs to human functioning is to test the multivariate relations between relevant determinants and the predicted variable in the theoretical causal model by hierarchical regression analysis or path analysis. These analytic tools for theory testing indicate how much of the variation in the predicted variable is explained by perceived self-efficacy when the influence of other determinants is controlled.

The multivariate investigations involve panel designs in which self-efficacy and the predicted variable are measured on two or more occasions to determine what effect either factor may have on the other. In some of these studies, perceived self-efficacy is altered by naturally occurring influences during the intervening period. More often, self-efficacy beliefs are altered by experimentally varied influences. The temporal ordering and systematic variation of perceived self-efficacy antecedently to the predicted outcome helps to remove ambiguities about the source and direction of causality. In addition to systematic variation and temporal priority of the self-efficacy beliefs, controls are applied for potential confounding variables. The results of such studies reveal that self-efficacy beliefs usually make substantial contribution to variations in motivation and performance accomplishments (Bandura & Jourden, 1991; Dzewaltowski, 1989; Locke, Frederick, Lee, & Bobko, 1984; Ozer & Bandura, 1990; Wood & Bandura, 1989a). The causal contribution of self-efficacy beliefs to
sociocognitive functioning is further documented in comparative tests of the predictive power of social cognitive theory and alternative conceptual models (Dzewaltowski, Noble, & Shaw, 1991; Lent, Brown, & Larkin, 1987; McCaul, O'Neill, & Glasgo, 1988; Siegel, Galassi, & Ware, 1985; Wheeler, 1983).

These diverse causal tests were conducted with different modes of efficacy induction, diverse populations, both interindividual and intraindividual verification, and all sorts of domains of functioning, and with microlevel and macrolevel relations. The evidence is consistent in showing that perceived self-efficacy contributes significantly to level of motivation and performance accomplishments. Evidence that divergent procedures produce convergent results adds to the explanatory and predictive generality of the self-efficacy mediator.

**EFFICACY-ACTIVATED PROCESSES**

Self-efficacy beliefs regulate human functioning through four major processes. They include cognitive, motivational, affective and selection processes. Some of these efficacy-activated events are of interest in their own right rather than merely intervening influencers of action. These processes are analyzed in some detail in the sections that follow.

**Cognitive Processes**

Self-beliefs of efficacy affect thought patterns that can enhance or undermine performance. These cognitive effects take various forms. Much human behavior, being purposive, is regulated by forethought embodying cognized goals. Personal goal setting is influenced by self-appraisal of capabilities. The stronger the perceived self-efficacy, the higher the goals people set for themselves and the firmer their commitment to them (Bandura & Wood, 1989; Locke et al., 1984; Taylor, Locke, Lee, & Gist, 1984). Challenging goals raise the level of motivation and performance attainments (Locke & Latham, 1990).

Most courses of behavior are initially shaped in thought (Bandura, 1986). People's beliefs about their efficacy influences the types of anticipatory scenarios they construct and rehearse. Those who have a high sense of efficacy visualize success scenarios that provide positive guides for performance. Those who judge themselves as inefficacious are more inclined to visualize failure scenarios which undermine performance by dwelling on how things will go wrong. Numerous studies have shown that cognitive simulations in which individuals visualize themselves executing activities skillfully enhance subsequent performance (Bandura, 1986; Corbin, 1972; Feltz & Landers, 1983; Kazdin, 1978). Perceived self-efficacy and cognitive simulation affect each other bidirectionally. A high sense of efficacy fosters cognitive constructions of effective actions and cognitive reiteration of efficacious courses of action strengthens self-beliefs of efficacy (Bandura & Adams, 1977; Kazdin, 1979).
A major function of thought is to enable people to predict the occurrence of events and to create the means for exercising control over those that affect their daily lives. Many activities involve inferential judgments about conditional relations between events. Discovery of such predictive rules requires effective cognitive processing of multidimensional information that contains ambiguities and uncertainties. The fact that the same predictor may contribute to different effects and the same effect may have multiple predictors creates uncertainty as to what is likely to lead to what in probabilistic environments.

In ferreting out predictive rules people must draw on their preexisting knowledge to construct options, to weigh and integrate predictive factors into composite rules, to test and revise their judgments against the immediate and distal results of their actions, and to remember which factors they had tested and how well they had worked. It requires a strong sense of efficacy to remain task oriented in the face of pressing situational demands and judgment failures that can have important social repercussions.

The powerful influence of self-efficacy beliefs on self-regulatory cognitive processes is revealed in a program of research on complex organizational decision-making (Wood & Bandura, 1989b). Much of the research on human decision-making involves discrete judgments in static environments under non-taxing conditions (Beach, Barnes, & Christensen-Szalanski, 1986; Hogarth, 1981). Judgments under such circumstances may not provide a sufficient basis for developing either descriptive or normative models of decision making in dynamic naturalistic environments which involve repeated judgments in the face of a wide array of information within a continuing flow of activity under time constraints and social and self-evaluative consequences. To complicate matters further, organizational decision making requires working through others and coordinating, monitoring and managing collective efforts.

The mechanisms and outcomes of organizational decision making do not lend themselves readily to experimental analysis in actual organizational settings. Advances in this complex field can be achieved by experimental analyses of decision making in simulated organizational environments. A simulated environment permits systematic variation of theoretically relevant factors and precise assessment of their impact on organizational performance and the psychological mechanisms through which they achieve their effects.

In this research, executives managed a computer-simulated organization in which they had to match their supervisees to subfunctions based on their talents and to learn and implement managerial rules to achieve organizational levels of performance that were difficult to fulfill. At periodic intervals we measured the managers' perceived self-efficacy, the goals of group performance they sought to achieve, the adequacy of their analytic thinking for discovering managerial rules, and the level of organizational performance they realized.

Social cognitive theory explains psychosocial functioning in terms of triadic reciprocal causation (Bandura, 1986). In this model of reciprocal determinism,
cognitive, biological and other personal factors, behavior, and environmental events all operate as interacting determinants that influence each other bidirectionally. Each of the major interactants in the triadic causal structure—cognitive, behavioral, and environmental—functions as an important constituent in the dynamic environment. The cognitive determinant is indexed by self-beliefs of efficacy, personal goal setting, and quality of analytic thinking. The managerial choices that are actually executed constitute the behavioral determinant. The properties of the organizational environment, the level of challenge it prescribes, and its responsiveness to managerial interventions represent the environmental determinant. Analyses of ongoing processes clarify how the interactional causal structure operates and changes over time.

The interactional causal structure was tested in conjunction with experimentally varied organizational properties and belief systems that can enhance or undermine the operation of self-regulatory determinants. One important belief system is concerned with the conception of ability (M. M. Bandura & Dweck, 1988; Dweck & Leggett, 1988; Nicholls, 1984). Some people regard ability as an acquirable skill that can be increased by gaining knowledge and perfecting competencies. They adopt a functional learning goal. They seek challenges that provide opportunities to expand their knowledge and competencies. They regard errors as a natural part of an acquisition process. One learns from mistakes. They judge their capabilities more in terms of personal improvement than by comparison against the achievement of others. For people who view ability as a more or less fixed capacity, performance level is regarded as diagnostic of inherent cognitive capacities. Errors and deficient performances carry high evaluative threat. Therefore, they prefer tasks that minimize errors and permit ready display of intellectual proficiency at the expense of expanding their knowledge and competencies. High effort is also threatening because it presumably reveals low ability. The successes of others belittle their own perceived ability.

We instilled these different conceptions of ability and then examined their effects on the self-regulatory mechanisms governing the utilization of skills and performance accomplishments (Wood & Bandura, 1989a). Managers who viewed decision-making ability as reflecting basic cognitive aptitude were beset by increasing self-doubts about their managerial efficacy as they encountered problems (Figure 6). They became more and more erratic in their analytic thinking, they lowered their organizational aspirations, and they achieved progressively less with the organization they were managing. In contrast, construal of ability as an acquirable skill fostered a highly resilient sense of personal efficacy. Under this belief system, the managers remained steadfast in their perceived managerial self-efficacy even when performance standards were difficult to fulfill, they continued to set themselves challenging organizational goals, and they used analytic strategies in efficient ways that aided discovery of optimal managerial decision rules. Such a self-efficacious orientation paid off in high organizational attainments. Viewing ability as an inherent capacity similarly lowers
Figure 6 Changes in perceived managerial for the organization relative to the preset standard, effective use of analytic strategies, and achieved level of organizational performance across blocks of production trials under conceptions of ability as an acquirable skill or as an inherent aptitude. Each trial block comprises six different production orders (Wood & Bandura, 1989a).
Figure 7 Changes in strength of perceived managerial self-efficacy, the performance goals set for the organization, and level of organizational performance for managers who operated under a cognitive set that organizations are controllable or difficult to control. Each trial block comprises six different production orders (Bandura & Wood, 1989).
perceived self-efficacy, retards physical skill development and diminishes interest in the activity (Jourden, Bandura, & Banfield, 1991).

Another important belief system that affects how efficacy-relevant information is cognitively processed is concerned with people's beliefs about the extent to which their environment is influenceable or controllable. This aspect to the exercise of control represents the level of system constraints, the opportunity structures to exercise personal efficacy, and the ease of access to those opportunity structures. Our organizational simulation research underscores the strong impact of perceived controllability on the self-regulatory factors governing decision making that can enhance or impede performance (Bandura & Wood, 1989). People who managed the simulated organization under a cognitive set that organizations are not easily changeable quickly lost faith in their decision-making capabilities even when performance standards were within easy reach (Figure 7). They lowered their aspirations. Those who operated under a cognitive set that organizations are controllable displayed a strong sense of managerial efficacy. They set themselves increasingly challenging goals and used good analytic thinking for discovering effective managerial rules. They exhibited high resiliency of self-efficacy even in the face of numerous difficulties. The divergent changes in the self-regulatory factors are accompanied by large differences in organizational attainments.

Path analyses confirm the postulated causal ordering of self-regulatory determinants. When initially faced with managing a complex unfamiliar environment, people relied heavily on their past performance in judging their efficacy and setting their personal goals. But as they began to form a self-schema concerning their efficacy through further experience, the performance system is powered more strongly and intricately by self-perceptions of efficacy (Figure 8). Perceived self-efficacy influences performance both directly and through its strong effects on personal goal setting and proficient analytic thinking. Personal goals, in turn, enhance performance attainments through the mediation of analytic strategies.

As previously noted, people judge their capabilities partly through comparison with the performances of others. A further experiment in this series examined how different forms of social comparison affect the mediating self-regulatory mechanisms and organizational attainments (Bandura & Jourden, 1991). Different patterns of performance disparities were conveyed but the findings summarized here are concerned with two that are of special psychological interest. A progressive mastery pattern showed the managers performing below the comparison group at the outset but they gradually closed the gap and eventually surpassed their counterparts. A contrasting pattern of progressive decline showed the managers performing as well as their counterparts at the outset, but then they began to fall behind and ended well below the comparison group. Figure 9 summarizes the substantial impact of comparative appraisal on self-regulatory mechanisms and organizational attainment.
Figure 8 Path analysis of causal structures. The initial numbers on the paths of influence are the significant standardized path coefficients; the numbers in parentheses are the first-order correlations. The network of relations on the left half of the figure are for the initial managerial efforts, and those on the right half are for later managerial efforts (Wood & Bandura, 1989b).
Figure 9 Changes in perceived managerial self-efficacy, quality of analytic thinking, and achieved level of organizational performance across blocks of production orders under comparative appraisal suggesting progressive mastery or progressive decline relative to a similar comparison group (Bandura & Jourden, 1991).
Seeing oneself surpassed by similar social referents undermined perceived self-efficacy, disrupted analytic thinking, created unremitting self-discontent and increasingly impaired organizational attainments. By contrast, seeing oneself gain progressive mastery strengthened a sense of personal efficacy, fostered efficient analytic thinking, transformed self-evaluation from self-discontent to self-satisfaction with accelerating progress and enhanced organizational attainments. Path analysis confirms that the different performance trajectories are mediated by changes in self-regulatory factors.

Motivational Processes

Self-beliefs of efficacy play a central role in the self-regulation of motivation. Most human motivation is cognitively generated. In cognitive motivation, people motivate themselves and guide their actions anticipatorily through the exercise of forethought. They form beliefs about what they can do, they anticipate likely outcomes of prospective actions, they set goals for themselves and plan courses of action designed to realize valued futures.

One can distinguish three different forms of cognitive motivators around which different theories have been built. These include causal attributions, outcome expectancies, and cognized goals. The corresponding theories are attribution theory, expectancy-value theory, and goal theory, respectively. Figure 10 summarizes schematically these alternative conceptions of cognitive motivation. Outcome and goal motivators clearly operate through the anticipation mechanism. Causal reasons conceived retrospectively for prior attainments can also affect future actions anticipatorily by altering self-appraisal of capability and perception of task demands.

![Figure 10](image-url)  
**Figure 10** Schematic representation of conceptions of cognitive motivation based on cognized goals, outcome expectancies and causal attributions.
The self-efficacy mechanism of personal agency operates in all of these variant forms of cognitive motivation. Causal attributions and self-efficacy appraisals involve bidirectional causation. Self-beliefs of efficacy bias causal attribution (Alden, 1986; Collins, 1982; Silver, Mitchell, & Gist, 1989). The relative weight given to information regarding adeptness, effort, task complexity, and situational circumstances affects self-efficacy appraisal. Causal analyses indicate that the effects of causal attributions on performance attainments are mediated through self-efficacy beliefs rather than operate directly on performance (Relich, Debus, & Walker, 1986; Schunk & Cox, 1986; Schunk & Gunn, 1986; Schunk & Rice, 1986). The stronger the self-efficacy belief, the higher the subsequent performance attainments.

In expectancy-value theory, strength of motivation is governed jointly by the expectation that particular actions will produce specified outcomes and the value placed on those outcomes (Ajzen & Fishbein, 1980; Atkinson, 1964; Feather, 1982; Rotter, 1954). However, people act on their beliefs about what they can do, as well as their beliefs about the likely outcomes of various actions. The effects of outcome expectancies on performance motivation are partly governed by self-beliefs of efficacy. There are many activities which, if done well, guarantee valued outcomes, but they are not pursued by people who doubt they can do what it takes to succeed (Beck & Lund, 1981; Betz & Hackett, 1986). The predictiveness of expectancy-value theory can be enhanced by including the self-efficacy determinant (Ajzen & Madden, 1986; De Vries, Dijkstra, & Kuhlman, 1988; McCaul et al., 1988; Schwarzer, 1992; Wheeler, 1983).

The degree to which outcome expectations contribute independently to performance motivation varies depending on how tightly contingencies between actions and outcomes are structured, either inherently or socially, in a given domain of functioning. For many activities, outcomes are determined by level of accomplishment. Hence, the types of outcomes people anticipate depend largely on how well they believe they will be able to perform in given situations. In most social, intellectual, and physical pursuits, those who judge themselves highly efficacious will expect favorable outcomes, whereas those who expect poor performances of themselves will conjure up negative outcomes. Thus, in activities in which outcomes are highly contingent on quality of performance, self-judged efficacy accounts for most of the variance in expected outcomes. When variations in perceived self-efficacy are partialed out, the outcomes expected for given performances do not have much of an independent effect on behavior (Barling & Abel, 1983; Barling & Beattie, 1983; Godding & Glasgow, 1985; Lee, 1984a, 1984b; Williams & Watson, 1985).

Self-efficacy beliefs account for only part of the variance in expected outcomes when outcomes are not completely controlled by quality of performance. This occurs when extraneous factors also affect outcomes, or outcomes are socially tied to a minimum level of performance so that some variations in quality of performance above and below the standard do not produce differential outcomes. And finally, expected outcomes are independent of perceived self-
efficacy when contingencies are discriminatively structured so that no level of competence can produce desired outcomes. This occurs in pursuits that are rigidly segregated by sex, race, age or some other factor. Under such circumstances, people in disfavored groups expect poor outcomes however efficacious they judge themselves to be.

The capacity to exercise self-influence by personal challenge and evaluative reaction to one's own attainments provides a major cognitive mechanism of motivation and self-directedness (Bandura, 1991). A large body of evidence is consistent in showing that explicit challenging goals enhance and sustain motivation (Locke & Latham, 1990). Goals operate largely through self-referent processes rather than regulate motivation and action directly. Motivation based on aspirational standards involves a cognitive comparison process. By making self-satisfaction conditional on matching adopted goals, people give direction to their actions and create self incentives to persist in their efforts until their performances match their goals. They seek self-satisfactions from fulfilling valued goals and are prompted to intensify their efforts by discontent with substandard performances.

Activation of self-evaluation processes through cognitive comparison requires both comparative factors—a personal standard and knowledge of one's performance level. Simply adopting a goal, without knowing how one is doing, or knowing how one is doing in the absence of a goal, has no lasting motivational impact (Bandura & Cervone, 1983; Becker, 1978; Strang, Lawrence, & Fowler, 1978). But the combined influence of goals with performance feedback heightens motivation substantially.

Cognitive motivation based on goal intentions is mediated by three types of self-influences: affective self-evaluative reactions to one's performance, perceived self-efficacy for goal attainment, and adjustment of personal standards in light of one's attainments. Perceived self-efficacy contributes to motivation in several ways. It is partly on the basis of self-beliefs of efficacy that people choose what challenges to undertake, how much effort to expend in the endeavor, and how long to persevere in the face of difficulties (Bandura, 1986, 1991). When faced with obstacles and failures, people who have self-doubts about their capabilities slacken their efforts or abort their attempts prematurely and settle for mediocre solutions, whereas those who have a strong belief in their capabilities exert greater effort to master the challenge (Bandura & Cervone, 1983; Cervone & Peake, 1986; Jacobs et al., 1984; Peake & Cervone, 1989; Weinberg et al., 1979). Strong perseverance usually pays off in performance accomplishments.

As previously noted, affective self-reactions provide a dual source of incentive motivation—the anticipated self-satisfaction for personal accomplishment operates as a positive motivator and discontent with deficient performance functions as a negative motivator. The more self-dissatisfied people are with substandard attainments, the more they heighten their efforts. These two forms of self-motivators contribute differentially to performance accomplishments depending on the complexity of the activity. On tasks where success is attainable
solely by increased level of effort, self-discontent with substandard attainments is the major regulator of performance accomplishments (Bandura & Cervone, 1983, 1986). In contrast, on tasks that make heavy attentional and cognitive demands, self-satisfaction with personal progress toward challenging standards provides a positive motivational orientation for performance accomplishments. Strong self-critical reactions can detract from the intricate task of generating and testing alternative organizational strategies (Bandura & Jourden, 1991; Cervone, Jiwani, & Wood, 1991). As people approach or surpass the adopted standard, they set new goals for themselves that serve as additional motivators. The higher the self-set challenges, the more effort invested in the endeavor. Thus, notable attainments bring temporary satisfaction, but people who are assured of their capabilities enlist new challenges as personal motivators for further accomplishment.

The contribution of these self-reactive influences to motivation is strikingly revealed in a study that systematically varied the direction and magnitude of discrepancy between performance and a difficult assigned standard (Bandura & Cervone, 1986). Inspection of Figure 11 shows that the more sources of self-influence individuals brought to bear on themselves, the higher the effort they exerted and sustained to attain what they seek. Taken together this set of self-reactive influences accounts for the major share of variation in motivation.

![Figure 11](image_url)  
**Figure 11** Mean percent change in motivational level as a function of the number of self-reactive influences operating in given individuals. The three self-reactive factors included strong perceived self-efficacy for goal attainment; self-dissatisfaction with substandard performance; and adoption of challenging standards. Plotted from data of Bandura & Cervone, 1986.
Many theories of motivation and self-regulation are founded on a negative feedback control model (Carver & Scheier, 1981; Lord & Hanges, 1987; Miller, Galanter, & Pribram, 1960). This type of system functions as a motivator and regulator of action through a discrepancy reduction mechanism. Perceived discrepancy between performance and a reference standard motivates action to reduce the incongruity. Discrepancy reduction clearly plays a central role in any system of self-regulation. However, in the negative feedback control system, if performance matches the standard the person does nothing. Such a feedback control system would produce circular action that leads nowhere. Nor could people be stirred to action until they received feedback that their performance is negatively discrepant from the standard.

Self-regulation by negative discrepancy tells only half the story and not necessarily the more interesting half. People are proactive, aspiring organisms. Their capacity for forethought enables them to organize and regulate their lives proactively. Human self-motivation relies on both discrepancy production and discrepancy reduction (Bandura, 1991). It requires proactive control as well as reactive control. People motivate and guide their actions through proactive control by setting themselves valued challenging standards that create a state of disequilibrium and then mobilizing their effort on the basis of anticipatory estimation of what it would take to reach them. Reactive feedback control comes into play in subsequent adjustments of effort to attain desired results. As previously shown, after people attain the standard they have been pursuing, those with a strong sense of efficacy set a higher standard for themselves. Adopting further challenges creates new motivating discrepancies to be mastered. Similarly, surpassing a standard is more likely to raise aspiration than to lower subsequent performance to conform to the surpassed standard. Self-regulation of motivation and action thus involves a hierarchical dual control process of disequilibrating discrepancy production followed by equilibrating discrepancy reduction.

There is a growing body of evidence that human attainments and positive well-being require an optimistic sense of personal efficacy (Bandura, 1986). This is because ordinary social realities are strewn with difficulties. They are full of impediments, failures, adversities, setbacks, frustrations, and inequities. People must have a robust sense of personal efficacy to sustain the perseverant effort needed to succeed. Self-doubts can set in fast after some failures or reverses. The important matter is not that difficulties arouse self-doubt, which is a natural immediate reaction, but the speed of recovery of perceived self-efficacy from difficulties. Some people quickly recover their self-assurance, others lose faith in their capabilities. Because the acquisition of knowledge and competencies usually requires sustained effort in the face of difficulties and setbacks, it is resiliency of self-belief that counts.

In his informative book, titled Rejection, John White (1982) provides vivid testimony that the striking characteristic of people who have achieved eminence in their fields is an inextinguishable sense of efficacy and a firm belief in the
worth of what they are doing. This resilient self-belief system enabled them to override repeated early rejections of their work.

Many of our literary classics brought their authors repeated rejections. The novelist, Saroyan, accumulated several thousand rejections before he had his first literary piece published. James Joyce's, the Dubliners, was rejected by 22 publishers. Gertrude Stein continued to submit poems to editors for about 20 years before one was finally accepted. Now that's invincible self-efficacy. Over a dozen publishers rejected a manuscript by e. e. cummings. When he finally got it published by his mother the dedication, printed in upper case, read: With no thanks to... followed by the list of 16 publishers who had rejected his offering.

Early rejection is the rule, rather than the exception, in other creative endeavors. The Impressionists had to arrange their own art exhibitions because their works were routinely rejected by the Paris Salon. Van Gogh sold only one painting during his life. Rodin was rejected repeatedly by the Ecole des Beaux-Arts. The musical works of most renowned composers were initially greeted with derision. Stravinsky was run out of town by an enraged audience and critics when he first served them the Rite of Spring. Many other composers suffered the same fate, especially in the early phases of their career. The brilliant architect, Frank Lloyd Wright, was one of the more widely rejected architects during much of his career.

To turn to more familiar examples, Hollywood initially rejected the incomparable Fred Astaire for being only "a balding, skinny actor who can dance a little." Decca Records turned down a recording contract with the Beatles with the nonprophetic evaluation, "We don't like their sound. Groups of guitars are on their way out." Whoever issued that rejective pronouncement must cringe at each sight of a guitar. After Decca Records got through rejecting the Beatles, Columbia Records followed suit with a prompt rejection.

It is not uncommon for authors of scientific classics to experience repeated initial rejection of their work, often with hostile embellishments if it is too discordant with what is in vogue at the time. For example, John Garcia, who eventually won well-deserved recognition for his fundamental psychological discoveries, was once told by a reviewer of his oft rejected manuscripts that one is no more likely to find the phenomenon he discovered than bird droppings in a cuckoo clock. Verbal droppings of this type demand tenacious self-belief to continue the tortuous search for new Muses. Scientists often reject theories and technologies that are ahead of their time. Because of the cold reception given to most innovations, the time between conception and technical realization typically spans several decades.

The findings of laboratory investigations are in accord with these records of human triumphs regarding the centrality of the motivational effects of self-beliefs of efficacy in human attainments. It takes a resilient sense of efficacy to override the numerous dissuading impediments to significant accomplishments.
It is widely believed that misjudgment breeds dysfunction. The functional value of veridical self-appraisal depends on the nature of the endeavor. In activities where the margins of error are narrow and missteps can produce costly or injurious consequences, personal well-being is best served by highly accurate self-appraisal. It is a different matter when difficult accomplishments can produce substantial personal or social benefits and where the personal costs involve time, effort and expendable resources. Individuals have to decide for themselves which creative abilities to cultivate, whether to invest their efforts and resources in endeavors that are difficult to fulfill, and how much hardship they are willing to endure for pursuits strewn with obstacles.

In most endeavors, optimistic self-appraisals of capability that are not unduly disparate from what is possible can be advantageous, whereas veridical judgments can be self-limiting. When people err in their self-appraisal they tend to overestimate their capabilities. This is a benefit rather than a cognitive failing to be eradicated. If self-efficacy beliefs always reflected only what people can do routinely, they would rarely fail but they would not mount the extra effort needed to surpass their ordinary performances. The emerging evidence indicates that the successful, the innovative, the sociable, the nonanxious, the nondespondent, and the social reformers take an optimistic view of their personal efficacy to exercise influence over events that affect their lives (Bandura, 1986). If not unrealistically exaggerated, such self-beliefs enhance and sustain the level of motivation needed for personal and social accomplishments. Societies enjoy considerable benefits from the eventual accomplishments of its persisters.

Affective Processes

The self-efficacy mechanism also plays a pivotal role in the self-regulation of affective states. One can distinguish three principal ways in which self-efficacy beliefs affect the nature and intensity of emotional experiences. Such beliefs create attentional biases and influence how emotive life events are construed and cognitively represented; they operate in the exercise of control over perturbing thought patterns; and they sponsor courses of action that transform environments in ways that alter their emotive potential. These alternative paths of affective influence are amply documented in the self-regulation of anxiety arousal and depressive mood.

In social cognitive theory (Bandura, 1986), perceived self-efficacy to exercise control over potentially threatening events plays a central role in anxiety arousal. Threat is not a fixed property of situational events. Nor does appraisal of the likelihood of aversive happenings rely solely on reading external signs of danger or safety. Rather, threat is a relational property concerning the match between perceived coping capabilities and potentially hurtful aspects of the environment. Therefore, to understand people's appraisals of external threats and their affective reactions to them it is necessary to analyze their judgments of their
coping capabilities which, in large part, determine the subjective perilousness of environmental events.

People who believe they can exercise control over potential threats do not conjure up apprehensive cognitions and, hence, are not perturbed by them. But those who believe they cannot manage potential threats experience high levels of anxiety arousal. They dwell on their coping deficiencies, view many aspects of their environment as fraught with danger, magnify the severity of possible threats and worry about perils that rarely, if ever, happen. Through such inefficacious thought they distress themselves and constrain and impair their level of functioning (Beck, Emery, & Greenberg, 1985; Lazarus & Folkman, 1984; Meichenbaum, 1977; Sarason, 1975).

That perceived coping efficacy operates as a cognitive mediator of anxiety and stress reactions has been tested by creating different levels of perceived self-efficacy and relating them at a microlevel to different manifestations of anxiety. People display little affective arousal while coping with potential threats they regard with high efficacy. But as they cope with threats for which they distrust their coping efficacy, their stress mounts, their heart rate accelerates, their blood pressure rises, and they display increased catecholamine secretion (Bandura et al., 1982; Bandura, Taylor, Williams, Mefford, & Barchas, 1985). After perceived efficacy is strengthened to the maximal level by guided mastery, previously intimidating tasks no longer elicit differential autonomic or catecholamine reactions.

The foregoing discussion documents how perceived coping self-efficacy affects the neurobiological aspects of emotional states. The types of biochemical reactions that have been shown to accompany a weak sense of coping efficacy, such as autonomic and catecholamine activation, are involved in the regulation of immune systems. Perceived self-inefficacy in exercising control over stressors also activates endogenous opioid systems (Bandura, Cioffi, Taylor, & Brouillard, 1988). Some of the immunosuppressive effects of inefficacy in controlling stressors are mediated by release of endogenous opioids (Shavit & Martin, 1987). When opioid mechanisms are blocked by an opiate antagonist, the stress of uncontrollability loses its immunosuppressive power. These combined findings identify some of the neurobiological paths through which perceived self-efficacy can affect immunoregulatory processes.

Several converging lines of evidence show that exposure to stressors without the ability to control them impairs the immune system (Coe & Levine, 1991; Maier, Laudenslager, & Ryan, 1985). However, stress activated in the process of acquiring controlling mastery may have very different effects than stress in aversive situations with no prospect in sight of ever gaining any self-protective efficacy. This view receives some support from examination of immunological changes accompanying self-efficacy enhancement through guided mastery experiences (Wiedenfeld et al., 1990). The rate with which people acquired a sense of controlling efficacy was a good predictor of whether exposure to acute stressors enhanced or suppressed various components of the immune system.
Development of a strong sense of efficacy to control phobic stressors had an immunoenhancing effect. A slow growth of perceived self-efficacy attenuated components of the immune system.

Anxiety arousal in situations involving some risks is affected not only by perceived coping efficacy, but also by perceived efficacy to control distressing cognitions. The exercise of control over one’s own consciousness is summed up well in the proverb: “You cannot prevent the birds of worry and care from flying over your head. But you can stop them from building a nest in your head.” Perceived self-efficacy in thought control is a key factor in the regulation of cognitively-generated arousal. It is not the sheer frequency of disturbing cognitions, but the perceived inability to turn them off that is the major source of distress (Churchill, 1990; Churchill & McMurray, 1990; Kent, 1987; Salkovskis & Harrison, 1984). Thus, the incidence of aversive cognitions is unrelated to anxiety level when variations in perceived thought control efficacy are controlled for, whereas perceived thought control efficacy is strongly related to anxiety level when extent of frightful cognitions is controlled (Kent & Gibbons, 1987).

The dual regulation of anxiety arousal and behavior by perceived coping efficacy and thought control efficacy is revealed in a study of the mechanisms governing personal empowerment over pervasive social threats (Ozer & Bandura, 1990). Sexual violence toward women is a prevalent problem. Because any woman may be a victim, the lives of many women are distressed and constricted by a sense of inefficacy to cope with the threat of sexual assault. Such concerns often preoccupy their thinking in situations posing potential risks. To address this problem at a self-protective level, women participated in a mastery modeling program in which they perfected the physical skills to defend themselves successfully against sexual assailants. Mastery modeling enhanced perceived coping efficacy and cognitive control efficacy, decreased perceived vulnerability to assault and reduced the incidence of intrusive aversive thoughts and anxiety arousal. These changes were accompanied by increased freedom of action and decreased avoidant social behavior. Path analysis of the causal structure revealed a dual path of regulation of behavior by perceived self-efficacy: One path was mediated through the effects of perceived coping self-efficacy on perceived vulnerability and risk discernment, and the other through the impact of perceived cognitive control self-efficacy on intrusive aversive thoughts (Figure 12). A strong sense of coping efficacy rooted in performance capabilities has substantial impact on perceived self-efficacy to abort the escalation or perseveration of perturbing cognitions.

Perceived coping efficacy regulates avoidance behavior in risky situations, as well as anxiety arousal. The stronger the perceived coping self-efficacy the more venturesome the behavior, regardless of whether self-beliefs of efficacy are strengthened by mastery experiences, modeling influences, or cognitive simulations (Bandura, 1988). The role of perceived self-efficacy and anxiety arousal in the causal structure of avoidant behavior has been examined in a number of studies. The results show that people base their actions on self-beliefs of efficacy
in situations they regard as risky. Williams and his colleagues (Williams, Dooseman, & Kleifield, 1984; Williams, Kinney, & Falbo, 1989; Williams & Rappoport, 1983; Williams, Turner, & Peer, 1985) have analyzed by partial correlation numerous data sets from studies in which perceived self-efficacy, anticipated anxiety, and phobic behavior were measured. Perceived self-efficacy accounts for a substantial amount of variance in phobic behavior when anticipated anxiety is partialed out, whereas the relationship between anticipated anxiety and phobic behavior essentially disappears when perceived self-efficacy is partialed out (Table 1). Studies of other threatening activities similarly demonstrate the predictive superiority of perceived self-efficacy over perceived dangerous outcomes in level of anxiety arousal (Hackett & Betz, 1984; Leland, 1983; McAuley, 1985; Williams & Watson, 1985).

The data taken as a whole indicate that anxiety arousal and avoidant behavior are largely coeffects of perceived coping inefficacy rather than causally linked. People avoid potentially threatening situations and activities, not because they experience anxiety arousal or anticipate they will be anxious, but because they believe they will be unable to cope successfully with situations they regard as risky. They take self-protective action regardless of whether or not they happen to be anxious at the moment. They do not have to conjure up an anxious state before they can take action. They commonly perform risky activities at lower strengths of perceived self-efficacy despite high anxiety arousal (Bandura, 1988).

Perceived self-efficacy to exercise control can give rise to despondency as well as anxiety. The nature of the outcomes over which personal control is sought operates as an important differentiating factor. People experience anxiety when they perceive themselves ill equipped to control potentially injurious events. Attenuation or control of aversive outcomes is central to anxiety. People are saddened and depressed by their perceived inefficacy in gaining highly valued outcomes. Irreparable loss or failure to gain valued outcomes figures
Table I
Comparison of the Relation Between Perceived Self-Efficacy and Coping Behavior When Anticipated Anxiety is Controlled, and the Relation Between Anticipated Anxiety and Coping Behavior When Perceived Self-Efficacy is Controlled

<table>
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<th>Perceived Self-Efficacy With Anticipated Anxiety Controlled</th>
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<td></td>
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<td>Follow-up</td>
<td>.06</td>
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</tr>
<tr>
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<td>Follow-up</td>
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</tr>
<tr>
<td>Kirsch et al. (1983)</td>
<td>Pretreatment</td>
<td>-.34*</td>
</tr>
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<td></td>
<td>Posttreatment</td>
<td>-.48**</td>
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<tr>
<td>Arnow et al. (1985)</td>
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Notes. \(^a\) The pretreatment phases of some of these experiments include only subjects selected for severe phobic behavior. They have a uniformly low sense of coping efficacy. In such instances, the highly restricted range of self-efficacy scores tends to lower the correlation coefficients in pretreatment phases. *p < .05, **p < .01, ***p < .001.
prominently in despondency. When the valued outcomes one seeks also protect against future aversive circumstances, as when failure to secure a job jeopardizes one's livelihood, perceived self-inefficacy is both distressing and depressing. Because of the interdependence of outcomes, both anxiety and despair often accompany perceived personal efficacy.

Several lines of evidence support the role of perceived self-inefficacy in depression. A sense of fulfillment and self-worth can have different sources, each of which is linked to an aspect of self-efficacy. Perceived self-inefficacy to attain valued goals that contribute to self-esteem and to secure things that bring satisfaction to one's life can give rise to bouts of depression (Bandura, 1991; Davis & Yates, 1982; Kanfer & Zeiss, 1983). A low sense of efficacy to fulfill role demands that reflect on personal adequacy also contributes to depression (Cutrona & Troutman, 1986; Olioff & Aboud, 1991).

Self-regulatory theories of motivation and of depression make seemingly contradictory predictions regarding the effects of negative discrepancies between attainments and standards invested with self-evaluative significance. Standards that exceed attainments are said to enhance motivation through goal challenges, but negative discrepancies are also invoked as activators of despondent mood. Moreover, when negative discrepancies do have adverse effects, they may give rise to apathy rather than to despondency. A conceptual scheme is needed that differentiates the conditions under which negative discrepancies will be motivating, depressing, or induce apathy.

In accord with social cognitive theory, the directional effects of negative goal discrepancies are predictable from the relationship between perceived self-efficacy for goal attainment and level of personal goal setting (Bandura & Abrams, 1986). Whether negative discrepancies are motivating or depressing depends on beliefs on one's efficacy to attain them. Negative disparities give rise to high motivation and low despondency when people believe they have the efficacy to fulfill difficult standards and continue to strive for them. Negative disparities diminish motivation and generate despondency for people who judge themselves as ineffectual to attain difficult standards but continue to demand them of themselves as the basis for self-satisfaction. People who view difficult goals as beyond their capabilities and abandon them as unrealistic for themselves become apathetic rather than despondent.

Supportive interpersonal relations can reduce the aversiveness of negative life events that give rise to stress and depression. However, social support does more than simply operate as a buffer against stressors. In addition to its protective function, social support serves a positive proactive function in fostering coping competencies that alter the threat value of potential stressors. Analyses of causal structures reveal that perceived interpersonal self-efficacy and social support contribute bidirectionally to depression. Social support is not a fixed entity cushioning people against stressors. Rather people have to seek out, cultivate and maintain social networks. Indeed, the Holahans have shown that people with a high sense of social efficacy create social supports for themselves. Perceived
social self-efficacy reduces vulnerability to depression both directly and through the cultivation of socially supportive networks (Holahan & Holahan, 1987a, 1987b). Acquaintances model coping attitudes and strategies, provide incentives for beneficial courses of behavior, and motivate others by showing that difficulties are surmountable by perseverant effort. Social support enhances perceived self-efficacy which, in turn, fosters successful adaptation and reduces stress and depression (Cutrona & Troutman, 1986; Major et al., 1990). A strong sense of social efficacy thus facilitates development of socially supportive relationships and social support, in turn, enhances perceived self-efficacy for rendering adversities less depressogenic.

Much human depression is cognitively generated by dejecting thought patterns. Therefore, perceived self-efficacy to exercise control over ruminative thought figures prominently in the occurrence, duration, and recurrence of depressive episodes. Kavanagh and Wilson (1989) found that the weaker the perceived efficacy to terminate ruminative thoughts the higher the depression \(r = -.51\), and the stronger the perceived thought control efficacy instilled by treatment the greater the decline in depression \(r = .71\) and the lower the vulnerability to recurrence of depressive episodes \(r = -.48\). Perceived self-efficacy retains its predictiveness of improvement and reduced vulnerability to depressive relapse when level of prior depression is controlled.

The preceding analysis centers on the path of influence from perceived self-inefficacy to depression. Mood states bias the way in which events are interpreted, cognitively organized, and retrieved from memory (Bower, 1983; Isen, 1987). Mood and self-efficacy influence each other bidirectionally. Perceived self-inefficacy breeds depression. Despondent mood diminishes perceived self-efficacy, positive mood enhances it (Kavanagh & Bower, 1985). People then act in accordance with their mood altered efficacy beliefs, choosing more challenging activities in a self-efficacious frame of mind than if they doubt their efficacy (Kavanagh, 1983). Despondency can thus lower self-efficacy beliefs, which undermine motivation and spawn deficient performances, causing even deeper despondency. In contrast, by raising perceived self-efficacy that facilitates motivation, aidful cognitive self-guidance and accomplishments, positive mood can set in motion an affirmative reciprocal process.

Selection Processes

People can exert some influence over their life paths by the environments they select and the environments they create. Thus far, the discussion has centered on efficacy-related processes that enable people to create beneficial environments and to exercise control over them. Judgments of personal efficacy also shape developmental trajectories by influencing selection of activities and environments. People tend to avoid activities and situations they believe exceed their coping capabilities, but they readily undertake challenging activities and pick social environments they judge themselves capable of handling. Any factor that
influences choice behavior can profoundly affect the direction of personal development. This is because the social influences operating in selected environments continue to promote certain competencies, values, and interests long after the decisional determinant has rendered its inaugurating effect (Bandura, 1986; Snyder, 1987). Thus, seemingly inconsequential efficacy determinants of choices can initiate selective associations that produce major and enduring personal changes. Selection processes are differentiated from cognitive, motivational and affective processes because, in prompt dismissal of certain courses of action on grounds of perceived personal ineffectiveness, the latter regulative processes never come into play. It is only after people choose to engage in an activity that they mobilize their effort, generate possible solutions and strategies of action and become elated, anxious, or depressed over how they are doing.

The power of self-efficacy beliefs to affect the course of life paths through choice-related processes is most clearly revealed in studies of career decision-making and career development (Betz & Hackett, 1986; Lent & Hackett, 1987). The stronger people's self-belief in their capabilities, the more career options they consider possible, the greater the interest they show in them, the better they prepare themselves educationally for different pursuits and the more successful they are at them. A high sense of decisional self-efficacy is also accompanied by a high level of exploratory activity designed to aid selection of pursuits (Blustein, 1989).

Biased cultural practices, stereotypic modeling of gender roles, and dissuading opportunity structures eventually leave their mark on women's beliefs about their occupational efficacy (Hackett & Betz, 1981). Women are especially prone to limit their interests and range of career options by self-beliefs that they lack the necessary capabilities for occupations traditionally dominated by men, even though they do not differ from men in actual ability. The self-limitation of career development arises from perceived ineffectiveness, rather than from actual inability. By constricting choice behavior that can cultivate interests and competencies, self-disbeliefs create their own behavioral validation and protection from corrective influence. However, changes in cultural attitudes and practices may be weakening self-efficacy barriers. Students currently coming through the school ranks reveal a much smaller disparity between males and females in their beliefs about their efficacy to pursue successfully different types of careers (Post-Kammer & Smith, 1985).

Self-efficacy beliefs contribute to the course of social development as well as occupational pursuits (Perry, Perry & Rasmussen, 1986). The developmental processes undoubtedly involve bidirectional causation. Beliefs of personal capabilities determine choice of associates and activities, and affiliation patterns, in turn, affect the direction of self-efficacy development.

Construction of Self-Efficacy as a Self-Persuasion Process

The multiple benefits of a sense of personal efficacy do not arise simply from the incantation of capability. Saying something should not be confused with
believing it to be so. Simply saying that one is capable is not necessarily self­
convincing, especially when it contradicts preexisting beliefs. For example, no
amount of reiteration that I can fly, will persuade me that I have the efficacy to
get myself airborne. Self-efficacy beliefs are the product of a complex process of
self-persuasion that relies on cognitive processing of diverse sources of efficacy
information conveyed enactively, vicariously, socially, and physiologically
(Bandura, 1986). People cannot persuade themselves of their efficacy if they
regard the information from which they construct their self-beliefs as
unrepresentative, tainted or erroneous.

The cognitive processing of efficacy information involves two separable
functions: The first concerns the types of information people attend to and use as
indicators of personal efficacy. Each of the four modes of conveying information
about personal capabilities has its distinctive set of efficacy indicators. The
second function concerns the combination rules or heuristics people use to weight
and integrate efficacy information from different sources in forming their self­
efficacy beliefs. Self processes govern the construction of such belief systems at
the level of selection, interpretation, and integration of efficacy-relevant
information.

Converging lines of evidence indicate that the self-efficacy mechanism plays
a central role in the exercise of personal agency. The value of a psychological
theory is judged not only by its explanatory and predictive power, but also by its
operative power to enhance the quality of human functioning. Social cognitive
theory provides prescriptive specificity on how to empower people with the
competencies, self-regulatory capabilities and resilient self-belief of efficacy that
enables them to enhance their psychological well-being and accomplishments.

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**Author Notes**

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TWO DIMENSIONS OF PERCEIVED SELF-EFFICACY: COGNITIVE CONTROL AND BEHAVIORAL COPING ABILITY

William J. McCarthy
and Michael D. Newcomb

Confirmatory factor analyses were conducted to test the empirical justification for distinguishing between perceptions of behavioral coping ability and perceptions of cognitive control coping ability for handling environmental challenges. Twenty-four measures of perceived personal effectiveness were collected from 739 young adults, including measures of perceived ability to have a social impact, assertiveness, leadership style, and dating competence. These items were submitted to a hierarchical confirmatory factor analysis in a random half of the sample. As expected, two empirically well-justified second order factors were obtained reflecting perceived cognitive control and behavioral coping strategies. This factor structure was cross-validated in the other half of the sample, and separately for males and females, with all hypothesized features confirmed. Literature on coping strategies, on sex role differences and on self-efficacy predictors is cited as support for distinguishing between perceived cognitive control and perceived behavioral coping abilities. Implications of this distinction for elucidating developmental patterns of drug use and for improving understanding of relapse in lifestyle change programs are discussed.

Why do individuals rely primarily on intrapsychic coping in some contexts and behavioral coping in other contexts? Suppose that a middle-aged woman whose children have grown and left home is distressed to find that her husband pays her inadequate attention, responding perfunctorily to her comments and showing more enthusiasm for newspaper reading and TV watching than for talking with her. Her perceived ability to cope cognitively with this situation may be high or low. If it is high, then by merely reframing her thoughts, she can palliate or eliminate her distress, perhaps by thinking of evidence that she is indeed an interesting person and that her husband pays her no attention because he is preoccupied by his work. If it is low, then the distressful observation that her husband finds her boring will intrude on her thoughts unless the situation changes.
Similarly, her perceived ability to cope behaviorally with the situation may be high or low. If it is high, she may elect to leave him or feel confident that she can alter his behavior. If it is low, she will feel that the situation is inescapable and that all of her alternatives are less attractive than the status quo.

Perceptions of personal coping ability have been related to a wide range of health-related outcomes, including smoking cessation, weight control, alcohol abuse, exercise, and contraceptive behavior (e.g., Strecher, DeVellis, Becker, & Rosenstock, 1986, and O'Leary, 1985). As individuals' self-percepts of coping ability increase, so does the probability of their achieving self-set health goals.

Between the identification of an important self-relevant goal and the ultimate achievement of the goal are interposed challenges with which the individual must cope. These challenges may be primarily cognitive or primarily behavioral in nature. The coping behaviors appropriate for dealing with these challenges have been termed emotion-focused or problem-focused (e.g., Folkman & Lazarus, 1980). Emotion-focused coping includes such behaviors as avoidance, intellectualization, isolation, suppression, and magical thinking. Problem-focused coping includes such behaviors as information-seeking, cognitive problem-solving, inhibition of action and direct action. The perception that one can effectively implement emotion-focused or problem-focused coping can be termed perceived cognitive control ability and perceived behavioral coping ability, respectively.

Other literature on coping has promoted a distinction between behavioral and cognitive ways of coping. For example, Pearlin and Schooler (1978) discussed three major categories of coping responses, two of which involved cognitive strategies to reduce or eliminate stress, whereas the third concerned the active manipulation of the environment. In her review, Taylor (1986) identified four types of control that mediated the effects of coping with stressors, but concluded that these four types of control could be reduced to two: (a) changing thoughts with respect to the stressor, and (b) taking some action with respect to the stressor. If people differ in whether they rely primarily on cognitive or behavioral means of coping with a challenge, they also probably differ in their perceived ability to use either cognitive control or behavioral strategies for coping with the challenges. The following report seeks to confirm the validity and usefulness of distinguishing between perceived cognitive control and behavioral coping ability through confirmatory factor analysis of young adult data on coping strategies and through example.

Although we find it useful to distinguish between perceived cognitive control ability and perceived behavioral coping ability, we note that efficacious behavior is rarely a function exclusively of only one of these. Characteristics of the context (such as the amount of freedom individuals have to change the environment) and characteristics of the individual (such as age) determine which type of perceived coping ability is the more important contributor to self-perceived ability to perform the desired behavior.
In their study of adult responses to 1,332 stress episodes, Folkman and Lazarus (1980) noted that both problem-focused and emotion-focused coping were used to cope with 98% of the episodes. They also noted that the importance of the type of coping varied, however, with context and according to the characteristics of the individuals. Cognitive strategies were employed most frequently in situations where the individual was relatively helpless to bring about the desired behavior by themselves, such as when recovering from an illness. Problem-focused strategies were employed more frequently in work situations. Folkman and Lazarus found that the importance of type of coping varied with gender, with men relying more heavily than women on problem-focused coping even when the context permitted only emotion-focused coping. It should be noted, again, that distinguishing conceptually between perceived cognitive control and perceived behavioral coping ability should not imply that we view these concepts as independent. Folkman and Lazarus (1980), in fact, observed a mean correlation of .44 between emotion-focused and problem-focused coping across three different samples.

This study was designed to confirm the reasonableness of distinguishing generically between perceived cognitive coping ability and perceived behavioral coping ability as separate components of self-efficacy. The importance of this distinction, if accepted, is that it would be likely to stimulate more careful examination of the contextual, temporal, and individual influences on percepts of self-efficacy. Individuals may have similar perceptions concerning their respective abilities to accomplish their jobs or to effect major lifestyle changes, but nevertheless vary greatly in their perceived ability to cope with the behavioral or cognitive challenges associated with accomplishing the desired behavior. Moreover, within individuals the relative importance of perceived cognitive control and behavioral coping ability may vary with time, age and the individual's experience with coping with the specific challenge.

In settings such as prisons, where inmates would find that a problem-focused coping strategy is often inappropriate, individuals can still vary in their ability to cope with environmental stressors, depending on their perceived ability to regulate their thoughts. In the same vein, children's responses to environmental challenges often are limited to cognitive coping strategies because their dependency on adults and their immaturity are such as to obviate the use of behavioral coping strategies. A child who is sexually abused by an adult relative, for instance, typically relies on cognitive strategies to cope with the situation, especially disassociation, and later, amnesia (Courtois, 1988).

Contrariwise, the theoretical necessity for the separate concept of a perceived ability to cope behaviorally seems justified by attempts to relate the use of coping strategies to spontaneous major lifestyle change. Spontaneous major lifestyle changes, such as taking up jogging, reducing the percentage of calories in one's diet derived from fat, and adopting a child, put a premium on behavioral coping relative to cognitive control coping, because there are simply too many changes in day-to-day behaviors resulting from the major lifestyle change in question to
be anticipated cognitively. It is reasonable to assume that persons with strong beliefs in their general ability to change their social and physical environment will be more likely to embark on major voluntary lifestyle changes than are persons who perceive themselves as generally having weak behavioral coping strategies. When discussing the influences on adoption of major lifestyle change one has to speak of “general” ability because many of the specific challenges that follow the major lifestyle change are unanticipated at the time of the decision. Successful voluntary lifestyle change is often accompanied by multiple changes in how the individual interacts with her/his social and physical environment. A successful change in diet, for instance, will typically be accompanied by changes in shopping habits, changes in cooking habits, and changes in where, when and with whom to dine out. For predicting the success of major lifestyle change efforts, one’s ability to cope intrapsychically with specific challenges seems less relevant than one’s general ability to have a behavioral impact on one’s environment. This focus on “general” ability might seem inappropriate for a discussion of self-efficacy as it is classically defined (Bandura, 1977). This focus is consistent, however, with recent demonstrations that global judgments about a subject’s ability to train employees or to influence organizational performance can influence their perception of their own organizational ability (Bandura & Wood, 1989; Wood & Bandura, 1989) and subsequent organizational performance.

Description of Proposed Study

For this study, we followed the strategy of Ryckman, Thornton, and Cantrell (1982). A comprehensive range of 24 measures of personal effectiveness was administered to a community sample of young adults being followed in a longitudinal study of growth and development. These measures were submitted to a hierarchical, confirmatory factor analysis in a random half of the sample and cross-validated in the other half. Based on the literature discussed above, we hypothesized finding two second order factors of perceived behavioral ability (Perceived Behavioral Coping Ability) and perceived cognitive control ability to cope with environmental challenges (Perceived Cognitive Control Ability). Multiple assessments of personal effectiveness included measures of perceived ability to have a social impact, general assertiveness, dating competence, social support, depression, perceived loss of control, purpose in life, and leadership style. These were selected to provide a comprehensive range of measures of the subjects’ cognitive and behavioral skills and emotional states related to interpersonal relations. We expected that Perceived Behavioral Coping Ability would be reflected in first-order factors of social impact efficacy (perceived ability to have a social impact), general assertiveness, social resources, dating competence, and leadership style because these represent ways of behaviorally operating on the environment. On the other hand, we expected that Cognitive Control Coping Ability would be reflected in constructs of social impact efficacy, depression, purpose in life, and perceived loss of control because these involve internal coping or cognitive qualities. Expected social impact efficacy was expected to load
on both second-order factors because this measure included cognitive and behavioral coping items (Blatt, Quinlan, Chevron, McDonald, & Zuroff, 1982).

Table 1
Description of Sample

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The analyses proceeded in steps, first testing for sex differences on the measures. Then the adequacy of the hypothesized latent measurement model was tested followed by testing the second-order factor model of the primary-order latent variables. These analyses were conducted in the derivation sample, and then the second-order factor results were confirmed in the cross-validation sample, and in separate samples of men and women.

METHOD

Subjects

Participants in this study were 739 young adults who completed an eight-year (fifth wave data assessment point) longitudinal study of adolescent and young adult development. Data were collected initially from 1,634 students in the seventh, eighth, and ninth grades at 11 randomly-selected Los Angeles County schools. At this young adult follow-up, each participant was paid $12.50 to complete the questionnaire and all subjects were apprised of a grant of confidentiality given by the U.S. Department of Justice. Forty-five percent of the original sample participated as young adults. The loss of subjects due to attrition over the eight years has been shown not likely to bias the results adversely (Newcomb, 1986; Newcomb & Bentler, 1988a).

Table 1 presents a description of the sample. As evident, 30% were men and 70% were women, which parallels the sex distribution in the initial sample and does not reflect differential attrition by sex. Most were employed full-time and represented varied ethnic backgrounds. Additional information is provided about their current living arrangements, income, and current life pursuits. When these sample characteristics are compared with national samples of young adults (e.g., Bachman, O'Malley, & Johnston, 1984; Miller et al., 1983) or other studies of young adult populations (e.g., Donovan, Jessor, & Jessor, 1983; Kandel, 1984) very similar patterns emerged. Consequently, we consider this sample to be reasonably representative of young adults in general.

Measures

Table 2 presents a listing of the 24 variables used in this study. They are organized according to the latent construct they are hypothesized to reflect. For instance, the latent construct of Social Impact Efficacy is assumed to generate the variation in three observed indicators called inner resources, independence, and others' respect. For factors which tend to be unidimensional in nature, three measured-variable indicators were constructed from the items to reflect the latent factor or construct. This was done, since, as a rule, it is recommended to have at least three, highly correlated indicators to identify a latent construct (e.g., Bentler & Newcomb, 1986). This was done on the self-efficacy, dating competence, general assertiveness, and purpose of life factors. Standard univariate statistics
for each variable are also given in the table. Below we describe how each variable was assessed in regard to the latent construct it represents.

**Social impact efficacy.** Three scales are used to reflect the Social Impact Efficacy construct. These were derived from the five-item scale of efficacy developed by Blatt et al. (1982). Responses to these five items were given on a five-point anchored rating scale that ranged from *strongly disagree* (1) to *strongly agree* (5). The items were factor analyzed and found to reflect a unitary construct (only one eigenvalue greater than 1.00 and all factor loadings were greater than .4 on the first unrotated factor). As a result, these five items were combined into three scales based on content. Inner resources was assessed with a single item—"I have many inner resources." Independence was the average of two items—"I am a very independent person" and "I set my personal goals as high as possible." Others' respect was the average of two items—"Others have high expectations of me" and "What I do and say has a great impact on those around me."

**General assertiveness and dating competence.** Dating Competence was assessed by three scales (dating 1, dating 2, and dating 3) derived from a nine-item scale of social competence in dating situations. General Assertiveness was assessed by three scales (assertive 1, assertive 2, and assertive 3) obtained from a nine-item social assertiveness scale. The total Dating Competence and Social Assertiveness scales were developed by Levenson and Gottman (1978), and in several studies had quite good discriminant validity in both normal and clinic samples. In the derivation study the entire Dating Competence scale had an internal consistency reliability alpha of .92, while for the General Assertiveness scale the alpha was .85. Latent constructs derived from these scales have also been used in a study of sexual behavior and responsiveness (Newcomb, 1984).

**Social resources.** Three questions were asked to determine the quantity or amount of social supports as perceived in three life contexts. The first item asked "How many clubs, groups, or organizations do you belong to (including church groups)?" The second item asked "How many friends do you really feel close to?" And the third item asked "How many family members or relatives can you talk to about things personal to you?" Responses were given on a rating scale that ranged from none to nine or more. These items were specifically developed for this research project, but are similar to standard measures of social support that focus on amount of social resources and correlate quite highly with satisfaction with social support from various types of social networks (Newcomb & Bentler, 1988b).

**Depression.** The 20-item depression scale from the Center for Epidemiologic Study of Depression (CES-D) was completed by all subjects. The development, validities, and reliabilities of the measure have been reported elsewhere (Husaini, Neff, Harrington, Hughes, & Stone, 1980; Radloff, 1977; Weissman, Sholomskas, Pottenger, Prusoff, & Locke, 1977). Participants were asked to rate their frequency of occurrence for each of the 20 symptom items during the past week on a scale from *none* (0) to *5-7 days* (3). The 20 items were factor
analyzed in this sample and found to contain four distinct factors, which is consistent with previous attempts to determine the factor structure of the CES-D (e.g., Clark, Aneshensel, Frerichs, & Morgan, 1981; Radloff, 1977; Roberts, 1980). The four factors included positive affect, negative affect, impaired motivation, and impaired relationships. Items were averaged into the respective four factors and were used as indicators of a general latent construct of Depression.

Perceived loss of control. Three single-item variables are hypothesized to reflect the construct of Perceived Loss of Control. Subjects were asked to rate their degree of agreement with three statements: (1) “I feel I am not in control of my life,” (2) “I feel that whether or not I am successful is just a matter of luck and chance, rather than my own doing,” and (3) “I feel that others are running my life for me.” Responses were given on a seven-point anchored rating scale that ranged from strongly disagree (1) to strongly agree (7). Cronbach’s alpha for these three items was .65. This construct assesses a general lack of control over life events, and has been validated in other samples and studies (Newcomb, 1986; Newcomb & Harlow, 1986).

Purpose in life. The Purpose in Life test (Crumbaugh, 1968; Crumbaugh & Maholic, 1964, 1969) consists of 20 items designed to assess one’s level of or purpose in life. Each item was rated on a seven-point anchored rating scale ranging from strongly disagree (1) to strongly agree (7). Previous research on the Purpose in Life test indicated that it contains several small primary factors and one large general factor (Harlow, Newcomb, & Bentler, 1987). For purposes of this study, the 20 items were randomly assigned into three scales (PIL 1, PIL 2, and PIL 3) which were used as manifest indicators of a latent construct of Purpose in Life.

Leadership style. Two personality scales, ambition and leadership, were used to reflect the construct of Leadership Style. These traits were assessed using a self-rating test modified for this research program, but based on the Bentler Psychological Inventory (BPI; Bentler & Newcomb, 1978; Huba & Bentler, 1982). Although the BPI was developed with multivariate methods, the items have a high degree of face validity. Half of the items for each trait are reverse-scored to minimize response bias or acquiescence. Four items were used to assess each trait and each item was rated on a 5-point bipolar scale. Thus, each scale had a range of 4 to 20. The BPI has proved useful in studies of marital success and failure (Bentler & Newcomb, 1978), criminal behavior (Huba & Bentler, 1983), and adolescent substance use (Huba & Bentler, 1982). The period-free test-retest reliability for ambition was .72 and the reliability for leadership was .71 (Stein, Newcomb, & Bentler, 1986).

Analyses

Our first set of analyses use point-biserial correlations to test for mean differences between men and women on each of the 24 variables. We next use a confirmatory factor analysis with latent variables to evaluate the adequacy of the
hypothesized factor structure (e.g., Bentler, 1980; Bentler & Newcomb, 1986), in a random half of the sample, which we call the derivation sample. An inspection of the skew and kurtosis estimates for the 24 observed measures indicates that they are relatively normally distributed. As a result we will use the maximum likelihood structural model estimator, which requires multivariately normal data (e.g., Bentler, 1983, 1986). If the initial hypothesized model does not adequately reflect the data (which is common in models with many variables and many subjects), we will modify the model until an acceptable fit is achieved, in a manner which will not disturb the critical features of the model. These empirical model modifications will be guided by the multivariate Lagrangian Multiplier test for adding parameters and the multivariate Wald test for deleting parameters (Bentler & Chou, 1986). Once this is accomplished, we will attempt to confirm our two hypothesized second-order constructs in this model, making modifications where necessary. This final model will be tested separately in the other random half of our sample (called the cross-validation sample), as well as the samples of men and women to determine whether the second-order factor structure is an accurate representation in these samples. The final model will also be tested in the original derivation sample, but without the empirical modifications to establish whether the model modifications may have distorted or biased the final results.

RESULTS

Sex Differences

Mean differences between men and women on the 24 variables were tested using point-biserial correlations. Males were coded 1 and females were coded 2, so that a positive correlation indicates that the women had the larger value and a negative correlation indicates that the men had the larger value. These mean difference correlations are presented in the right-hand column of Table 2.

Of the 24 variables, significant mean differences were found on 14 of them. These differences indicate that the women, compared to the men, felt that they had fewer inner resources, less independence, less respect from others, less assertiveness (on all three scales), a smaller number of friends they could rely on, less positive affect, more negative affect, more impaired motivation, others controlled her life more, slightly less dating competence (only one scale significantly different), less ambition, and fewer leadership qualities. Although there were many mean differences between the men and women, the magnitude of these differences was quite small. For instance, the largest difference accounted for only four percent of the variance between groups (on ambition). Based on these rather small in magnitude mean differences between men and women, and previous results indicating that there were not different factor structures for men and women on social support and loneliness variables (Newcomb & Bentler, 1986) and on physical health status indicators (Newcomb & Bentler, 1987), we will collapse across sex for the bulk of the remaining analyses. However, we will test our final
model in the separate samples of men and women to determine whether we may have obscured any important findings by combining the men with the women.

Table 2
**Summary of Variable Characteristics and Sex Mean Difference Tests**

<table>
<thead>
<tr>
<th>Factor/Variable</th>
<th>Mean</th>
<th>Range</th>
<th>SD</th>
<th>Skew</th>
<th>Kurtosis</th>
<th>Difference $r_{pb}^{a}$</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Social Impact Efficacy</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inner resources</td>
<td>3.87</td>
<td>1-5</td>
<td>.75</td>
<td>-.55</td>
<td>.61</td>
<td>-.18***</td>
</tr>
<tr>
<td>Independence</td>
<td>3.86</td>
<td>1-5</td>
<td>.76</td>
<td>-.76</td>
<td>.41</td>
<td>-.11**</td>
</tr>
<tr>
<td>Others respect</td>
<td>3.64</td>
<td>1-5</td>
<td>.62</td>
<td>-.39</td>
<td>.56</td>
<td>-.08*</td>
</tr>
<tr>
<td><strong>General Assertiveness</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assertive 1</td>
<td>8.89</td>
<td>4-13</td>
<td>1.84</td>
<td>-.13</td>
<td>-.38</td>
<td>-.13**</td>
</tr>
<tr>
<td>Assertive 2</td>
<td>9.07</td>
<td>4-14</td>
<td>1.90</td>
<td>.03</td>
<td>-.32</td>
<td>-.18***</td>
</tr>
<tr>
<td>Assertive 3</td>
<td>8.74</td>
<td>4-14</td>
<td>1.87</td>
<td>.05</td>
<td>-.24</td>
<td>-.09*</td>
</tr>
<tr>
<td><strong>Social Resources</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of family members</td>
<td>3.48</td>
<td>0-9</td>
<td>2.44</td>
<td>.91</td>
<td>.12</td>
<td>.02</td>
</tr>
<tr>
<td>Number of friends</td>
<td>4.04</td>
<td>0-9</td>
<td>2.34</td>
<td>.71</td>
<td>-.10</td>
<td>-.14***</td>
</tr>
<tr>
<td>Number of organizations</td>
<td>1.34</td>
<td>0-9</td>
<td>1.36</td>
<td>1.21</td>
<td>2.54</td>
<td>-.06</td>
</tr>
<tr>
<td><strong>Depression (CES-D)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive affect</td>
<td>2.34</td>
<td>0-3</td>
<td>.64</td>
<td>-.96</td>
<td>.32</td>
<td>-.10**</td>
</tr>
<tr>
<td>Negative affect</td>
<td>.63</td>
<td>0-3</td>
<td>.64</td>
<td>1.20</td>
<td>1.20</td>
<td>.15***</td>
</tr>
<tr>
<td>Impaired motivation</td>
<td>.71</td>
<td>0-2.75</td>
<td>.46</td>
<td>.79</td>
<td>.79</td>
<td>.08*</td>
</tr>
<tr>
<td>Impaired relationships</td>
<td>.34</td>
<td>0-3</td>
<td>.47</td>
<td>1.72</td>
<td>3.30</td>
<td>.00</td>
</tr>
<tr>
<td><strong>Purpose in Life</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PIL 1</td>
<td>5.57</td>
<td>2-7</td>
<td>1.80</td>
<td>-.81</td>
<td>.22</td>
<td>-.04</td>
</tr>
<tr>
<td>PIL 2</td>
<td>5.30</td>
<td>2.4-7</td>
<td>1.80</td>
<td>-.58</td>
<td>.06</td>
<td>-.06</td>
</tr>
<tr>
<td>PIL 3</td>
<td>5.41</td>
<td>2-7</td>
<td>1.77</td>
<td>-.57</td>
<td>.13</td>
<td>-.05</td>
</tr>
<tr>
<td><strong>Perceived Loss of Control</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not in control</td>
<td>2.26</td>
<td>1-7</td>
<td>1.51</td>
<td>1.31</td>
<td>1.05</td>
<td>-.02</td>
</tr>
<tr>
<td>Powerless</td>
<td>2.28</td>
<td>1-7</td>
<td>1.45</td>
<td>1.20</td>
<td>.82</td>
<td>.03</td>
</tr>
<tr>
<td>Others control life</td>
<td>2.73</td>
<td>1-7</td>
<td>1.50</td>
<td>.87</td>
<td>.01</td>
<td>.11**</td>
</tr>
<tr>
<td><strong>Dating Competence</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dating 1</td>
<td>8.84</td>
<td>4-13</td>
<td>1.75</td>
<td>-.06</td>
<td>-.28</td>
<td>-.08*</td>
</tr>
<tr>
<td>Dating 2</td>
<td>9.25</td>
<td>3-13</td>
<td>1.82</td>
<td>-.19</td>
<td>-.23</td>
<td>-.03</td>
</tr>
<tr>
<td>Dating 3</td>
<td>9.96</td>
<td>4-14</td>
<td>1.87</td>
<td>-.14</td>
<td>-.17</td>
<td>-.05</td>
</tr>
<tr>
<td><strong>Leadership Style</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambition</td>
<td>14.52</td>
<td>4-20</td>
<td>3.53</td>
<td>-.41</td>
<td>-.49</td>
<td>-.20***</td>
</tr>
<tr>
<td>Leadership</td>
<td>14.29</td>
<td>5-20</td>
<td>2.83</td>
<td>-.13</td>
<td>-.30</td>
<td>-.16***</td>
</tr>
</tbody>
</table>

*Note. a Males were coded 1 and females were coded 2, so that a positive point-biserial correlation indicates that the females had the larger value.  
* $p < .05$; ** $p < .01$; *** $p < .001$. 
First-Order Latent Factor Model

This first sequence of models are tested on a random half \((n = 370)\) of our total sample, which we call our derivation sample. In the initial confirmatory factor model, the eight latent constructs were hypothesized to "cause" or generate the variation in the 24 observed variables. The factor structure of this first model was "pure" in that each observed variable was allowed to load on only one latent construct. For instance, inner resources was assumed to be an indicator only of Social Impact Efficacy. This assumption of mutual exclusivity may be an overly constrained imposition on the model, since many of the variables are conceptually similar and may in fact reflect more than one underlying quality.

To identify the model all factor loadings were freed, the variances of the constructs were fixed at unity, and all factor intercorrelations were allowed to be freely estimated. This initial confirmatory factor model did not fit the data to an acceptable degree, \(\chi^2 (df = 224, N = 370) = 480.17, p < .001, \text{NFI (normed fit index: Bentler & Bonett, 1980)} = .86\). Latent-factor intercorrelations for this model are presented in the upper triangle of Table 3. All hypothesized factor loadings were highly significant, \(p < .001\). The NFI was sufficiently large to suggest that an acceptable model could be achieved by adding several small empirically determined parameters that were not hypothesized in the initial model.

Based on an examination of selected modification indices for additional factor loadings and correlated uniquenesses (Bentler & Chou, 1986), five non-hypothesized factor loadings and 22 correlations among manifest variable residuals were added to the model. With these additions the model adequately fit the data, \(\chi^2 (df = 196, N = 370) = 181.97, p = .76, \text{NFI} = .95\). This new model was a significant improvement over the initial model \((p < .001)\). A summary of all model fit statistics and difference \(\chi^2\) tests are given in Table 4. To test whether the addition of these empirically-determined parameters distorted the substantive interpretation of the model, the latent-factor intercorrelations from the initial model were correlated with those obtained in the final, modified model. These parameters were correlated greater than .99. As a result, the final model was not considered biased due to the model modifications.

Standardized factor loadings and residual variances for the final first-order confirmatory factor model are given in Figure 1. The rectangles represent the observed variables, the large circles indicate the latent constructs, and the small circles reflect residual variances of the observed variables. These five non-hypothesized factor loadings tend to be small in magnitude (only one is over .40) and all are in interpretable directions. For instance, general assertiveness also negatively influenced the perception that others control your life. The latent-factor intercorrelations for this model are given in the lower triangle of Table 3. The absolute value of the correlations ranged from a low of .06 to a high of .88, and 11 were higher than .5. In other words, many of the constructs appear to be highly correlated and may reflect higher-order factors, as originally hypothesized.
Final confirmatory factor analysis model for the derivation sample. Large circles represent latent factors, rectangles observed variables, and small circles residuals. Not depicted in the figure for reasons of clarity are two-headed arrows (correlations) joining all possible pairs of latent factors. Parameter estimates are standardized and residual variables are variances. Significance levels were determined by critical ratios (*p < .05; **p < .01; ***p < .001).
Table 3
Factor Intercorrelations Between the Initial (Upper Triangle) and Final (Lower Triangle) First-Order Confirmatory Factor Models

<table>
<thead>
<tr>
<th>Factor</th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
<th>V</th>
<th>VI</th>
<th>VII</th>
<th>VIII</th>
</tr>
</thead>
<tbody>
<tr>
<td>I Social Impact Efficacy</td>
<td>1.00</td>
<td>.65</td>
<td>.44</td>
<td>-.44</td>
<td>.71</td>
<td>-.59</td>
<td>.51</td>
<td>.62</td>
</tr>
<tr>
<td>II General Assertiveness</td>
<td>.60</td>
<td>1.00</td>
<td>.30</td>
<td>-.31</td>
<td>.50</td>
<td>-.40</td>
<td>.58</td>
<td>.67</td>
</tr>
<tr>
<td>III Social Resources</td>
<td>.40</td>
<td>.31</td>
<td>1.00</td>
<td>-.37</td>
<td>.50</td>
<td>-.30</td>
<td>.48</td>
<td>.20</td>
</tr>
<tr>
<td>IV Depression (CES-D)</td>
<td>-.44</td>
<td>-.34</td>
<td>-.29</td>
<td>1.00</td>
<td>-.59</td>
<td>.73</td>
<td>-.35</td>
<td>-.22</td>
</tr>
<tr>
<td>V Purpose in Life</td>
<td>.78</td>
<td>.46</td>
<td>.50</td>
<td>-.53</td>
<td>1.00</td>
<td>-.88</td>
<td>.54</td>
<td>.30</td>
</tr>
<tr>
<td>VI Perceived Loss of Control</td>
<td>-.61</td>
<td>-.39</td>
<td>-.25</td>
<td>.61</td>
<td>-.84</td>
<td>1.00</td>
<td>-.48</td>
<td>-.32</td>
</tr>
<tr>
<td>VII Dating Competence</td>
<td>.56</td>
<td>.61</td>
<td>.49</td>
<td>-.32</td>
<td>.52</td>
<td>-.4</td>
<td>1.00</td>
<td>.48</td>
</tr>
<tr>
<td>VIII Leadership Style</td>
<td>.61</td>
<td>.56</td>
<td>.12</td>
<td>-.06</td>
<td>.27</td>
<td>-.25</td>
<td>.41</td>
<td>1.00</td>
</tr>
</tbody>
</table>

Note. r between initial and final correlations > .99. All correlations are significant at p < .01.

Second-Order Confirmatory Factor Models

Based upon our theoretical position, which hypothesized that two second-order factors should underlie the construct of self-efficacy, two second-order factors were introduced into the confirmatory factor analysis. One second-order factor represented Perceived Behavioral Coping Ability and was reflected in loadings allowed on social impact efficacy, general assertiveness, social resources, dating competence, and leadership style. The other second-order factor reflected Perceived Cognitive Control Coping Ability with hypothesized factor indicators of social impact efficacy (the only first-order construct to load on both second-order factors), a lack of depression, purpose in life, and a lack of perceived loss of control.

A model was tested which included the two second-order factors as defined above. Perceived Behavioral Coping Ability and Perceived Cognitive Control Coping Ability were allowed to correlate freely. Three additional empirically-determined correlations were included between pairs of first-order factor residuals: Depression and leadership style, social impact efficacy and leadership style, and depression and perceived loss of control. The factor residual of purpose in life was fixed at zero in order to prevent it from being estimated as negative.

This model adequately fit the data and was not significantly different from the first-order confirmatory factor models, even though 16 fewer parameters were necessary to represent the first-order latent factor intercorrelations (see summary of fit indices in Table 4). This model is graphically depicted in
Figure 2 omitting the observed variables for clarity. Parameter estimates are standardized and residual variables are variances.

Table 4
Summary of Fit Statistics

<table>
<thead>
<tr>
<th>Model</th>
<th>chi2</th>
<th>Degrees of Freedom</th>
<th>p Value</th>
<th>Normed Fit Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Initial CFAa</td>
<td>480.17</td>
<td>224</td>
<td>&lt;.001</td>
<td>.86</td>
</tr>
<tr>
<td>2. Final CFBb</td>
<td>191.97</td>
<td>196</td>
<td>.76</td>
<td>.95</td>
</tr>
<tr>
<td>Model 1-2 difference</td>
<td>288.20</td>
<td>28</td>
<td>&lt;.001</td>
<td></td>
</tr>
<tr>
<td>3. Two second-order factors on Model 2</td>
<td>211.13</td>
<td>212</td>
<td>.50</td>
<td>.94</td>
</tr>
<tr>
<td>Model 3-2 difference</td>
<td>19.16</td>
<td>16</td>
<td>.26</td>
<td></td>
</tr>
<tr>
<td>4. Two second-order factors on Model 1</td>
<td>501.04</td>
<td>240</td>
<td>&lt;.001</td>
<td>.87</td>
</tr>
<tr>
<td>Model 4-1 difference</td>
<td>20.87</td>
<td>16</td>
<td>.18</td>
<td></td>
</tr>
<tr>
<td>5. Second-order factors correlated at unity</td>
<td>278.89</td>
<td>213</td>
<td>.001</td>
<td>.92</td>
</tr>
<tr>
<td>Model 5-3 difference</td>
<td>67.76</td>
<td>1</td>
<td>&lt;.001</td>
<td></td>
</tr>
</tbody>
</table>

Cross-Validation Samples

| 6. Separate cross-validation sample-Model 3 | 358.54| 212 | <.001 | .89 |
| 7. Males only, Model 3 | 219.29| 212 | .35 | .90 |
| 8. Females only, Model 3 | 352.51| 212 | <.001 | .92 |

Note. a CFA = Confirmatory factor analysis. b Modified by adding 22 correlated residuals and 5 nonhypothesized factor loadings.

Perceived Behavioral Coping Ability and Perceived Cognitive Control Coping Ability were correlated .66, indicating a moderate association between them (44% common variance), while retaining their own uniqueness. This correlation resembled the correlation of .44 that Folkman and Lazarus (1980) observed between emotion-focused and problem-focused coping and the range of correlations (.48-.37) between perceived coping and cognitive control efficacy that Ozer and Bandura (1990) recently reported. (These studies measured variables rather than latent constructs, which might account for the smaller size). The largest additional correlation was between the residuals of Social Impact
Efficacy and Leadership Style, indicating that the two second-order factors did not account for the entire association between these two constructs. This association may reflect an additional second-order factor for these two constructs, over-and-above the relationship accounted for by the Perceived Behavioral Coping Ability factor. A similar possibility may exist for Depression and Perceived Loss of Control. These were not tested because two-indicator factors tend to be very unstable, and the fit and interpretability of the model seem to be quite good as it stands.

In order to determine whether the two second-order factors of self-efficacy that we have identified are in fact separate constructs, an additional more restricted model was tested. In this model the correlation between the two second-order factors was fixed at 1.0, operationalizing the hypothesis that they are assessing the same quality. This model did not accurately reflect the data and was significantly worse when compared to the previous model which allowed the two second-order constructs to be unique (see summary of fit statistics in Table 4).

Finally, we tested the second-order factor model in the initial confirmatory model that did not include the additional five factor loadings nor the 22 correlated uniquenesses. All significant relationships were retained and the resultant model was not significantly different from the initial model. Thus, we conclude that the model depicted in Figure 2 is an accurate portrayal of the data that is not biased or distorted due to model modifications.

Cross-Validation of the Second-Order Factor Model

This final model was tested in the separate, untouched random half of the total sample, as well as the separate samples of men and women. Fit indices for these runs are given in Table 4 (Models 6, 7, and 8). In each of these three samples, all hypothesized factor loadings and second-order factor results were significant.

Although only the male sample fit the model according to the $p$-value criterion, all three models had NFI's greater than .89, indicating that each fit the data reasonably well. Similarly, the ratio of $\chi^2$ to degrees of freedom was consistently under 2.0, also reflecting an excellent degree of fit. All hypothesized factor loadings on the first-order factors were significant in each of the three sample partitions. Table 5 presents the standardized parameter estimates for the second-order factors for the derivation sample, as well as the cross-validation, female, and male samples. Although the magnitude of the factor loadings varied somewhat, the general patterns of association were remarkably similar. The correlation between the two second-order factors was consistently in the .64 to .66 range. Using the cross-validation method suggested by Cudeck and Browne (1983), the specific model developed in the derivation sample was used in the cross-validation sample (by imposing identical parameterization and parameter estimates) and accounted for 86% of the variance of their new data. Although the fit was worse in this second sample, the decrement was not substantial, and more
important, the substantive conclusions (i.e., interpretation of parameter estimates) was virtually identical in the derivation and cross-validation sample, when parameters were estimated freely (Table 5). As a result, we conclude that the factor model presented in Figure 2 is equally representative of men and women, and thus does not differ by sex of the subject, and has been cross-validated in a separate sample.

### Table 5
**Summary of Second-Order Factor Parameters for Several Sample Partitions**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Derivation Sample</th>
<th>Cross-Validation Sample</th>
<th>Female Sample</th>
<th>Male Sample</th>
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</thead>
<tbody>
<tr>
<td><strong>Behavioral Coping Efficacy</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social impact efficacy</td>
<td>.40</td>
<td>.28</td>
<td>.32</td>
<td>.31</td>
</tr>
<tr>
<td>General assertiveness</td>
<td>.73</td>
<td>.74</td>
<td>.74</td>
<td>.66</td>
</tr>
<tr>
<td>Social resources</td>
<td>.57</td>
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<td>.60</td>
<td>.47</td>
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<td>.81</td>
<td>.64</td>
<td>.69</td>
<td>.81</td>
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<tr>
<td>Leadership style</td>
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<td>.56</td>
<td>.46</td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Social impact efficacy</td>
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<td>.55</td>
<td>.59</td>
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<td>Depression</td>
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<td>-.47</td>
<td>-.47</td>
<td>-.56</td>
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<tr>
<td>Purpose in life</td>
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<td>.97</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Perceived loss of control</td>
<td>-.85</td>
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<td>-.91</td>
<td>-.85</td>
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</table>

**Factor Correlations**

<table>
<thead>
<tr>
<th>Correlation</th>
<th>Derivation Sample</th>
<th>Cross-Validation Sample</th>
<th>Female Sample</th>
<th>Male Sample</th>
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<td>Perceived Behavioral Coping Ability with Perceived Cognitive/Emotional Ability Depression (R) with perceived loss of control (R)</td>
<td>.66</td>
<td>.64</td>
<td>.66</td>
<td>.66</td>
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<td>Social impact efficacy, (R) with leadership style (R)</td>
<td>.41</td>
<td>.25</td>
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<td>.32</td>
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<tr>
<td>Depression (R) with leadership style (R)</td>
<td>-.20</td>
<td>-.12</td>
<td>-.15</td>
<td>-.17</td>
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</table>

**Note.** a (R) denotes factor residual.
Figure 2 Final second-order factor model for the derivation sample. The large circles are latent constructs (the two on the right-hand side are second-order factors); the small circles represent factor residuals. Two-headed arrows are correlations. Parameter estimates are standardized and residual variables are variances. Significance levels were determined by critical ratios (**p < .01; ***p < .001).
DISCUSSION

Affirmation of the Distinction Between Perceived Ability to Self-Regulate Cognitively and Perceived Ability to Cope Behaviorally With Environmental Challenges

Our results confirm the validity of distinguishing between beliefs about one's ability to regulate cognitions in response to challenges associated with accomplishing desired goals and beliefs about one's ability to have an impact on the environment to accomplish desired goals. Those constructs that are primarily intrapsychic, such as depression, purpose in life, and perceived loss of control loaded heavily on the Perceived Cognitive Control Ability factor, but did not load on the Perceived Behavioral Coping Ability factor. Those constructs that concern active involvement with one's social environment, such as general assertiveness, leadership, and dating competence, on the other hand, loaded heavily on the Perceived Behavioral Coping Ability factor, but not on the Perceived Cognitive Control factor.

The empirical results obtained in this study confirm the usefulness of a theoretical distinction that is already current and frequently applied in the literature on coping with stress. This report, of course, goes beyond the literature on coping to justify elaborating the self-efficacy construct to include the distinction between perceived cognitive control and perceived behavioral abilities. The findings from a recent prospective study involving these two distinguishable percepts of ability (Ozer & Bandura, 1990) further affirm the importance of distinguishing between cognitive control and behavioral coping ability. Ozer and Bandura noted in this study of women mastering self-defense skills that perceived [behavioral] coping self-efficacy developed more rapidly during the period of training than did cognitive control self-efficacy. One explanation for this finding is that the behavioral and attitudinal changes engendered by 22 contact hours of training in thwarting simulated physical assaults were too many, too disparate, and too emotionally disturbing to be fully apprehended and integrated at the time of skill acquisition. The resulting dissociation of perceived cognitive control and perceived [behavioral] coping self-efficacy during the skill acquisition phase was temporary. By the 6-month follow-up the positive correlation between cognitive control efficacy and [behavioral] coping self-efficacy was restored ($r = .37$), despite sustained increases in self-defense efficacy and sustained decreases in perceived vulnerability and anxiety. It is as if time and effort were required to alter existing patterns of cognitive control following sudden major changes in perceived behavioral coping self-efficacy. If these findings are generalizable to other efforts at mastering complex behaviors, they suggest the need to examine in more detail the nature and sequencing of self-efficacy beliefs prior to, during, and following the acquisition of mastery.
Health Consequences of High Intrapsychic Efficacy Relative to Problem-Focused Efficacy

Individuals high in Perceived Cognitive Control Coping Ability, relative to Perceived Behavioral Coping Ability, may end up merely palliating problems that could be resolved behaviorally. For example, a woman suffering from an unhappy marriage may successfully reduce that unhappiness via psychotherapy that boosts her self-esteem, thereby increasing her ability to avoid intrusive, self-denigrating thoughts, without doing anything about increasing her perceived ability to influence her husband’s insensitivity to her needs.

Individuals who perceive that they have little control over their environment can nevertheless increase their probability of achieving a healthful lifestyle change by maximizing their Perceived Cognitive Control. An example would be an individual working in a tobacco processing plant who would like to quit smoking. Such an individual would find few opportunities for changing the social and physical environment to make it more conducive to quitting smoking, but might nevertheless embark on a plan to become an ex-smoker by relying on primarily cognitive control strategies for coping with temptations to smoke. Cognitive strategies such as thought management, self-reward, and distractive thoughts for reducing urges to smoke could be employed to accomplish a successful transition to being a nonsmoker even though the individual’s Perceived Behavioral Coping Ability was low.

Conversely, smokers who feel that they have little “willpower” and who are hostile to conventional intrapsychic approaches to behavior change can nevertheless be successfully counseled to effect a successful change to being a nonsmoker by being encouraged to adopt behaviors seriatim that cumulatively are antithetical to the smoking habit. A program of steadily increasing physical activity, for instance, is likely to improve one’s chances of becoming a long-term nonsmoker because aerobic exercise is inherently inconsistent or incompatible with the cigarette smoking lifestyle (e.g., Koplan, Powell, Sikes, Shirley, & Campbell, 1982). Successful adoption of behaviors that are inconsistent with smoking should lead to increased access to images of the self as a nonsmoker, with an attendant increase in perceived ability to abstain from smoking (Kazdin, 1979).

Implications of the Distinction for Interventions Designed to Change Perceptions of Self-Efficacy

Interventions designed to influence individuals’ self-efficacy with respect to a desirable health-related lifestyle change have not distinguished between Perceived Behavioral Coping Ability and Perceived Cognitive Control Ability. In the few instances where distinctions have been made between the use of cognitive or behavioral coping strategies, there have been notable differences in the contribution of behavioral and cognitive coping to explaining the behavior change. The literature on the behavior change involved in drug use cessation, to
take one example, includes reports of contrasts between behavioral and cognitive methods of coping with temptations to return to drug use. One such applied study found that recidivists among would-be exsmokers reported relying more heavily on behavioral coping than did the more successful exsmokers who continued to abstain from smoking (Shiffman, Reed, Maltese, Rapkin, & Jarvik, 1985). Another study investigated the determinants of cessation of heroin use and found a similar advantage for cognitive coping relative to behavioral coping strategies (Chaney & Roszell, 1985).

The findings reported above could be an artifact of the intervention model used, namely the Relapse Prevention model (Marlatt & Gordon, 1985). Much of the work on relapse prevention has focused on how to equip individuals with self-efficacy percepts that would help them cope in situations that pose a high risk of recidivism. The focus however, has not been on increasing the individual’s perceived ability to reduce exposure to high-risk situations, but rather on the individual’s perceived ability to reduce the experience of stress in high-risk situations. In other words, the focus has been such as to exaggerate the importance of perceived cognitive control for coping with high-risk situations relative to the importance of perceived ability to respond behaviorally for avoiding or escaping from high-risk situations.

The superiority of enhancing percepts of Behavioral Coping Ability rather than enhancing percepts of Cognitive Control Coping Ability in lifestyle change programs is suggested by some multi-year follow-ups of heroin addicts. In their 12-year follow-up of the effects of treatment of 405 black and white male opiate addicts, Simpson, Joe, Lehman, and Sells (1986) concluded that the most predictive determinants of long-term continued abstinence were primarily behavioral: Avoiding old drug-using friends and old hangouts, developing new friendships with nonusers, and establishing new family ties and new work habits. In their review of the determinants of spontaneous remission from substance use, Stall and Biernacki (1986) arrived at similar conclusions. These results suggest that would-be ex-addicts with strong beliefs about their ability to cope behaviorally will experience higher rates of long-term abstinence than would-be ex-addicts who may have strong beliefs in their ability to cope cognitively but weak beliefs about their ability to cope behaviorally.

Percepts of ability have been shown to be important determinants of effort and achievement (Bandura, 1986). Failure to distinguish between perceptions of cognitive control ability and perceptions of behavioral coping ability, however, could mask important information about the processes by which actions, beliefs and perceptions of ability influence each other. Two examples are given below where potentially important applications of social cognitive theory may be limited by the failure to make this distinction.

Conjecture Relating to Adolescent Maturation and Risk of Drug Abuse

An important, unexplained phenomenon in the literature on drug abuse onset is the “window of vulnerability,” namely, the relatively few teenage and young
adult years when individuals are at risk of adopting a drug abusing lifestyle (Abelson, Fishburne, & Cisin, 1980; Johnston, O'Malley, & Eveland, 1978; Kandel & Logan, 1984). Lifestyle drug abuse rarely begins earnestly before adolescence and almost never manifests de novo after age 25. The “Just Say No” drug prevention program is premised on the belief that success in dissuading teenagers from starting drug abuse during the teenage years will prevent drug abuse at any age.

Why, over a lifespan of 72-78 years, should the average American only be at risk of lifestyle drug abuse between the ages of 13 and 25, with peak onset during the high school years? Part of the answer may be facilitated by distinguishing between cognitive control and behavioral coping ability. The behavioral coping ability of children is generally limited to secondary control (e.g., Rothbaum & Weisz, 1989) because of their societally-mandated dependency on their parents and because of their lack of life skills. Children’s maturation is marked more by increases in their cognitive control ability (e.g., distractive thoughts) than in their behavioral coping skills (e.g., progressive goal-setting to achieve mastery over challenge; Altshuler & Ruble, 1989).

The transition from childhood to adulthood is almost inevitably accompanied by increases in behavioral coping ability. The life skills that are acquired include decision-making skills, communication skills, dating skills, and employment skills. At the beginning of the transition, these behavioral skills are uniformly absent but young adolescents become increasingly aware of the need to acquire them (Katz & Zigler, 1967). There is considerable distress and anxiety that accompanies adolescents’ increasing realization of the need for life skills in the immediate absence of their acquisition. This distress and anxiety are palliated in teenagers performing well in school by societally-administered reassurances that their career trajectory is favorable and that, by implication, the teenagers need not fear a characterological inability to acquire the necessary life skills. For these success-bound teenagers, positive self-statements are easily accessible as antidotes to the inevitable anxiety that their immaturity occasions. For many teenagers not performing well in school and otherwise not receiving societal reassurances concerning future expectations of success, however, only the actual acquisition of life skills will permanently reduce the fear that they will never be fully accepted as autonomous, responsible adults. The literature, shows, in fact, that drug abuse-prone teenagers are characterized by a syndrome of “accelerated maturity,” (Gritz, 1977), which manifests in precocious sexual behavior, marriage, cessation of schooling, and employment. Despite the uniform absence of life skills at the beginning of adolescence, only a minority go on to adopt a lifestyle habit of drug abuse. The at-risk teenagers who successfully avoid drug abuse are those who can through cognitive control alone reduce their immaturity-associated anxiety to acceptable levels. At-risk teenagers who successfully avoid drug abuse tend to come from intact families, suggesting that family social support can strengthen self-percepts of ability to control immaturity-associated anxiety. For at-risk teenagers without the requisite cognitive control skills, their
immaturity-associated anxiety is functionally (but only intermittently) palliated by regular administration of psychoactive drugs, especially nicotine and alcohol. Kaplan, Martin, and Robbins (1982) demonstrated prospectively that non-drug abusing teenagers with low self-esteem were significantly more likely in future years to become drug abusers than their non-drug abusing agemates with high self-esteem. Drug abuse, therefore, can be viewed as a functional way to mediate for intrapsychic discomfort. By the time of onset of adulthood, most individuals have demonstrated successful mastery of at least the rudiments of the most important life skills. With the ebbing of immaturity-associated anxiety, there is decreased need for psychoactive agents to provide functional relief. By the time of young adulthood, unfortunately, many individuals have become physiologically dependent on their chosen drugs and cannot, therefore, stop using the drug just because the original need for the drug has disappeared.

A Conjecture Concerning Self-Efficacy Gender Differences in Sex-Role Socialization

The distinction between perceived cognitive control ability and perceived behavioral coping ability may similarly shed light on the origins of observed differences between men and women in mastery of a variety of life's challenges, including occupational achievement (Austin & Hanisch, 1990) and weight control (Jeffery, French, & Schmid, 1990). Women's continuing preference for teaching, nursing, and childcare, and men's continuing preference for construction, community safety (policy, fire, paramedics), and surgery, are consistent with women relying more on cognitive control coping and men relying more on behavioral coping. Similarly, women's relative reluctance to adopt increased physical activity and their preference for relying on willpower relative to men as a strategy for maintaining desirable weight is also consistent with women relying on cognitive control and men relying on behavioral coping. This difference between men and women may help to explain why women to view weight as less controllable than men (Jeffery et al., 1990), given the clear long-term advantage that exercise represents as a weight loss strategy (King, Frey-Hewitt, Dreon, & Wood, 1989; Koplan et al., 1982).

In her review of the literature on sex role socialization, Weitz (1977) cited studies of adult communication patterns in same-sex groups in which it was observed that women tended to be socioemotional whereas men tended to be task-oriented. Although similar communication patterns were not observed in children, Weitz noted a consistent association of activity and aggression in boys and not in girls. Her evidence suggested that boys were encouraged to combat their frustrations behaviorally and that girls were more encouraged to palliate their frustrations through cognitive control strategies. Consistent gender differences in adult performance could well have roots in the different coping strategies that boys and girls are encouraged to develop.
CONCLUSION

Further research on how perceived cognitive control ability and perceived behavioral coping ability vary among individuals, among situations, and within individuals over time seems warranted. Investigating the relative importance of perceived cognitive control and perceived behavioral coping ability in therapy-mediated lifestyle change and spontaneous, unaided lifestyle change would seem especially worthwhile. This distinction would also seem useful in illuminating more clearly why there exist differences in mastery between men and women, and in better understanding what contributes to the youthful decision to adopt a drug abusing lifestyle.

REFERENCES


Author Notes

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It is assumed that the motivation to extend social support is governed by specific emotions and cognitions, among them outcome expectancies and self-efficacy expectancies. Two experiments were conducted to explore this assumption, Study I dealing with outcome expectancy and Study II dealing with self-efficacy expectancy. In Study I, outcome expectancies toward eight disease-related stigmas and the intention to extend social support were examined with two experimental conditions. The onset of the stigmas was varied as being either controllable or uncontrollable. In addition, the target person was described either as actively coping with the stigma or as not actively coping. Examined were the effects of onset controllability and coping on pity, outcome expectancy, and willingness to support the target person. In a within-groups design, 84 subjects were confronted with all eight stigmas under four different conditions. Both experimental factors influenced the reported reactions. The coping variable appeared to be stronger than the controllability variable and, in addition, outcome expectancy was a somewhat more important mediator of helping than pity. However, the pattern of data was context-specific, i.e., different sets of predictors emerged for different stigmas. Study II was a similar experiment pursuing the notion that the motivation to help is affected by the belief that one can be effective as a helper (self-efficacy expectancy). It examined whether self-efficacy expectancy for helping a rape victim served as a mediator of the relationship between recipient characteristics and support intentions. The recipient characteristics assessed were victim coping and controllability of the assault. Both pity and self-efficacy expectancy emerged as good predictors of support, whereas controllability and coping were of lesser influence.

According to Bandura's cognitive-social theory, human behaviors are partly governed by expectancies, in particular by outcome expectancies and self-efficacy expectancies (Bandura, 1977, 1986, 1991). Many studies, some of them
presented in this volume, have applied this assumption to specific behaviors in various domains of human functioning such as achievement, organizational management, or health. There seems to be, however, no application to studies on social support. The willingness to help others depends partly on one's emotions at the time, but helping also depends on judgments about the specific situation, characteristics of the recipient, and one's self. Among such cognitions are expectancies about the likelihood that the situation can be changed and regarding one's ability to provide the necessary social support. Expecting a condition to improve under certain circumstances represents an outcome expectancy. Belief in oneself as an effective support provider in a particular situation represents a self-efficacy expectancy. These cognitions are hypothesized to serve as causal mediators of the relationships between antecedent recipient characteristics and consequent intentions to extend social support. In addition, a number of other factors outlined below are considered important in the study of social support.

The present chapter reports two studies. The first one deals with the mediating role of outcome expectancy, the second one with the mediating role of self-efficacy expectancy. In the following sections, we describe in more detail the constructs involved in this research, in particular perceived controllability, perceived coping, expectancies, and social support.

Perceived Controllability

Attribution theory has recently been extended to the study of social stigmas and reactions to the stigmatized (Weiner, Perry, & Magnusson, 1988). By social stigma we mean a discrediting condition or mark that defines a person as "deviant, flawed, limited, spoiled, or generally undesirable" (Jones et al., 1984, p. 6). Among others, physical deformities, behavioral problems such as excessive eating and drinking, and diseases can be regarded as stigmas. Attribution theory is relevant to the study of stigmas because individuals typically search for the cause(s) of a negative state or condition existing in others. That is, observers confronted with a "markable" target initiate an attributional search to determine the origin of the stigma.

Researchers have identified controllability as one of the basic dimensions of perceived causality (Weiner, 1985, 1986). Controllable causes are those which an actor can volitionally change, whereas uncontrollable causes are not subject to personal mastery or management. The onset of a drug problem, for example, is seen as controllable if a person has been experimenting with drugs out of curiosity, whereas it is perceived as comparatively uncontrollable if a person has had medical treatment with drugs and thereby developed a dependency (Weiner et al., 1988). In a similar manner, the onset of a heart disease is construed as controllable if the person has led an unhealthy life-style, including smoking and a poor diet, whereas it is considered relatively uncontrollable if hereditary factors have played a major role in the illness.
Affective and Behavioral Reactions

It has been documented that the perceived controllability of a social stigma determines disparate affective reactions toward the target person and different behavioral responses as well (e.g., DeJong, 1980; Weiner et al., 1988). More specifically, uncontrollable origins of stigmas tend to elicit pity and offers of help, whereas controllable origins tend to elicit anger and no help (see Reisenzein, 1986; Schmidt & Weiner, 1988; Weiner et al., 1988). Hence, it has been shown that experimentation with drugs and an unhealthy life-style as causes of stigmas yield much anger, little pity, and relative neglect, whereas drug problems due to medical treatment, and heart disease derived from genetic factors, give rise to little anger, much pity, and prosocial responses.

Perhaps more than in any other area within the field of social motivation, investigators of helping behavior have assumed that emotions play an important motivational role (see review in Carlson & Miller, 1987). These emotions have included discomfort (e.g., Cialdini, Darby, & Vincent, 1973), distress (e.g., Batson, O’Quinn, Fultz, Vanderplas, & Isen, 1983), empathy (e.g., Batson, 1990; Hoffman, 1975), gratitude (e.g., Goranson & Berkowitz, 1966), guilt (e.g., Hoffman, 1982), as well as pity and anger (Schwarzer & Weiner, 1990, 1991). While there is strong support for an attribution—emotion—helping link, there are also studies that have failed to demonstrate this effect. Capitalizing on a real-life event, Amato, Ho, and Partidge (1984) sent survey questionnaires to residents living near the setting of a major bushfire which killed 46 people and destroyed over 2,000 homes. The questionnaire addressed perceptions of causality and responsibility, affective reactions, and helping behavior. Most people reported donating to the victims regardless of the amount of responsibility attributed to them. The obvious high degree of need in this context seemed to have overpowered the attribution of control effects.

Jung (1988) presented subjects with vignettes depicting a close friend experiencing a variety of common problems, with manipulations of the responsibility for the problem. For each vignette, subjects rated the target person’s deservedness of fate, perception of how helpful social support would be for the problem, and their likelihood of providing social support. Perceived deservedness of fate was greater for those viewed as having high responsibility. Perceived benefits of social support were also higher in this case. However, neither factor affected the likelihood of social support provision.

Skokan (1990) examined the affective responses and support behaviors extended towards a roommate who is dealing with either cancer or the death of her father. Subjects were presented with scenarios which depicted the roommate as either responsible or as not responsible for the onset of the critical event. In her initial within-subjects analysis, controllability was associated with more anger, less sympathy and less social support; however, when reanalyzed as a between-subjects design because of order effects, the impact of controllability on sympathy and support disappeared.
Perceived Coping

It remains unclear whether stigma onset, which is a distant event, is the sole or main determinant of affective and behavioral reactions toward the stigmatized or whether subsequent events, controllable or uncontrollable, alter the causal sequence. Drug experimentation and poor life-style, for example, might be weak predictors of the emotions and behaviors of observers when compared with the present efforts of the target person to cope with the consequences of the stigma. In the achievement domain, it is obvious that even after failure due to lack of effort, present expenditure of effort to compensate or recover generates positive affect and rewards for the failed student (Karasawa, 1991; Weiner, 1985). When generalized to the health domain, this finding suggests that positive coping attempts with a serious health condition could play an important role in determining the affective and behavioral reactions of others.

Skokan (1990) distinguished in her scenario experiment between adaptive coping and maladaptive coping. In the adaptive condition, the target person who either had cancer or was bereaved, tried to stay optimistic and to look for ways to go on with her life and to grow from the experience. In the maladaptive condition, she dwelled on the negative aspects of the situation and did not try to overcome the crisis instrumentally. Adaptive coping of the target was related to less anger in subjects but had mixed effects on their willingness to offer social support. In the bereavement condition, poor coping elicited less support, but in the cancer condition, unexpectedly, poor coping elicited even more support.

Silver, Wortman, and Crofton (1990) studied subject reactions to a cancer patient who was portrayed either as a “good coper,” a “bad coper” or a “balanced coper.” In the good coping condition, the target person expressed an optimistic view of her illness and appeared to be coping well. In the balanced coping condition, she conveyed distress about what was happening, but also indicated that she was trying her best. In the poor coping condition, she displayed distress about what was happening and appeared to have difficulty coping. In nine out of ten comparisons, the responses to confederates who were portrayed as having positive or balanced coping styles were significantly more favorable than were responses to poor copers.

In sum, both the origin of a problem and its solution are hypothesized to be important when examining reactions of others toward the stigmatized person (Brickman et al., 1982). That is, the responsibility for causing a problem should be separated from the responsibility for maintaining or not alleviating it. This important distinction has been ignored in prior research on attributions (see also Karasawa, 1991; Schwarzer & Weiner, 1991). The present studies compare the effects of perceived onset controllability with those of perceived coping efforts on pity, outcome expectancy, and social support towards the stigmatized and examines the mediating role of pity and expectancy.
Expectancies

The focus of the present paper is on the role of mediating factors that link attributions and affect regarding a social stigma to behavioral intentions or to actual support behavior. Bandura (1977, 1986, 1991) has convincingly demonstrated that expectancies are very important social-cognitive mediators of action. There are two major cognitions of this kind, outcome expectancies and self-efficacy expectancies. In the first experiment, we deal with outcome expectancies that refer to the possibility of improvement of a condition. The subjects were asked how likely it is that a target person’s condition would improve under particular circumstances. It is hypothesized that an individual’s active coping with an ailment will trigger positive outcome expectancies in the observer. Coping behavior implicitly refers to the stability of a stigma. If the victim is not actively involved in alleviating the distress, maintaining functioning and moving on with daily life, one would have little reason to expect an improvement; support may be seen as wasted labor. If, however, a great deal of effort is expended by the victim in solving the problem, one can expect that changes are more likely and that supplementary contributions would be a worthwhile investment. This reasoning does not apply to situations that require acceptance; that is, we are likely to help people who behave passively when passivity is required in the situation.

In the second experiment, the focus is on self-efficacy expectancy in terms of one’s helping capabilities. Empathy, perspective taking, comforting skills and so on, not only facilitate social support in an objective sense (Batson, 1990; Clary & Orenstein, 1991); these abilities also have to be perceived by the help provider in order to establish a motivation to help. Help-specific self-efficacy deals with cognitions about one’s capability to support others and to make a difference with this support; it refers to one’s perceived personal resources to provide competent assistance and to achieve relief for a sufferer.

Social Support

Social support has been defined as an exchange of resources “perceived by the provider or the recipient to be intended to enhance the well-being of the recipient” (Shumaker & Brownell, 1984, p. 13). This definition requires that either the provider or the recipient must perceive that the provider has a positive intent. Intentions have also been claimed as being the best predictors of a variety of behaviors; this is well-documented in research based upon the Theory of Reasoned Action (Fishbein & Ajzen, 1975) and the Theory of Planned Behavior (Ajzen, 1988). Evidence of the influence of help intentions on actual helping behavior has been found by Borgida, Simmons, Conner, and Lombard (1990) and Dalbert, Montada, and Schmitt (1988). Whether intentions to help are accurately perceived by the provider or by the recipient is a related but different question (Dunkel-Schetter & Bennett, 1990; Dunkel-Schetter, Blasband, Feinstein, & Bennett, 1991).
Several factors determine the likelihood that a supportive exchange actually takes place. Stress factors, relationship factors, recipient factors, and provider factors have been discussed and somewhat studied (Dunkel-Schetter & Skokan, 1990). We will deal here with the latter two exclusively. **Recipient factors** are critical determinants of support. Victims who are not only distressed, but are also not responsible for the event, and who invest a great deal of effort to manage their condition, are apt to elicit more help than those who are responsible themselves for their misfortune and who do not take action to solve their issue (Bennett-Herbert & Dunkel-Schetter, in press; Brickman et al., 1982). Creating frustration and helplessness in the potential provider leads to a lesser likelihood of support (Dunkel-Schetter & Wortman, 1981, 1982). The expression of too much distress strains the social network, evokes negative reactions, and turns those away who would have been supportive if the distress level had only been moderate. Another reason why the network may not be mobilized is if a victim is not coping adaptively. Passive, depressive and ungrateful victims or patients are seen as socially unattractive and, therefore, receive less support in the long run (Barbee, 1990; Gurtman, 1986; Notarius & Herrick, 1988). Paradoxically, those subjects who have valuable personal resources such as competence, high self-esteem, locus of control, and optimism and who make use of their resources seem to elicit a stronger tendency in others to extend support.

**Provider factors** have been intensively studied in social psychology research on helping (Batson, 1990; Berkowitz, 1987; Dovidio, 1984; Eisenberg & Miller, 1987; Jung, 1988). It makes a difference how the cause of the problem is attributed. If it is seen as controllable then the victim is blamed and negative emotional reactions are aroused such as anger, leading to neglect of the sufferer. If, on the other hand, the cause is seen as uncontrollable and the person does not seem to be responsible for the problem, then positive emotions such as pity emerge, which make help more likely (Weiner, 1985). Thus, emotions are mediators of attributions and behavioral intentions. According to Batson (1990), empathy predicts altruistic motivation to help, whereas a provider's distress tends to elicit egoistic motivation, which does not induce help. These two theories by Weiner and Batson are closely related in terms of emotional mediators of motivation. Pity can be matched to empathy as a predictor of help, and anger parallels distress in predicting neglect. Betancourt (1990) has attempted to integrate both views by manipulating experimentally the controllability of onset of a problem as well as inducing different perspectives in the potential support provider. He found that both experimental factors influenced perceived controllability and empathic emotions that, in turn, influenced helping.

In the present chapter, the focus is on experimentally manipulated recipient factors, but it is kept in mind that these do not operate in an isolated manner. Rather, they interact with on-going responses by the provider during a specific social encounter. It is only of secondary importance whether the victim is actually responsible for the problem and whether active coping is executed. Moreover, the degree to which the provider makes these attributions, is
considered to be critical. The perception in the beholder may be more relevant than the actual cause of the onset of the stigma or the actual coping behavior.

The present experiments were designed to examine the effects of perceived controllability and perceived coping on pity as an affective reaction and on expectancies that, in turn, were hypothesized to exert an influence on support intent. The studies differ in terms of the scenarios used and in terms of the expectancy variables. While Study I deals with outcome expectancy, Study II deals with self-efficacy expectancy.

**STUDY I**

**Method**

*Sample.* The subjects were 84 male and female students at the University of California, Los Angeles, who received credit in an introductory psychology course for their participation. They were randomly assigned to one of four groups (see below) and given questionnaires in small group sessions with anonymity assured.¹

*Design.* Eight health-related stigmas were selected, each of which was manipulated with respect to onset controllability and coping effort. Each subject received four of the eight stigmas paired uniquely with one of the four controllability conditions (2 Levels of Onset Responsibility x 2 Levels of Coping). Subjects were divided into four groups that received different combinations of stigmas and conditions (see Table I).

**Table I**

*Experimental Design*

<table>
<thead>
<tr>
<th>Onset Responsible</th>
<th>Onset Irresponsible</th>
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</thead>
<tbody>
<tr>
<td>No Coping</td>
<td>Coping</td>
</tr>
<tr>
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<td>Aids</td>
</tr>
<tr>
<td>Group 2</td>
<td>Cancer</td>
</tr>
<tr>
<td>Group 3</td>
<td>Drug abuse</td>
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<tr>
<td>Group 4</td>
<td>Heart disease</td>
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<td>Child abuse</td>
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<td>Group 3</td>
<td>Depression</td>
</tr>
<tr>
<td>Group 4</td>
<td>Obesity</td>
</tr>
</tbody>
</table>

¹ Study I was conducted by Ralf Schwarzer and Bernard Weiner.
As shown in Table 1, one part of the design included four stigmas (AIDS, cancer, drug abuse, and heart disease) paired with the four conditions, while a second part replicated the first but used another four stigmas (anorexia, depression, obesity, and child abuse). Thus, there were two within-group factors (onset controllability and coping) and one between-group factor (stigma set). This design allowed for an overall analysis as well as for stigma-specific subanalyses.

Four vignettes were created for each stigma consisting of: (a) onset responsibility and low coping; (b) onset responsibility and high coping; (c) no onset responsibility and low coping; and (d) no onset responsibility and high coping. As an example, the obesity vignettes are given:

1. Maladaptive coping, controllable. Your roommate has become excessively overweight, and is experiencing severe problems in social- and work-related activities. Excessive eating and lack of exercise have been the primary contributors to the obesity. This roommate does not take any steps to lose weight, either by dieting, exercising or by following a medical regimen.

2. Adaptive coping, controllable. Your roommate has become excessively overweight, and is experiencing severe problems in social- and work-related activities. Excessive eating and lack of exercise have been the primary contributors to the obesity. Recently this roommate has commenced a new diet prescribed by a physician, and is regularly exercising.

3. Maladaptive coping, uncontrollable. Your roommate has become excessively overweight, and is experiencing severe problems in social- and work-related activities. Glandular dysfunction has been identified as the reason for the obesity. This roommate does not take any steps to lose weight, either by dieting, exercising or by following a medical regimen.

4. Adaptive coping, uncontrollable. Your roommate has become excessively overweight, and is experiencing severe problems in social- and work-related activities. Glandular dysfunction has been identified as the reason for the obesity. Recently this roommate has commenced a new diet prescribed by a physician, and is regularly exercising.

Measures. The dependent variables were the following 9-point rating scales, anchored with extremes such as not at all and very much so. Pity was assessed by the single item “How much pity would you feel?”

Typically, outcome expectancies are worded in an “if-then manner.” In the present experiment, however, the if-component was given by the four experimental conditions such as: “If the stigma is uncontrollable and if the victim is actively coping with it, then...” Because of these implicit assumptions, the measurement of the outcome expectancy was restricted to the then-component and simply worded: “How likely is it that the condition will improve?”

Social support intention was measured by seven items representing different kinds of social support. However, this was a homogeneous scale (Cronbach’s alpha for the seven social support items was .91), and, therefore, the aggregated score was used as an indicator of support intentions. The items were:
1. How much would you like to extend support to your roommate?
2. How much time would you be willing to spend talking and listening?
3. How much money would you be willing to donate in order to provide the best possible treatment?
4. How much would you like to go on a holiday trip with your roommate?
5. How much would you be willing to give advice and information?
6. How much would you be willing to console and reassure your roommate when being upset?
7. How willing would you be to assist with a small problem?

Other dependent variables were analyzed previously within the framework of analysis of variance, and some of the results are published elsewhere. However, we have only reported about the stigmas of heart disease (Schwarzer & Weiner, 1990), AIDS and cancer (Schwarzer & Weiner, 1991).

**Results**

To examine the role of pity and outcome expectancy as mediators of the relationship between victim characteristics and provider support intentions, a structural equation model was specified with controllability and coping as exogenous variables and pity, expectancy, and support as endogenous variables. This is a straightforward single indicator model with manifest variables. The two orthogonal experimental factors were believed to influence emotions and cognitions, whereas emotions and cognitions were specified to influence the behavioral intention directly. Controllability and coping, therefore, could exert indirect effects on support intent through pity and expectancy but were constrained not to exert direct effects, because this would not be in line with theory or past research. The two alternative mediating factors were pity and expectancy, and for both of them the size of their mediating effect was computed in addition to their direct impact on support intent (see Figures 2 to 9). This procedure was repeated eight times, for each stigma individually. Eight path analyses were carried out with the LISREL VII program (Jöreskog & Sörbom, 1988).

First, the degree to which the experimental data fitted the structural equation model was examined. Several indices of fit have been suggested in the literature (cf. Bentler, 1980). We have used five of them in this study, (a) the chi-square test which, if significant, indicates that the data deviate from the model, (b) the chi-square /df ratio which takes the degrees of freedom into account (df = 3) and which should be as low as possible; ratios above 3.0 are usually seen as unsatisfactory, (c) Jöreskog's Goodness of Fit Index (GFI) which should be close to unity, (d) his Adjusted Goodness of Fit Index (AGFI) that makes an adjustment to the degrees of freedom and also should be as high as possible, and (e) the Root Mean Square Residual (RMSR) which is an index derived from the deviations of the original correlation matrix from the reproduced correlation matrix on the basis of the estimated parameters; this index should not exceed .05.
Table 2 summarizes the results of all eight path analyses. In six of eight cases, an excellent fit emerged, whereas the stigmas “Cancer” and “Child Abuse” turned out to be associated with a less appropriate fit. Overall, these satisfactory results indicate that the model specification is in line with the experimental data, but also that the specific stigma context makes a difference.

### Table 2
**Goodness of Fit for the Eight Path Models**

<table>
<thead>
<tr>
<th>Stigma</th>
<th>chi²</th>
<th>p</th>
<th>chi²/df</th>
<th>GFI</th>
<th>AGFI</th>
<th>RMSR</th>
</tr>
</thead>
<tbody>
<tr>
<td>AIDS</td>
<td>4.36</td>
<td>.23</td>
<td>1.45</td>
<td>.98</td>
<td>.90</td>
<td>.05</td>
</tr>
<tr>
<td>Cancer</td>
<td>9.49</td>
<td>.02</td>
<td>3.16</td>
<td>.96</td>
<td>.79</td>
<td>.07</td>
</tr>
<tr>
<td>Drug abuse</td>
<td>1.46</td>
<td>.69</td>
<td>0.49</td>
<td>.99</td>
<td>.97</td>
<td>.03</td>
</tr>
<tr>
<td>Heart disease</td>
<td>2.44</td>
<td>.49</td>
<td>0.81</td>
<td>.99</td>
<td>.94</td>
<td>.04</td>
</tr>
<tr>
<td>Anorexia</td>
<td>0.92</td>
<td>.82</td>
<td>0.31</td>
<td>.99</td>
<td>.98</td>
<td>.02</td>
</tr>
<tr>
<td>Child abuse</td>
<td>15.18</td>
<td>.002</td>
<td>5.06</td>
<td>.94</td>
<td>.69</td>
<td>.08</td>
</tr>
<tr>
<td>Depression</td>
<td>1.50</td>
<td>.68</td>
<td>0.50</td>
<td>.99</td>
<td>.97</td>
<td>.03</td>
</tr>
<tr>
<td>Obesity</td>
<td>4.65</td>
<td>.20</td>
<td>1.55</td>
<td>.98</td>
<td>.90</td>
<td>.05</td>
</tr>
</tbody>
</table>

*Note. GFI = goodness of fit, AGFI = adjusted GFI, RMSR = root mean square residual.*

### Table 3
**Percent of Explained Variance**

<table>
<thead>
<tr>
<th>Stigma</th>
<th>Pity</th>
<th>Expectancy</th>
<th>Support</th>
</tr>
</thead>
<tbody>
<tr>
<td>AIDS</td>
<td>22</td>
<td>1</td>
<td>31</td>
</tr>
<tr>
<td>Cancer</td>
<td>6</td>
<td>29</td>
<td>21</td>
</tr>
<tr>
<td>Drug abuse</td>
<td>9</td>
<td>51</td>
<td>15</td>
</tr>
<tr>
<td>Heart disease</td>
<td>1</td>
<td>31</td>
<td>11</td>
</tr>
<tr>
<td>Anorexia</td>
<td>4</td>
<td>51</td>
<td>6</td>
</tr>
<tr>
<td>Child abuse</td>
<td>9</td>
<td>36</td>
<td>29</td>
</tr>
<tr>
<td>Depression</td>
<td>1</td>
<td>16</td>
<td>14</td>
</tr>
<tr>
<td>Obesity</td>
<td>1</td>
<td>38</td>
<td>11</td>
</tr>
</tbody>
</table>

This is corroborated by the explained variance for the three endogenous variables pity, expectancy and support (Table 3). The model succeeded in explaining a great deal of the variance of expectancy and support but much less so of pity. This shows that the emotion of pity is not sufficiently predicted by controllability and coping. Other factors, not under scrutiny here, must be responsible for the variation in pity.
The stigma-specific path coefficients are displayed in Figures 1-8; Table 4 contains the decomposition of total effects into direct and indirect effects. Results for each stigma will be described briefly. Coefficients above .21 are significant.

**Table 4**

*Decomposition of Effects on Social Support Intention*

<table>
<thead>
<tr>
<th>Stigma</th>
<th>Predictor</th>
<th>Direct</th>
<th>Indirect</th>
<th>Total Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>AIDS</td>
<td>Control</td>
<td>0</td>
<td>21</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>Coping</td>
<td>0</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Pity</td>
<td>55</td>
<td>0</td>
<td>55</td>
</tr>
<tr>
<td></td>
<td>Expectancy</td>
<td>7</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>Cancer</td>
<td>Control</td>
<td>0</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Coping</td>
<td>0</td>
<td>13</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>Pity</td>
<td>43</td>
<td>0</td>
<td>43</td>
</tr>
<tr>
<td></td>
<td>Expectancy</td>
<td>7</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>Drug abuse</td>
<td>Control</td>
<td>0</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Coping</td>
<td>0</td>
<td>29</td>
<td>29</td>
</tr>
<tr>
<td></td>
<td>Pity</td>
<td>14</td>
<td>0</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Expectancy</td>
<td>40</td>
<td>0</td>
<td>40</td>
</tr>
<tr>
<td>Heart disease</td>
<td>Control</td>
<td>0</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Coping</td>
<td>0</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>Pity</td>
<td>19</td>
<td>0</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>Expectancy</td>
<td>26</td>
<td>0</td>
<td>26</td>
</tr>
<tr>
<td>Anorexia</td>
<td>Control</td>
<td>0</td>
<td>17</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>Coping</td>
<td>0</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Pity</td>
<td>14</td>
<td>0</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Expectancy</td>
<td>24</td>
<td>0</td>
<td>24</td>
</tr>
<tr>
<td>Child abuse</td>
<td>Control</td>
<td>0</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>Coping</td>
<td>0</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>Pity</td>
<td>37</td>
<td>0</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>Expectancy</td>
<td>31</td>
<td>0</td>
<td>31</td>
</tr>
<tr>
<td>Depression</td>
<td>Control</td>
<td>0</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Coping</td>
<td>0</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Pity</td>
<td>14</td>
<td>0</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Expectancy</td>
<td>34</td>
<td>0</td>
<td>34</td>
</tr>
<tr>
<td>Obesity</td>
<td>Control</td>
<td>0</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Coping</td>
<td>0</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>Pity</td>
<td>14</td>
<td>0</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Expectancy</td>
<td>30</td>
<td>0</td>
<td>30</td>
</tr>
</tbody>
</table>
In the case of *AIDS*, a substantial causal path leads from controllability to pity \((p = -0.39)\) and another from pity to support \((p = 0.55)\). Coping has a somewhat lower impact on pity \((p = 0.25)\). Expectancy does not play a role: it is predicted neither by controllability nor by coping, and it does not predict support. Since AIDS is a terminal disease, it is not surprising not to find a large variation in outcome expectancy. Pity appears to be the appropriate emotional reaction which facilitates the likelihood to extend support (see Figure 1 and Table 4).

![Figure 1](image1)

**Figure 1** Pity and expectancy as mediators between controllability and coping and social support in the AIDS scenario.

For *cancer*, pity was again the best predictor of support \((p = 0.43)\), whereas expectancy failed to contribute anything \((p = 0.07)\). But the antecedents were different; controllability had no significant impact on pity or expectancy, whereas coping had a strong path to expectancy \((p = 0.52)\) and a moderate one to pity \((p = 0.22)\). Although cancer can be a terminal disease in many cases, there are better survival chances for those who comply with treatment. This explains the association between coping and expectancy, but, surprisingly, there was little effect on support intentions that were based more on pity (see Figure 2 and Table 4).

![Figure 2](image2)

**Figure 2** Pity and expectancy as mediators between controllability and coping and social support in the cancer scenario.

In case of *drug abuse*, variations in controllability elicited no effects reactions but coping did. A strong path from coping to expectancy emerged \((p = 0.70)\),
accompanied by another strong path from expectancy to support \((p = .40)\) making this the major pathway to help intentions. A minor pathway was added from coping through pity \((p = .25, p = .13)\). Drug abuse is a rather unstable condition and appears to be modifiable. Whether one is ready to support a drug user mainly depends on the likelihood of perceived change based on his or her coping efforts, no matter how the problem was originally caused (see Figure 3 and Table 4).

**Figure 3** Pity and expectancy as mediators between controllability and coping and social support in the drug abuse scenario.

In case of *heart disease*, there was no effect of controllability, and pity also had no significant relationships (see Figure 4 and Table 4. The only pathway to support led from coping via expectancy \((p = .56, p = .26)\). Heart disease is interpreted as a modifiable condition that varies with one's health behavior such as nutrition, exercise, and relaxation. The origin of this condition seems to be unimportant for a decision to help the patient.

**Figure 4** Pity and expectancy as mediators between controllability and coping and social support in the heart disease scenario.

*Anorexia nervosa* can also be regarded as an unstable condition where active coping makes a difference. Controllability had no influence but coping determined expectancy \((p = .70)\) and pity \((p = .20)\) (see Figure 5 and Table 4).
Anorexia is considered a highly modifiable condition. If a patient copes well it will vanish, no matter how controllable the origin was.

![Figure 5](image)

**Figure 5** Pity and expectancy as mediators between controllability and coping and social support in the anorexia scenario.

A different picture emerged for child abuse. Both direct effects on support were almost equal, with pity (e = .37) and expectancy (e = .31) accounting for a similar amount of variation in support. The key antecedent factor, however, was coping which was closely related to expectancy (p = .60). Compared to drug abuse, child abuse is not a health-compromising behavior but more a socially deviant act that elicits emotions such as either outrage or pity towards the actor, the latter emotion only if there was not much control over the behavior (see Figure 6 and Table 4).

![Figure 6](image)

**Figure 6** Pity and expectancy as mediators between controllability and coping and social support in the child abuse scenario.

In case of depression, the predictors controllability and pity turned out to be irrelevant, whereas expectancy had an influence on support (p = .34), based on the coping efforts of the target person (p = .38). This clearly documents that an active contribution on behalf of the mental health patient is required in order to make the condition look changeable, so that support would not be in vain. Only expectancy had an effect on support (see Figure 7 and Table 4).
Finally, in case of obesity, an almost identical result emerged. Again, controllability and pity were negligible factors but expectancy ($p = .30$), based on coping ($p = .61$), made the difference. Obesity is an unstable condition, and those who do not counteract their problem cannot count on help from others. Only active coping efforts elicit expectancy which in turn trigger readiness for social support (see Figure 8 and Table 4).

**Figure 7** Pity and expectancy as mediators between controllability and coping and social support in the depression scenario.

**Figure 8** Pity and expectancy as mediators between controllability and coping and social support in the obesity scenario.

In sum, in five of the eight stigmas, *outcome expectancy* was the main predictor of support intention. These five were drug abuse, heart disease, anorexia, depression, and obesity. The two terminal diseases, AIDS and cancer, differed from the majority by their conspicuous pathway from pity to support intent. In these two cases, one’s intention to help was almost exclusively based on pity. For child abuse, a balanced influence of pity and expectancy emerged. *Coping* was a stronger antecedent than *controllability* in seven out of eight cases. The exception was AIDS. The overall picture corroborates the assumption that outcome expectancy is a critical mediator between target coping and social support intention. From these results, whether one extends help or not is primarily dependent on the expectancies aroused by the victim characteristics, and particularly the person’s way of coping.
Discussion

Each of the eight stigmas was examined in separate path analyses with respect to the two experimental factors, controllability and coping as antecedents, and pity and expectancy as mediators. The model fit the data and expectancies were a major direct source of support variation. Pity was a direct predictor of social support only in three specific contexts. It is noteworthy that there was a high degree of variation between the eight stigmas, indicating that the specific circumstances decide whether the willingness to help is primarily based on either pity or expectancy. In terminal diseases such as AIDS or cancer, pity appeared to be more influential than expectancy, whereas for unstable health conditions such as drug abuse, anorexia or obesity the coping-expectancy-support link was obvious. It might be, therefore, that the perceived stability of a condition is a critical underlying dimension that affects judgments of help. Controllability was less influential compared to coping which, in turn, partly determined expectancy. The most conspicuous pathway led from coping via expectancy to support intent.

STUDY II

In the first experiment, the expected improvement of the target's condition was one of the mediators under investigation. In the second experiment, the attention was shifted to a support provider characteristic to address the question of whether the perception of one's ability to help would make it more likely that a support intention occurs. In other words, self-efficacy expectancy, one's perceived personal capability of extending effective support, was the focus. It was hypothesized that self-efficacy expectancy played the same role as a mediator that outcome expectancy did in the first experiment.2

Method

Design. The path-analytic model was the same as in the first study but there were some differences in the experimental manipulations and in the measures involved. Only one problem situation was selected, a sexual assault scenario, that was varied with respect to controllability and coping. A rape victim in the uncontrollable condition was described as a student who studied one night at the library and was raped on the way to her car by a stranger. In the condition designed to seem slightly more controllable she was described as someone who attended a party where she drank too much and flirted with the males; when she was taken home by one of them, she invited him up to her apartment and was raped. The adaptively coping victim was characterized as one who was trying hard to go on with her life after the assault, having joined a support group and seeing a counselor each week. The maladaptively coping victim did not try to

2 Study II was conducted by Grace Woo, Christine Dunkel-Schetter, and Ralf Schwarzer.
overcome her problem situation. She had withdrawn from friends and did not eat; she also refused to attend a support group meeting and to see a counselor.

The experiment was arranged as a 2 x 2 between-subjects design; 70 undergraduate students responded to the vignette randomly assigned to one of four conditions. There were 55 males and only 15 females, but their distribution over the four cells was about equal, with cell sizes of 19, 17, 18 and 16.

Measures. Pity, self-efficacy expectancy and support intentions were the dependent variables used in this report. All were rated on a 5-point scale. Pity was assessed by four adjectives as part of a checklist, namely empathy, sympathy, pity, and compassion. Emotional support intent was measured by four items such as “Would you be willing to try to console and reassure your friend when she is upset?” and “Would you spend time listening to her emotional reactions to the assault?” Tangible support intent was measured by six items such as “Would you be willing to offer her help with her school work if she needed it?” and “Would you lend her money to see a therapist?” Self-efficacy expectancy was measured by a newly developed 10-item scale that was employed for the first time. Its psychometric properties were satisfactory with an average item-total correlation of .55 and an internal consistency of Cronbach’s alpha = .85. The items were worded in the following way:

1. I possess the necessary social skills to alleviate the distress of a sexual assault victim.
2. It is easy for me to comfort someone in distress.
3. I am capable of providing the appropriate resources for a rape victim.
4. It is difficult for me to communicate empathic understanding. (-)
5. I could make someone feel better no matter how depressed she is.
6. When it comes to comforting someone, I feel awkward. (-)
7. I am not sensitive enough to meet the support needs of a sufferer. (-)
8. I do not trust my skills to communicate in a beneficial way with a sexual assault victim. (-)
9. I am not the kind of person who can meet the emotional needs of others who are in a crisis. (-)
10. I have sufficient communication skills to cheer up someone who is experiencing stress.

Results

A structural model was specified with the two experimental factors as antecedents, and with pity, self-efficacy expectancy, and support as the dependent variables. In contrast to the previous study, this is a multiple indicator model. The three endogenous variables were specified with two indicators each. The four pity items were divided into two sets (each pity indicator had two items); support was specified by the emotional support scale as well as the tangible support scale, and the two self-efficacy indicators were two 5-item subsets of the instrument described above. The results of the LISREL analysis are depicted in Figure 9.
Figure 9 Pity and expectancy as mediators between controllability and coping and social support in the rape scenario.

The fit of the model was chi-square = 17.4 (15 df, \( p = .295 \)) with a chi-square/df ratio of 1.16. Goodness of fit was GFI = .94 and adjusted goodness of fit AGFI = .87. The root mean square residual was RMSR = .09. Although the latter two indices fall short of the usual requirement, the overall fit can be regarded as satisfactory, based on the other indices. The explained variance for social support was 34%, which is quite good, whereas those for pity and for self-efficacy expectancy were low (7% each). Decomposing the effects on support led to substantial direct effects for pity (\( e = .44 \)) and for self-efficacy expectancy (\( e = .36 \)), and to smaller indirect effects for controllability (\( e = .03 \)), and for coping (\( e = .17 \)). Pity and expectancy were very good predictors of support intent, but the underlying experimental factors (control, coping) were of lesser influence.

Discussion

The second experiment has replicated the general causal model leading from victim characteristics to support provider emotional reactions or cognitions, resulting in an intention formation. Pity emerged here as the strongest predictor of support, but self-efficacy expectancy also contributed substantially. Controllability turned out to be negligible, whereas coping exerted a weak, but statistically significant, influence on pity and self-efficacy.

However, it is difficult to construe a sexual assault as controllable, and the two conditions differed in ratings of controllability only by one point, although significantly. In addition, the rape scenario is quite different from the eight stigma scenarios described in Study I. There is no disease or bodily condition
involved but a single violent act caused by an external agent. An assault is likely
to be viewed generally as less controllable than other social stigmas such as
obesity or drug abuse. The degree of controllability only varied in the study from
*uncontrollable* to *somewhat controllable*; there was not really a "controllable"
experimental condition. Adverse chance events seem especially likely to trigger
pity, whereupon the victim is not blamed.

**GENERAL DISCUSSION**

The present findings from Studies I and II are based on hypothetical
scenarios with students. Therefore, the results can be generalized neither to actual
helping situations nor to other populations. This procedure also has some inher­
ent limitations in that respondents may be unable to judge accurately their affec­
tive reactions and whether they would or would not offer help to particular indi­
viduals. In addition, some key variables that affect emotion and social support
certainly are excluded from the manipulated factors. However, as noted by
Cooper (1976), "when looked at from the point of view of generating hypotheses,
finding new leads, and initiating models of behavior, [role playing] may be the
[best] method" (p. 605). In addition, in the investigations presented here and by
Weiner et al. (1988), the stimulus configurations examined could not be found
without overwhelming difficulty in field research, with the consequences that
variables would be confounded. Finally, prior research has suggested that role­
enactment strategies in the study of help-giving have yielded data comparable
with observations of actual behavior (see review in Weiner, 1986). For these
reasons, and particularly in light of the relatively recent growth of the study of
social support, we used a hypothetical scenario method. Research must extend
theoretical and experimental analyses within the current framework before
applying these research questions to real-life situations.

The present studies have underscored the notion of emotional and cognitive
mediators in the process of forming behavioral intentions. When dealing with
victims of life events including medical patients, the likelihood of mobilizing
help is dependent on a number of recipient and provider characteristics (Dunkel­
Schetter & Skokan, 1990). The controllability of the cause of the problem ap­
pears to play a role in the determination of help. Moreover, the changeability or
instability of the problem as reflected in coping efforts seems to elicit positive
expectancies in the observer and motivation to help. Such efforts may create both
a sense that the situation can be improved and a belief that one can effectively as­
sist the victim. Thus, outcome expectancy as well as self-efficacy expectancy are
useful cognitive mediators. They are part of a mechanism that governs the trans­
lation of thought into action. Both studies have dealt with one of these cognitions
exclusively, and it would be worthwhile to integrate both concepts into one
empirical framework in a subsequent study.

One conclusion of the first experiment concerns the specificity of the result
pattern to individual situations. To what degree pity or expectancy mediate
recipient characteristics and support intent depended on the particular circumstances, i.e., the stigma chosen and, probably, the unique wording of the vignettes. In the second experiment, there was only one context provided, namely the rape scenario. Therefore, it remains unclear, as to whether these circumstances have affected the results. It could be, for example, that for a divorce or an accident, completely different path coefficients would emerge. The evidence for self-efficacy expectancy as a mediator is limited to the context chosen, and further research should make use of a number of different problem domains.

There are underlying similarities, however, between the selected problems that may suggest a common pattern of reactions to victims. For AIDS, cancer, and rape, the emotion of pity appears to be a stronger mediator than expectancy. These problems are loss/harm situations, whereas contexts such as anorexia, obesity, drug abuse, child abuse, depression and heart disease are more like threats (see Dunkel-Schetter et al., 1991; Hobfoll, 1988; Lazarus, 1990; Lazarus & Folkman, 1984). Different stress appraisals may determine the amount of pity and specific expectancies in potential support providers. If a victim is severely harmed or if the physical integrity of a victim is lost, then pity prevails; if, however, an on-going risky or threatening behavior is the topic, it is seen as more unstable and modifiable and, therefore, gives rise to a greater role for expectancies.

Expectancies can be pessimistic or optimistic. Pessimism undermines the motivation to help because the investment of further support efforts appears to be wasted; optimism, however, assumes that the victim will be responsive to future support attempts and thereby render them worthwhile. Optimism, as a psychological construct, has been defined as “generalized outcome expectancies” (Scheier & Carver, 1985, 1987). This construct has recently become one of the key issues in research on stress, coping, and mental health as well as physical health (Scheier et al., 1989; Seligman, 1991). The present studies have underscored the role of situation-specific outcome expectancies and self-efficacy expectancies after Bandura (1977, 1991). Further research should address the notion of specificity versus generality of expectancy, with dispositional optimism being one example of a more general construct. Jerusalem and Schwarzer (this volume) have developed a global self-efficacy scale that has demonstrated high predictive and construct validity in several field studies. Although specific measures are preferred in clinical intervention studies of behavioral change, there might be an advantage to global measures in other research domains.

Although the present studies have provided preliminary evidence for the role of expectancies as mediators in the helping process, it remains undetermined how outcome expectancy and self-efficacy expectancy are interrelated. Each experiment has dealt with only one of these cognitions but failed to account for their joint influence. It would be premature to conclude from the above findings that outcome expectancy exerts a stronger influence on support intent than self-efficacy expectancy. There might be a causal order among the two. For example, it might be that a support provider does not scrutinize her helping capability
unless being faced with a target’s condition that is improving or one that is, at least, modifiable. A third variable could be critical here, namely one’s personal experience with (a) crisis situations that require support, and with (b) the effectiveness of one’s previous helping attempts (Dunkel-Schetter & Skokan, 1990). Self-efficacy expectancy is shaped by context-specific mastery experiences, among others, and therefore it would be necessary to investigate expectancies jointly with an assessment of previous help experience.

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This chapter includes revised and expanded material from an article published in

The Psychologist as an invited address at the annual meeting of the British
TWO DIMENSIONS OF PERCEIVED SELF-EFFICACY: COGNITIVE CONTROL AND BEHAVIORAL COPING ABILITY William J. McCarthy and Michael D. Newcomb Confirmatory factor analyses were conducted to test the empirical justification for distinguishing between perceptions of behavioral coping ability and perceptions of cognitive control coping ability for handling environmental challenges. Twenty-four measures of perceived personal effectiveness were collected from 739 young adults, including measures of perceived ability to have a social impact, assertiveness, leadership style, and dating competence. These items were submitted to a hierarchical confirmatory factor analysis in a random half of the sample. As expected, two empirically well-justified second order factors were obtained reflecting perceived cognitive control and behavioral coping strategies. This factor structure was cross-validated in the other half of the sample, and separately for males and females, with all hypothesized features confirmed. Literature on coping strategies, on sex role differences, and on self-efficacy predictors is cited as support for distinguishing between perceived cognitive control and perceived behavioral coping abilities. Implications of this distinction for elucidating developmental patterns of drug use and for improving understanding of relapse in lifestyle change programs are discussed.

Why do individuals rely primarily on intrapsychic coping in some contexts and behavioral coping in other contexts? Suppose that a middle-aged woman whose children have grown and left home is distressed to find that her husband pays her inadequate attention, responding perfunctorily to her comments and showing more enthusiasm for newspaper reading and TV watching than for talking with her. Her perceived ability to cope cognitively with this situation may be high or low. If it is high, then by merely reframing her thoughts, she can palliate or eli
minimize her distress, perhaps by thinking of evidence that she is indeed an inter
esting person and that her husband pays her no attention because he is preoccu
 pied by his work. If it is low, then the distressful observation that her husband
 finds her boring will intrude on her thoughts unless the situation changes. Similarly, her perceived ability to cope behaviorally with the situation may
 be high or low. If it is high, she may elect to leave him or feel confident that she
 can alter his behavior. If it is low, she will feel that the situation is inescapable
 and that all of her alternatives are less attractive than the status quo. Perceptions of personal coping ability have been related to a wide range of
 health-related outcomes, including smoking cessation, weight control, alcohol
 abuse, exercise, and contraceptive behavior (e.g., Strecher, DeVellis, Becker, &
 Rosenstock, 1986, and O'Leary, 1985). As individuals' self-percepts of coping
 ability increase, so does the probability of their achieving self-set health goals. Between the identification of an important self-relevant goal and the ultimate
 achievement of the goal are interposed challenges with which the individual must
 cope. These challenges may be primarily cognitive or primarily behavioral in
 nature. The coping behaviors appropriate for dealing with these challenges have
 been termed emotion-focused or problem-focused (e.g., Folkman & Lazarus,
 1980). Emotion-focused coping includes such behaviors as
avoidance, intellectualization, isolation, suppression, and magical thinking. Problem-focused coping includes such behaviors as information-seeking, cognitive problem-solving, inhibition of action and direct action. The perception that one can effectively implement emotion-focused or problem-focused coping can be termed perceived cognitive control ability and perceived behavioral coping ability, respectively. Other literature on coping has promoted a distinction between behavioral and cognitive ways of coping. For example, Pearlin and Schooler (1978) discussed three major categories of coping responses, two of which involved cognitive strategies to reduce or eliminate stress, whereas the third concerned the active manipulation of the environment. In her review, Taylor (1986) identified four types of control that mediated the effects of coping with stressors, but concluded that these four types of control could be reduced to two: (a) changing thoughts with respect to the stressor, and (b) taking some action with respect to the stressor. If people differ in whether they rely primarily on cognitive or behavioral means of coping with a challenge, they also probably differ in their perceived ability to use either cognitive control or behavioral strategies for coping with the challenges. The following report seeks to confirm the validity and usefulness of
distinguishing between perceived cognitive control and behavioral coping ability

through confirmatory factor analysis of young adult data on coping strategies and

through example. Although we find it useful to distinguish between perceived cognitive control

ability and perceived behavioral coping ability, we note that efficacious behavior

is rarely a function exclusively of only one of these. Characteristics of the con

text (such as the amount of freedom individuals have to change the environment)

and characteristics of the individual (such as age) determine which type of per

ceived coping ability is the more important contributor to self-perceived ability to

perform the desired behavior. In their study of adult responses to 1,332 stress episodes, Folkman and

Lazarus (1980) noted that both problem-focused and emotion-focused coping

were used to cope with 98% of the episodes. They also noted that the importance

of the type of coping varied, however, with context and according to the charac

teristics of the individuals. Cognitive strategies were employed most frequently

in situations where the individual was relatively helpless to bring about the

desired behavior by themselves, such as when recovering from an illness.

Problem-focused strategies were employed more frequently in work situations.

Folkman and Lazarus found that the importance of type of
coping varied with
gender, with men relying more heavily than women on
problem-focused coping
even when the context permitted only emotion-focused
coping. It should be not
ed, again, that distinguishing conceptually between
perceived cognitive control
and perceived behavioral coping ability should not imply
that we view these con
cepts as independent. Folkman and Lazarus (1980), in fact,
observed a mean cor
relation of .44 between emotion-focused and problem-focused
coping across
three different samples. This study was designed to
confirm the reasonableness of distinguishing
generically between perceived cognitive coping ability and
perceived behavioral
coping ability as separate components of self-efficacy.
The importance of this
distinction, if accepted, is that it would be likely to
stimulate more careful exami
nation of the contextual, temporal, and individual
influences on percepts of self
efficacy. Individuals may have similar perceptions
concerning their respective
abilities to accomplish their jobs or to effect major
lifestyle changes, but never
theless vary greatly in their perceived ability to cope
with the behavioral or cog
native challenges associated with accomplishing the desired
behavior. Moreover,
within individuals the relative importance of perceived
cognitive control and be
Behavioral coping ability may vary with time, age and the individual's experience with coping with the specific challenge. In settings such as prisons, where inmates would find that a problem-focused coping strategy is often inappropriate, individuals can still vary in their ability to cope with environmental stressors, depending on their perceived ability to regulate their thoughts. In the same vein, children's responses to environmental challenges often are limited to cognitive coping strategies because their dependency on adults and their immaturity are such as to obviate the use of behavioral coping strategies. A child who is sexually abused by an adult relative, for instance, typically relies on cognitive strategies to cope with the situation, especially disassociation, and later, amnesia (Courtois, 1988). Contrariwise, the theoretical necessity for the separate concept of a perceived ability to cope behaviorally seems justified by attempts to relate the use of coping strategies to spontaneous major lifestyle change. Spontaneous major lifestyle changes, such as taking up jogging, reducing the percentage of calories in one's diet derived from fat, and adopting a child, put a premium on behavioral coping relative to cognitive control coping, because there are simply too many changes in day-to-day behaviors resulting from the major lifestyle change in question to be anticipated cognitively. It is reasonable to assume that
persons with strong beliefs in their general ability to change their social and physical environment will be more likely to embark on major voluntary lifestyle changes than are persons who perceive themselves as generally having weak behavioral coping strategies. When discussing the influences on adoption of major lifestyle change one has to speak of "general" ability because many of the specific challenges that follow the major lifestyle change are unanticipated at the time of the decision.

Successful voluntary lifestyle change is often accompanied by multiple changes in how the individual interacts with her/his social and physical environment. A successful change in diet, for instance, will typically be accompanied by changes in shopping habits, changes in cooking habits, and changes in where, when and with whom to dine out. For predicting the success of major lifestyle change efforts, one's ability to cope intrapsychically with specific challenges seems less relevant than one's general ability to have a behavioral impact on one's environment. This focus on "general" ability might seem inappropriate for a discussion of self-efficacy as it is classically defined (Bandura, 1977). This focus is consistent, however, with recent demonstrations that global judgments about a subject's
ability to train employees or to influence organizational performance can influence their perception of their own organizational ability (Bandura & Wood, 1989; Wood & Bandura, 1989) and subsequent organizational performance.

Description of Proposed Study
For this study, we followed the strategy of Ryckman, Thornton, and Cantrell (1982). A comprehensive range of 24 measures of personal effectiveness was administered to a community sample of young adults being followed in a longitudinal study of growth and development. These measures were submitted to a hierarchical, confirmatory factor analysis in a random half of the sample and cross-validated in the other half. Based on the literature discussed above, we hypothesized finding two second order factors of perceived behavioral ability (Perceived Behavioral Coping Ability) and perceived cognitive control ability to cope with environmental challenges (Perceived Cognitive Control Ability).

Multiple assessments of personal effectiveness included measures of perceived ability to have a social impact, general assertiveness, dating competence, social support, depression, perceived loss of control, purpose in life, and leadership style. These were selected to provide a comprehensive range of measures of the subjects' cognitive and behavioral skills and emotional states related to interper
sonal relations. We expected that Perceived Behavioral Coping Ability would be reflected in first-order factors of social impact efficacy (perceived ability to have a social impact), general assertiveness, social resources, dating competence, and leadership style because these represent ways of behaviorally operating on the environment. On the other hand, we expected that Cognitive Control Coping Ability would be reflected in constructs of social impact efficacy, depression, purpose in life, and perceived loss of control because these involve internal coping or cognitive qualities. Expected social impact efficacy was expected to load on both second-order factors because this measure included cognitive and behavioral coping items (Blatt, Quinlan, Chevron, McDonald, & Zuroff, 1982).

Table 1

<table>
<thead>
<tr>
<th>Description of Sample Characteristic</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex Male</td>
<td>221</td>
<td>30</td>
</tr>
<tr>
<td>Female</td>
<td>518</td>
<td>70</td>
</tr>
<tr>
<td>Age Mean 21.93 Range 19 24</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ethnicity Black</td>
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<td>15</td>
</tr>
<tr>
<td>Hispanic 72 10 White 490 66</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian 66 9 High School Graduate Yes</td>
<td>684</td>
<td>93</td>
</tr>
<tr>
<td>No 55 7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Living Situation Alone 28 4 Parents</td>
<td>343</td>
<td>46</td>
</tr>
<tr>
<td>Spouse 77 10 Spouse and Child 56 8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cohabitation 67 9 Dormitory 40</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Roommates 96 13 Other 32 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of Children None 619 84</td>
<td></td>
<td></td>
</tr>
<tr>
<td>One 106 14 Two or more 14 2 Current</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Life Activity Military 23 3 Junior College 87 12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Four-year college 153 21 Part-time job 102 14 Full-time job 343 46 Other 31 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Income for Past Year None 71</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Under $5,000 242 33 $5,001 to $15,000 334 45 Over $15,001 92 12</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The analyses proceeded in steps, first testing for sex differences on the measures. Then the adequacy of the hypothesized latent measurement model was
tested followed by testing the second-order factor model of the primary-order latent variables. These analyses were conducted in the derivation sample, and then the second-order factor results were confirmed in the cross-validation sample, and in separate samples of men and women. METHOD Subjects Participants in this study were 739 young adults who completed an eight-year (fifth wave data assessment point) longitudinal study of adolescent and young adult development. Data were collected initially from 1,634 students in the seventh, eighth, and ninth grades at II randomly-selected Los Angeles County schools. At this young adult follow-up, each participant was paid $12.50 to complete the questionnaire and all subjects were apprised of a grant of confidentiality given by the U.S. Department of Justice. Forty-five percent of the original sample participated as young adults. The loss of subjects due to attrition over the eight years has been shown not likely to bias the results adversely (Newcomb, 1986; Newcomb & Bentler, 1988a). Table I presents a description of the sample. As evident, 30% were men and 70% were women, which parallels the sex distribution in the initial sample and does not reflect differential attrition by sex. Most were employed full-time and represented varied ethnic backgrounds. Additional information is provided about their current living arrangements, income, and current life
pursuits. When these

sample characteristics are compared with national samples of young adults (e.g.,

Bachman, O'Malley, & Johnston, 1984; Miller et al., 1983) or other studies of

young adult populations (e.g., Donovan, Jessor, & Jessor, 1983; Kandel, 1984)

very similar patterns emerged. Consequently, we consider this sample to be

reasonably representative of young adults in general. Measures Table 2 presents a listing of the 24 variables used in this study. They are

organized according to the latent construct they are hypothesized to reflect. For

instance, the latent construct of Social Impact Efficacy is assumed to generate the

variation in three observed indicators called inner resources, independence, and

others' respect. For factors which tend to be unidimensional in nature, three

measured-variable indicators were constructed from the items to reflect the latent

factor or construct. This was done, since, as a rule, it is recommended to have at

least three, highly correlated indicators to identify a latent construct (e.g., Bentler

& Newcomb, 1986). This was done on the self-efficacy, dating competence,
general assertiveness, and purpose of life factors.
Standard univariate statistics

for each variable are also given in the table. Below we describe how each

variable was assessed in regard to the latent construct it represents. Social impact efficacy. Three scales are used
to reflect the Social Impact Efficacy construct. These were derived from the five-item scale of efficacy developed by Blatt et al. (1982). Responses to these five items were given on a five-point anchored rating scale that ranged from strongly disagree (1) to strongly agree (5). The items were factor analyzed and found to reflect a unitary construct (only one eigenvalue greater than 1.00 and all factor loadings were greater than .4 on the first unrotated factor). As a result, these five items were combined into three scales based on content. Inner resources was assessed with a single item-"I have many inner resources." Independence was the average of two items-"I am a very independent person" and "I set my personal goals as high as possible." Others' respect was the average of two items-"Others have high expectations of me" and "What I do and say has a great impact on those around me." General assertiveness and dating competence. Dating Competence was assessed by three scales (dating 1, dating 2, and dating 3) derived from a nine-item scale of social competence in dating situations. General Assertiveness was assessed by three scales (assertive 1, assertive 2, and assertive 3) obtained from a nine-item social assertiveness scale. The total Dating Competence and Social Assertiveness scores were calculated as the sum of the respective scales.
tiveness scales were developed by Levenson and Gottman (1978), and in several studies had quite good discriminant validity in both normal and clinic samples.

In the derivation study the entire Dating Competence scale had an internal consistency reliability alpha of .92, while for the General Assertiveness scale the alpha was .85. Latent constructs derived from these scales have also been used in a study of sexual behavior and responsiveness (Newcomb, 1984). Social resources. Three questions were asked to determine the quantity or amount of social supports as perceived in three life contexts. The first item asked "How many clubs, groups, or organizations do you belong to (including church groups)?" The second item asked "How many friends do you really feel close to?" And the third item asked "How many family members or relatives can you talk to about things personal to you?" Responses were given on a rating scale that ranged from none to nine or more. These items were specifically developed for this research project, but are similar to standard measures of social support that focus on amount of social resources and correlate quite highly with satisfaction with social support from various types of social networks (Newcomb & Bentler, 1980b). Depression. The 20-item depression scale from the Center for Epidemiology Study of Depression (CES-D) was completed by all
subjects. The development, validities, and reliabilities of the measure have been reported elsewhere (Husaini, Neff, Harrington, Hughes, & Stone, 1980; Radloff, 1977; Weissman, Sholomskas, Pottenger, Prusoff, & Locke, 1977).

Participants were asked to rate their frequency of occurrence for each of the 20 symptom items during the past week on a scale from none (0) to 5 - 7 days (3). The 20 items were factor analyzed in this sample and found to contain four distinct factors, which is consistent with previous attempts to determine the factor structure of the CES-D (e.g., Clark, Aneshensel, Frerichs, & Morgan, 1981; Radloff, 1977; Roberts, 1980). The four factors included positive affect, negative affect, impaired motivation, and impaired relationships. Items were averaged into the respective four factors and were used as indicators of a general latent construct of Depression. Perceived loss of control. Three single-item variables are hypothesized to reflect the construct of Perceived Loss of Control. Subjects were asked to rate their degree of agreement with three statements: (1) "I feel I am not in control of my life," (2) "I feel that whether or not I am successful is just a matter of luck and chance, rather than my own doing," and (3) "I feel that others are running my life for me." Responses were given on a seven-point anchored rating scale that
ranged from strongly disagree (1) to strongly agree (7). Cronbach’s alpha for these three items was .65. This construct assesses a general lack of control over life events, and has been validated in other samples and studies (Newcomb, 1986; Newcomb & Harlow, 1986). Purpose in life. The Purpose in Life test (Crumbaugh, 1968; Crumbaugh & Maholic, 1964, 1969) consists of 20 items designed to assess one’s level of or purpose in life. Each item was rated on a seven-point anchored rating scale ranging from strongly disagree (1) to strongly agree (7). Previous research on the Purpose in Life test indicated that it contains several small primary factors and one large general factor (Harlow, Newcomb, & Bentler, 1987). For purposes of this study, the 20 items were randomly assigned into three scales (PIL I, PIL 2, and PIL 3) which were used as manifest indicators of a latent construct of Purpose in Life. Leadership style. Two personality scales, ambition and leadership, were used to reflect the construct of Leadership Style. These traits were assessed using a self-rating test modified for this research program, but based on the Bentler Psychological Inventory (BPI; Bentler & Newcomb, 1978; Huba & Bentler, 1982). Although the BPI was developed with multivariate methods, the items have a high degree of face validity. Half of the
items for each trait are reverse-scored to minimize response bias or acquiescence. Four items were used to assess each trait and each item was rated on a 5-point bipolar scale. Thus, each scale had a range of 4 to 20. The BPI has proved useful in studies of marital success and failure (Bentler & Newcomb, 1978), criminal behavior (Huba & Bentler, 1983), and adolescent substance use (Huba & Bentler, 1982). The period-free test-retest reliability for ambition was .72 and the reliability for leadership was .71 (Stein, Newcomb, & Bentler, 1986).

Analyses Our first set of analyses use point-biserial correlations to test for mean differences between men and women on each of the 24 variables. We next use a confirmatory factor analysis with latent variables to evaluate the adequacy of the hypothesized factor structure (e.g., Bentler, 1980; Bentler & Newcomb, 1986), in a random half of the sample, which we call the derivation sample. An inspection of the skew and kurtosis estimates for the 24 observed measures indicates that they are relatively normally distributed. As a result we will use the maximum likelihood structural model estimator, which requires multivariately normal data (e.g., Bentler, 1983, 1986). If the initial hypothesized model does not adequately reflect the data (which is common in models with many variables and many sub
jects), we will modify the model until an acceptable fit is achieved, in a manner which will not disturb the critical features of the model. These empirical model modifications will be guided by the multivariate Lagrangian Multiplier test for adding parameters and the multivariate Wald test for deleting parameters (Bentler & Chou, 1986). Once this is accomplished, we will attempt to confirm our two hypothesized second-order constructs in this model, making modifications where necessary. This final model will be tested separately in the other random half of our sample (called the cross-validation sample), as well as the samples of men and women to determine whether the second-order factor structure is an accurate representation in these samples. The final model will also be tested in the original derivation sample, but without the empirical modifications to establish whether the model modifications may have distorted or biased the final results. RESULTS Sex Differences Mean differences between men and women on the 24 variables were tested using point-biserial correlations. Males were coded 1 and females were coded 2, so that a positive correlation indicates that the women had the larger value and a negative correlation indicates that the men had the larger value. These mean difference correlations are presented in the right-hand column of Table 2. Of the 24 variables, significant mean
differences were found on 14 of them.

These differences indicate that the women, compared to the men, felt that they had fewer inner resources, less independence, less respect from others, less assertiveness (on all three scales), a smaller number of friends they could rely on, less positive affect, more negative affect, more impaired motivation, others controlled her life more, slightly less dating competence (only one scale significantly different), less ambition, and fewer leadership qualities. Although there were many mean differences between the men and women, the magnitude of these differences was quite small. For instance, the largest difference accounted for only four percent of the variance between groups (on ambition). Based on these rather small in magnitude mean differences between men and women, the results indicating that there were not different factor structures for men and women on social support and loneliness variables (Newcomb & Bentler, 1986) and on physical health status indicators (Newcomb & Bentler, 1987), we will collapse across sex for the bulk of the remaining analyses. However, we will test our final model in the separate samples of men and women to determine whether we may have obscured any important findings by combining the men with the women.
<table>
<thead>
<tr>
<th>Factor</th>
<th>Variable</th>
<th>Mean</th>
<th>Range</th>
<th>SD</th>
<th>Skew</th>
<th>Kurtosis</th>
<th>Difference rpb</th>
</tr>
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<tr>
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<td>Efficacy</td>
<td>Inner resources</td>
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<td>1-5</td>
<td>.75</td>
<td>-.55</td>
<td>.61</td>
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<td></td>
<td></td>
<td>Independence</td>
<td>3.86</td>
<td>1-5</td>
<td>.76</td>
<td>-.76</td>
<td>.41</td>
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<tr>
<td></td>
<td></td>
<td>Others respect</td>
<td>3.64</td>
<td>1-5</td>
<td>.62</td>
<td>-.39</td>
<td>.56</td>
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<tr>
<td>General Assertiveness</td>
<td>Assertive 1</td>
<td>8.89</td>
<td>4-13</td>
<td>1.84</td>
<td>-.13</td>
<td>-.38</td>
<td>-.13**</td>
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<tr>
<td></td>
<td>Assertive 2</td>
<td>9.07</td>
<td>4-14</td>
<td>1.90</td>
<td>.03</td>
<td>-.32</td>
<td>-.18***</td>
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<td></td>
<td>Assertive 3</td>
<td>8.74</td>
<td>4-14</td>
<td>1.87</td>
<td>.05</td>
<td>-.24</td>
<td>-.09*</td>
</tr>
<tr>
<td>Social Resources</td>
<td>Number of family members</td>
<td>3.48</td>
<td>0-9</td>
<td>2.44</td>
<td>.91</td>
<td>.12</td>
<td>.02</td>
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<tr>
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<td>Number of friends</td>
<td>4.04</td>
<td>0-9</td>
<td>2.34</td>
<td>.71</td>
<td>-.10</td>
<td>.14***</td>
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<td></td>
<td>Number of organizations</td>
<td>1.34</td>
<td>0-9</td>
<td>1.36</td>
<td>1.21</td>
<td>2.54</td>
<td>-.06</td>
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<td>Depression (CES-D)</td>
<td>Positive affect</td>
<td>2.34</td>
<td>0-3</td>
<td>.64</td>
<td>-.96</td>
<td>.32</td>
<td>-.10**</td>
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<tr>
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<td>Negative affect</td>
<td>.63</td>
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<td>.64</td>
<td>1.20</td>
<td>1.20</td>
<td>.15***</td>
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<td></td>
<td>Impaired motivation</td>
<td>.71</td>
<td>0-2.75</td>
<td>.46</td>
<td>.79</td>
<td>.79</td>
<td>.08*</td>
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<td></td>
<td>Impaired relationships</td>
<td>.34</td>
<td>0-3</td>
<td>.47</td>
<td>1.72</td>
<td>3.30</td>
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<tr>
<td>Purpose in Life</td>
<td>PIL I</td>
<td>5.57</td>
<td>2-7</td>
<td>1.80</td>
<td>-.81</td>
<td>.22</td>
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<td></td>
<td>PIL2</td>
<td>5.30</td>
<td>2.4-7</td>
<td>1.80</td>
<td>-.50</td>
<td>.06</td>
<td>-.06</td>
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<td></td>
<td>PIL3</td>
<td>5.41</td>
<td>2-7</td>
<td>1.77</td>
<td>-.57</td>
<td>.13</td>
<td>-.05</td>
</tr>
</tbody>
</table>
Perceived Loss of Control

Not in control 2.26 1-7 1.51 1.31 1.05 -.02
Powerless 2.28 1-7 1.45 1.20 .82 .03
Others control life 2.73 1-7 1.50 .87 .01 .11 **

Dating Competence

Dating 1 8.84 4-13 1.75 -.06 -.28 -.08*
Dating 2 9.25 3-13 1.82 -.19 -.23 -.03
Dating 3 9.96 4-14 1.87 -.14 -.17 -.05

Leadership Style

Ambition 14.52 4-20 3.53 -.41 -.49 -.20***
Leadership 14.29 5-20 2.83 -.13 -.30 -.16***

Note. a Males were coded 1 and females were coded 2, so that a positive point-biserial correlation indicates that the females had the larger value. *p < .05; **p < .01; ***p < .001.

First-Order Latent Factor Model

This first sequence of models are tested on a random half (n = 370) of our total sample, which we call our derivation sample. In the initial confirmatory factor model, the eight latent constructs were hypothesized to "cause" or generate the variation in the 24 observed variables. The factor structure of this first model was "pure" in that each observed variable was allowed to load on only one latent construct. For instance, inner resources was assumed to be an indicator only of Social Impact Efficacy. This assumption of mutual exclusivity may be an overly constrained imposition on the model, since many of the variables are concep
tually similar and may in fact reflect more than one underlying quality. To identify the model all factor loadings were freed, the variances of the constructs were fixed at unity, and all factor intercorrelations were allowed to be freely estimated. This initial confirmatory factor model did not fit the data to an acceptable degree, \( \chi^2 (df = 224, N = 370) = 480.17, p < .001 \), NR (normed fit index: Bentler & Bonett, 1980) = .86. Latent-factor intercorrelations for this model are presented in the upper triangle of Table 3. All hypothesized factor loadings were highly significant, \( p < .001 \). The NFI was sufficiently large to suggest that an acceptable model could be achieved by adding several small empirically determined parameters that were not hypothesized in the initial model. Based on an examination of selected modification indices for additional factor loadings and correlated uniquenesses (Bentler & Chou, 1986), five non-hypothesized factor loadings and 22 correlations among manifest variable residuals were added to the model. With these additions the model adequately fit the data, \( \chi^2 (df = 196, N = 370) = 181.97, p = .76, \text{NFI} = .95 \). This new model was a significant improvement over the initial model (\( p < .01 \)). A summary of all model fit statistics and difference \( \chi^2 \) tests are given in Table 4. To test whether the addition of these empirically-determined parameters distorted the substantive inter
pretation of the model, the latent-factor intercorrelations from the initial model were correlated with those obtained in the final, modified model. These parameters were correlated greater than .99. As a result, the final model was not considered biased due to the model modifications. Standardized factor loadings and residual variances for the final first-order confirmatory factor model are given in Figure I. The rectangles represent the observed variables, the large circles indicate the latent constructs, and the small circles reflect residual variances of the observed variables. These five non-hypothesized factor loadings tend to be small in magnitude (only one is over .40) and all are in interpretable directions. For instance, general assertiveness also negatively influenced the perception that others control your life. The latent-factor intercorrelations for this model are given in the lower triangle of Table 3. The absolute value of the correlations ranged from a low of .06 to a high of .88, and II were higher than .5. In other words, many of the constructs appear to be highly correlated and may reflect higher-order factors, as originally hypothesized. Figure I: Final confirmatory factor analysis model for heterosexual sample. Large circles represent latent factors, rectangles observed variables, and small circles residuals. Not depicted in the figure for reasons of clarity are two-headed arrows (correlations) joining all possible pairs of latent
Parameter estimates are standardized and residual variances. Significance levels were determined by critical ratios (Up < .01; ***p < .001).

.64 Inner resources
.64 Independence .60 .60
.66 Others respect .74
.38 Assertive 1 .79
.45 Assertive 2 .74 .59 Assertive 3 .66 Number of family members
.67 Number of friends
.67
.92 Number of organizations
.47 Positive affect
.22 Negative affect .57 .57 -.40 .88 Impaired motivation
.42' Impaired relationships .59, .76 .40 .2 6
.37 PIL1
.39 PIL2
.31. PIL 3
.50 Not in control .70 .8 3 .85
.74 Powerless
.58 Others control ffe .51 7 1
.21 Dating 1 Dating 2.37, .89 .79 ,63 .73 Leadership Ambition Dating 3 .48
.59,
.44 Social Impact Efficacy General Assertiveness .09 Social Resources Depression (CES-D ) .43 Purpose in Life -.35 Perceived Loss of Control .72 Dating Competence Leadership Style -.26 .57 .51
Table 3

Factor Intercorrelations Between the Initial (Upper Triangle) and Final (Lower Triangle) First-Order Confirmatory Factor Models

<table>
<thead>
<tr>
<th>Factor II</th>
<th>III IV</th>
<th>V VI VII VIII Social Impact Efficacy</th>
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<tbody>
<tr>
<td>1.00</td>
<td>.60</td>
<td>.40 .31 1.00 - .37 .50 - .30 040 .58 .67</td>
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<tr>
<td>II General Assertiveness</td>
<td>.60</td>
<td>1.00 .30 - .31 .50 - 040</td>
</tr>
<tr>
<td>III Social Resources</td>
<td>.40</td>
<td>.31 1.00 - .37 .50 - .30 040 .20</td>
</tr>
<tr>
<td>IV Depression (CES-D)</td>
<td>.44</td>
<td>-.34 -.29 1.00 -.59 .73 -.35 -.22</td>
</tr>
<tr>
<td>V Purpose in Life</td>
<td>.78</td>
<td>.46 .50 -.53 1.00 -.88 .54 .30</td>
</tr>
<tr>
<td>VI Perceived Loss of Control</td>
<td>-.61</td>
<td>-.39 -.25 .61 -.84</td>
</tr>
<tr>
<td>VII Dating Competence</td>
<td>.56</td>
<td>.61 049 -.32 .52 -A 1.00 .48</td>
</tr>
<tr>
<td>VIII Leadership Style</td>
<td>.61</td>
<td>.56 .12 -.06 .27 -.25 AI 1.00</td>
</tr>
</tbody>
</table>

Note. *r* between initial and final correlations > .99. All correlations are significant at *p* < .01. Second-Order Confirmatory Factor Models Based upon our theoretical position, which hypothesized that two second-order factors should underlie the construct of self-efficacy, two second-order factors were introduced into the confirmatory factor analysis. One second-order factor represented Perceived Behavioral Coping Ability and was reflected in loadings allowed on social impact efficacy, general assertiveness, social resources, dating competence, and leadership style. The other second-order
factor reflected Perceived Cognitive Control Coping Ability with hypothesized
factor indicators of social impact efficacy (the only first-order construct to load
on both second-order factors), a lack of depression, purpose in life, and a lack of
perceived loss of control. A model was tested which included the two second-order factors as defined
above. Perceived Behavioral Coping Ability and Perceived Cognitive Control
Coping Ability were allowed to correlate freely. Three additional empirically
determined correlations were included between pairs of first-order factor resid
uals: Depression and leadership style, social impact efficacy and leadership
style, and depression and perceived loss of control. The factor residual of
purpose in life was fixed at zero in order to prevent it from being estimated as
negative. This model adequately fit the data and was not significantly different from
the first-order confirmatory factor models, even though 16 fewer parameters
were necessary to represent the first-order latent factor intercorrelations (see
summary of fit indices in Table 4). This model is graphically depicted in I
Figure 2 omitting the observed variables for clarity. Parameter estimates are
standardized and residual variables are variances.
Table 4

Summary of Fit Statistics

Model

1. Initial CFAa 480.17
2. Final CFAb 191.97

Model 1-2 difference 288.20

3. Two second-order factors on Model 2 211.13

Model 3-2 difference 19.16

4. Two second-order factors on Model 5 501.04

Model 4-1 difference 20.87

5. Second-order factors correlated at unity 278.89

Model 5-3 difference 67.76

6. Separate cross-validation sample-Model 3 358.54

7. Males only, Model 3 219.29

8. Females only, Model 3 352.51 Degrees of p Value

<table>
<thead>
<tr>
<th>Freedom Derivation Sample (N = 370)</th>
<th>&lt;.001</th>
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<th>.76</th>
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<tr>
<td>20 &lt;.001 212</td>
<td>.50</td>
<td>16</td>
<td>.26</td>
</tr>
<tr>
<td>240 &lt;.001 16 10 213 &lt;.001 1</td>
<td>.89</td>
<td></td>
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<table>
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<th>Cross-Validation Samples</th>
<th>&lt;.001</th>
<th>212</th>
<th>.35</th>
</tr>
</thead>
<tbody>
<tr>
<td>212 &lt;.001 212</td>
<td>.89</td>
<td></td>
<td></td>
</tr>
<tr>
<td>212 &lt;.001 Normed Fit Index</td>
<td>.90</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. a CFA = Confirmatory factor analysis. b Modified by adding 22 correlated residuals and 5 nonhypothesized factor loadings. Perceived Behavioral Coping Ability and Perceived Cognitive Control

Coping Ability were correlated .66, indicating a moderate association between them (44% common variance), while retaining their own uniqueness. This cor

relation resembled the correlation of .44 that Folkman and Lazarus (1980)

observed between emotion-focused and problem-focused coping
and the range of correlations (.48-.37) between perceived coping and cognitive control efficacy that Ozer and Bandura (1990) recently reported. (These studies measured var
iables rather than latent constructs, which might account for the smaller size).

The largest additional correlation was between the residuals of Social Impact chi2 Efficacy and Leadership Style, indicating that the two second-order factors did not account for the entire association between these two constructs. This association may reflect an additional second-order factor for these two constructs, over-and-above the relationship accounted for by the Perceived Behavioral Coping Ability factor. A similar possibility may exist for Depression and Perceived Loss of Control. These were not tested because two-indicator factors tend to be very unstable, and the fit and interpretability of the model seem to be quite good as it stands. In order to determine whether the two second-order factors of self-efficacy that we have identified are in fact separate constructs, an additional more restrict ed model was tested. In this model the correlation between the two second-order factors was fixed at 1.0, operationalizing the hypothesis that they are assessing the same quality. This model did not accurately reflect the data and was signifi
cantly worse when compared to the previous model which allowed the two
second-order constructs to be unique (see summary of fit
statistics in Table 4). Finally, we tested the
second-order factor model in the initial confirmatory
model that did not include the additional five factor
loadings nor the 22 corre
lated uniquenesses. All significant relationships were
retained and the resultant
model was not significantly different from the initial
model. Thus, we conclude
that the model depicted in Figure 2 is an accurate
portrayal of the data that is not
biased or distorted due to model modifications.

Cross-Validation of the Second-Order Factor Model This
final model was tested in the separate, untouched random
half of the
total sample, as well as the separate samples of men and
women. Fit indices for
these runs are given in Table 4 (Models 6, 7, and 8). In
each of these three sam
ples, all hypothesized factor loadings and second-order
factor results were
significant. Although only the male sample fit the model
according to the p-value crite
rion, all three models had NFI$s greater than .89,
indicating that each fit the data
reasonably well. Similarly, the ratio of chi 2 to degrees
of freedom was
consistently under 2.0, also reflecting an excellent degree
of fit. All hypothesized
factor loadings on the first-order factors were significant
in each of the three
sample partitions. Table 5 presents the standardized
parameter estimates for the
second-order factors for the derivation sample, as well as the cross-validation, female, and male samples. Although the magnitude of the factor loadings varied somewhat, the general patterns of association were remarkably similar. The correlation between the two second-order factors was consistently in the .64 to .66 range. Using the cross-validation method suggested by Cudeck and Browne (1983), the specific model developed in the derivation sample was used in the cross-validation sample (by imposing identical parameterization and parameter estimates) and accounted for 86% of the variance of their new data. Although the fit was worse in this second sample, the decrement was not substantial, and more important, the substantive conclusions (i.e., interpretation of parameter estimates) was virtually identical in the derivation and cross-validation sample, when parameters were estimated freely (Table 5). As a result, we conclude that the factor model presented in Figure 2 is equally representative of men and women, and thus does not differ by sex of the subject, and has been cross-validated in a separate sample.

Table 5

Summary of Second-Order Factor Parameters for Several Sample Partitions
Parameter Derivation Cross-Validation Female Male Sample
Sample Sample Sample Second-Order Factor Loadings

Behavioral Coping Efficacy

Social impact efficacy A0 .28 .32 .31
General assertiveness .73 .74 .74 .66
Social resources .57 A9 .60 A7
Dating competence .81 .64 .69 .81
Leadership style .50 .50 .56 A6

Cognitive/Emotional Coping

Social impact efficacy .51 .59 .55 .59
Depression -.53 -A7 -A7 -.56
Purpose in life 1.00 .97 1.00 1.00
Perceived loss of control -.85 -.93 -.91 -.85

Factor Correlations

Perceived Behavioral Coping .66 .64 .66 .66
Ability with Perceived
Cognitive/Emotional Ability
Depression (R)a with perceived
loss of control (R) AI .25 .35 .32
Social impact efficacy, (R)
with leadership style (R) A8 A9 .52 .31
Depression (R) with
leadership style (R) -.20 -.12 -.15 -.17

Note. a (R) denotes factor residual.

Figure 2 Final second-order factor model for the derivation sample. The large circles are latent constructs (the two
on the right-hand side are second-order factors; the small circles represent factor residuals. Two-headed arrows are correlations. Parameter estimates are standardized and residual variables are variances. Significance levels were determined by critical ratios (**p < .01; ***p < .001). Social Impact SelfEfficacy .47 General Assertiveness .40 Behavioral Coping Ability .57 Social Resources Depression (CES-D) .72 - .35 .66 Cognitive Control Ability 1.00 .42 .20 .48 Purpose in Life Perceived Loss of Control .28 .20 .81 Dating Competence Leadership Style .50 .28 DISCUSSION

Affirmation of the Distinction Between Perceived Ability to Self-Regulate Cognitively and Perceived Ability to Cope Behaviorally

With Environmental Challenges Our results confirm the validity of distinguishing between beliefs about one's ability to regulate cognitions in response to challenges associated with accomplishing desired goals and beliefs about one's ability to have an impact on the environment to accomplish desired goals. Those constructs that are primarily intrapsychic, such as depression, purpose in life, and perceived loss of control loaded heavily on the Perceived Cognitive Control Ability factor, but did not load on the Perceived Behavioral Coping Ability factor. Those constructs that concern active involvement with one's social environment, such as general assertiveness, leadership, and dating competence, on the other hand, loaded heavily on the Perceived Behavioral Coping Ability factor, but not on the Perceived Cognitive Control factor. The empirical results obtained in this study confirm the usefulness of a theo
retical distinction that is already current and frequently applied in the literature on coping with stress. This report, of course, goes beyond the literature on coping to justify elaborating the self-efficacy construct to include the distinction between perceived cognitive control and perceived behavioral abilities. The findings from a recent prospective study involving these two distinguishable percepts of ability (Ozer & Bandura, 1990) further affirm the importance of distinguishing between cognitive control and behavioral coping ability. Ozer and Bandura noted in this study of women mastering self-defense skills that perceived (behavioral) coping self-efficacy developed more rapidly during the period of training than did cognitive control self-efficacy. One explanation for this finding is that the behavioral and attitudinal changes engendered by 22 contact hours of training in thwarting simulated physical assaults were too many, too disparate, and too emotionally disturbing to be fully apprehended and integrated at the time of skill acquisition. The resulting dissociation of perceived cognitive control and perceived (behavioral) coping self-efficacy during the skill acquisition phase was temporary. By the 6-month follow-up the positive correlation between cognitive control efficacy and (behavioral) coping self-efficacy was restored (r = .37).
despite sustained increases in self-defense efficacy and sustained decreases in perceived vulnerability and anxiety. It is as if time and effort were required to alter existing patterns of cognitive control following sudden major changes in perceived behavioral coping self-efficacy. If these findings are generalizable to other efforts at mastering complex behaviors, they suggest the need to examine in more detail the nature and sequencing of self-efficacy beliefs prior to, during, and following the acquisition of mastery.

Health Consequences of High Intrapsychic Efficacy Relative to Problem-Focused Efficacy Individuals high in Perceived Cognitive Control Coping Ability, relative to Perceived Behavioral Coping Ability, may end up merely palliating problems that could be resolved behaviorally. For example, a woman suffering from an unhappy marriage may successfully reduce that unhappiness via psychotherapy that boosts her self-esteem, thereby increasing her ability to avoid intrusive, self-denigrating thoughts, without doing anything about increasing her perceived ability to influence her husband's insensitivity to her needs. Individuals who perceive that they have little control over their environment can nevertheless increase their probability of achieving a healthful lifestyle change by maximizing their Perceived Cognitive Control. An example would be
an individual working in a tobacco processing plant who would like to quit smoking. Such an individual would find few opportunities for changing the social and physical environment to make it more conducive to quitting smoking, but might nevertheless embark on a plan to become an exsmoker by relying on primarily cognitive control strategies for coping with temptations to smoke.

Cognitive strategies such as thought management, self-reward, and distractive thoughts for reducing urges to smoke could be employed to accomplish a successful transition to being a nonsmoker even though the individual's Perceived Behavioral Coping Ability was low. Conversely, smokers who feel that they have little "willpower" and who are hostile to conventional intrapsychic approaches to behavior change can nevertheless be successfully counseled to effect a successful change to being a nonsmoker by being encouraged to adopt behaviors seriatim that cumulatively are antithetical to the smoking habit. A program of steadily increasing physical activity, for instance, is likely to improve one's chances of becoming a long-term nonsmoker because aerobic exercise is inherently inconsistent or incompatible with the cigarette smoking lifestyle (e.g., Koplan, Powell, Sikes, Shirley, & Campbell, 1982). Successful adoption of behaviors that are
inconsistent with smoking should lead to increased access to images of the self as a nonsmoker,

with an attendant increase in perceived ability to abstain from smoking (Kazdin, 1979).

Implications of the Distinction/or Interventions Designed to Change

Perceptions of Self-Efficacy Interventions designed to influence individuals' self-efficacy with respect to a desirable health-related lifestyle change have not distinguished between Perceived Behavioral Coping Ability and Perceived Cognitive Control Ability.

In the few instances where distinctions have been made between the use of cognitive or behavioral coping strategies, there have been notable differences in the contribution of behavioral and cognitive coping to explaining the behavior change. The literature on the behavior change involved in drug use cessation, to take one example, includes reports of contrasts between behavioral and cognitive methods of coping with temptations to return to drug use. One such applied study found that recidivists among would-be exsmokers reported relying more heavily on behavioral coping than did the more successful exsmokers who continued to abstain from smoking (Shiffman, Reed, Maltese, Rapkin, & Jarvik, 1985). Another study investigated the determinants of
cessation of heroin use

and found a similar advantage for cognitive coping relative to behavioral coping

strategies (Chaney & Roszell, 1985). The findings reported above could be an artifact of the intervention model used, namely the Relapse Prevention model (Marlatt & Gordon, 1985). Much of the work on relapse prevention has focused on how to equip individuals with self-efficacy percepts that would help them cope in situations that pose a high risk of recidivism. The focus however, has not been on increasing the individual's perceived ability to reduce exposure to high-risk situations, but rather on the individual's perceived ability to reduce the experience of stress in high-risk situations. In other words, the focus has been such as to exaggerate the importance of perceived cognitive control for coping with high-risk situations relative to the importance of perceived ability to respond behaviorally for avoiding or escaping from high-risk situations. The superiority of enhancing percepts of Behavioral Coping Ability rather than enhancing percepts of Cognitive Control Coping Ability in lifestyle change programs is suggested by some multi-year follow-ups of heroin addicts. In their 12-year follow-up of the effects of treatment of 405 black and white male opiate addicts, Simpson, Joe, Lehman, and Sells (1986) concluded
that the most predictive determinants of long-term continued abstinence were primarily behavioral:

Avoiding old drug-using friends and old hangouts, developing new friendships with nonusers, and establishing new family ties and new work habits. In their review of the determinants of spontaneous remission from substance use, Stall and Biernacki (1986) arrived at similar conclusions. These results suggest that would-be ex-addicts with strong beliefs about their ability to cope behaviorally will experience higher rates of long-term abstinence than would-be ex-addicts who may have strong beliefs in their ability to cope cognitively but weak beliefs about their ability to cope behaviorally. Percepts of ability have been shown to be important determinants of effort and achievement (Bandura, 1986). Failure to distinguish between perceptions of cognitive control ability and perceptions of behavioral coping ability, however, could mask important information about the processes by which actions, beliefs and perceptions of ability influence each other. Two examples are given below where potentially important applications of social cognitive theory may be limited by the failure to make this distinction.

Conjecture Relating to Adolescent Maturation and Risk of Drug Abuse An important, unexplained phenomenon in the literature on drug abuse onset
is the "window of vulnerability," namely, the relatively few teenage and young adult years when individuals are at risk of adopting a drug abusing lifestyle (Abelson, Fishburne, & Cis in, 1980; Johnston, O'Malley, & Eveland, 1978; Kandel & Logan, 1984). Lifestyle drug abuse rarely begins earnestly before adolescence and almost never manifests de novo after age 25. The "Just Say No" drug prevention program is premised on the belief that success in dissuading teenagers from starting drug abuse during the teenage years will prevent drug abuse at any age. Why, over a lifespan of 72-78 years, should the average American only be at risk of lifestyle drug abuse between the ages of 13 and 25, with peak onset during the high school years? Part of the answer may be facilitated by distinguishing between cognitive control and behavioral coping ability. The behavioral coping ability of children is generally limited to secondary control (e.g., Rothbaum & Weisz, 1989) because of their societally-mandated dependency on their parents and because of their lack of life skills. Children's maturation is marked more by increases in their cognitive control ability (e.g., distractive thoughts) than in their behavioral coping skills (e.g., progressive goal-setting to achieve mastery over challenge; Altshuler & Ruble, 1989). The transition from
childhood to adulthood is almost inevitably accompanied by increases in behavioral coping ability. The life skills that are acquired include decision-making skills, communication skills, dating skills, and employment skills. At the beginning of the transition, these behavioral skills are uniformly absent but young adolescents become increasingly aware of the need to acquire them (Katz & Zigler, 1967). There is considerable distress and anxiety that accompanies adolescents' increasing realization of the need for life skills in the immediate absence of their acquisition. This distress and anxiety are palliated in teenagers performing well in school by societally-administered reassurances that their career trajectory is favorable and that, by implication, the teenagers need not fear a characterological inability to acquire the necessary life skills. For these success-bound teenagers, positive self-statements are easily accessible as antidotes to the inevitable anxiety that their immaturity occasions. For many teenagers not performing well in school and otherwise not receiving societal reassurances concerning future expectations of success, however, only the actual acquisition of life skills will permanently reduce the fear that they will never be fully accepted as autonomous, responsible adults. The literature, shows, in fact,
that drug abuse-prone teenagers are characterized by a syndrome of "accelerated maturity," (Gritz, 1977), which manifests in precocious sexual behavior, marriage, cessation of schooling, and employment. Despite the uniform absence of life skills at the beginning of adolescence, only a minority go on to adopt a lifestyle habit of drug abuse. The at-risk teenagers who successfully avoid drug abuse are those who can through cognitive control alone reduce their immaturity associated anxiety to acceptable levels. At-risk teenagers who successfully avoid drug abuse tend to come from intact families, suggesting that family social support can strengthen self-percepts of ability to control immaturity-associated anxiety. For at-risk teenagers without the requisite cognitive control skills, their immaturity-associated anxiety is functionally (but only intermittently) palliated by regular administration of psychoactive drugs, especially nicotine and alcohol. Kaplan, Martin, and Robbins (1982) demonstrated prospectively that non-drug abusing teenagers with low self-esteem were significantly more likely in future years to become drug abusers than their non-drug abusing agemates with high self-esteem. Drug abuse, therefore, can be viewed as a functional way to mediate for intrapsychic discomfort. By the time of onset of adulthood, most
individuals have demonstrated successful mastery of at least the rudiments of the most important life skills. With the ebbing of immaturity-associated anxiety, there is decreased need for psychoactive agents to provide functional relief. By the time of young adulthood, unfortunately, many individuals have become physiologically dependent on their chosen drugs and cannot, therefore, stop using the drug just because the original need for the drug has disappeared.

A Conjecture Concerning Self-Efficacy Gender Differences in Sex-Role Socialization The distinction between perceived cognitive control ability and perceived behavioral coping ability may similarly shed light on the origins of observed differences between men and women in mastery of a variety of life's challenges, including occupational achievement (Austin & Hanisch, 1990) and weight control (Jeffery, French, & Schmid, 1990). Women's continuing preference for teaching, nursing, and childcare, and men's continuing preference for construction, community safety (policy, fire, paramedics), and surgery, are consistent with women relying more on cognitive control coping and men relying more on behavioral coping. Similarly, women's relative reluctance to adopt increased physical activity and their preference for relying on willpower relative to men as
a strategy for maintaining desirable weight is also consistent with women relying
on cognitive control and men relying on behavioral coping. This difference
between men and women may help to explain why women to view weight as less
controllable than men (Jeffery et al., 1990), given the clear long-term advantage
that exercise represents as a weight loss strategy (King, Frey-Hewitt, Oreon, &
Wood, 1989; Koplan et al., 1982). In her review of the literature on sex role socialization, Weitz (1977) cited
studies of adult communication patterns in same-sex groups in which it was
observed that women tended to be socioemotional whereas men tended to be
task-oriented. Although similar communication patterns were not observed in
children, Weitz noted a consistent association of activity and aggression in boys
and not in girls. Her evidence suggested that boys were encouraged to combat
their frustrations behaviorally and that girls were more encouraged to palliate
their frustrations through cognitive control strategies. Consistent gender dif
ferences in adult performance could well have roots in the different coping
strategies that boys and girls are encouraged to develop.

CONCLUSION Further research on how perceived cognitive control ability and perceived
behavioral coping ability vary among individuals, among situations, and within
individuals over time seems warranted. Investigating the relative importance of perceived cognitive control and perceived behavioral coping ability in therapy mediated lifestyle change and spontaneous, unaided lifestyle change would seem especially worthwhile. This distinction would also seem useful in illuminating more clearly why there exist differences in mastery between men and women, and in better understanding what contributes to the youthful decision to adopt a


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ability on self-regulatory mechanisms and complex decision making. Journal of Personality and Social Psychology, 56, 407-415. Author Notes This research was supported by grant DA01070 from the National Institute on Drug Abuse. The computer assistance of Sandy Yu and production assistance of Julie Speckart are gratefully acknowledged.

EXPECTANCIES AS MEDIATORS BETWEEN RECIPIENT CHARACTERISTICS AND SOCIAL SUPPORT INTENTIONS Ralf Schwarzer, Christine Dunkel-Schetter, Bernard Weiner, and Grace Woo It is assumed that the motivation to extend social support is governed by specific emotions and cognitions, among them outcome expectancies and self-efficacy expectancies. Two experiments were conducted to explore this assumption, Study I dealing with outcome expectancy and Study II dealing with self-efficacy expectancy. In Study I, outcome expectancies toward eight disease-related stigmas and the intention to extend social support were examined with two experimental conditions. The onset of the stigmas was varied as being either controllable or uncontrollable. In addition, the target person was described either as actively coping with the stigma or as not actively coping. Examined were the effects of onset controllability and coping on pity, outcome expectancy, and willingness to support the target person. In a within-groups design, 84 subjects were confronted with all eight stigmas under four different conditions. Both experimental factors influenced the reported reactions. The coping variable appeared to be stronger than the controllability variable and, in addition, outcome expectancy was a somewhat more important mediator of helping than pity. However, the pattern of data was context-specific, i.e., different sets of predictors emerged for different stigmas. Study II was a similar experiment pursuing the notion that the motivation to help is affected by the belief that one can be effective as a helper (self-efficacy expectancy). It examined whether self-efficacy expectancy for helping a rape victim served as a mediator of the relationship between recipient characteristics and support intentions. The recipient characteristics assessed were victim coping and controllability of the assault. Both pity and self-efficacy expectancy emerged as good predictors of support, whereas controllability and coping were of lesser influence.
According to Bandura's cognitive-social theory, human behaviors are partly governed by expectancies, in particular by outcome expectancies and self-efficacy expectancies (Bandura, 1977, 1986, 1991). Many studies, some of them presented in this volume, have applied this assumption to specific behaviors in various domains of human functioning such as achievement, organizational management, or health. There seems to be, however, no application to studies on social support. The willingness to help others depends partly on one's emotions at the time, but helping also depends on judgments about the specific situation, characteristics of the recipient, and one's self. Among such cognitions are expectancies about the likelihood that the situation can be changed and regarding one's ability to provide the necessary social support. Expecting a condition to improve under certain circumstances represents an outcome expectancy. Belief in oneself as an effective support provider in a particular situation represents a self-efficacy expectancy. These cognitions are hypothesized to serve as causal mediators of the relationships between antecedent recipient characteristics and consequent intentions to extend social support. In addition, a number of other factors outlined below are considered important in the study of social
support. The present chapter reports two studies. The first one deals with the mediating role of outcome expectancy, the second one with the mediating role of self efficacy expectancy. In the following sections, we describe in more detail the constructs involved in this research, in particular perceived controllability,

perceived coping, expectancies, and social support. Perceived Controllability Attribution theory has recently been extended to the study of social stigmas and reactions to the stigmatized (Weiner, Perry, & Magnusson, 1988). By social stigma we mean a discrediting condition or mark that defines a person as "deviant, flawed, limited, spoiled, or generally undesirable" (Jones et al., 1984, p. 6). Among others, physical deformities, behavioral problems such as excessive eating and drinking, and diseases can be regarded as stigmas. Attribution theory is relevant to the study of stigmas because individuals typically search for the cause(s) of a negative state or condition existing in others. That is, observers confronted with a "markable" target initiate an attributional search to determine the origin of the stigma. Researchers have identified controllability as one of the basic dimensions of perceived causality (Weiner, 1985, 1986). Controllable causes are those which an actor can volitionally change, whereas uncontrollable causes are not subject to personal mastery or management. The onset of a drug
problem, for example, is seen as controllable if a person has been experimenting with drugs out of curiosity, whereas it is perceived as comparatively uncontrollable if a person has had medical treatment with drugs and thereby developed a dependency (Weiner et al., 1988). In a similar manner, the onset of a heart disease is construed as controllable if the person has led an unhealthy lifestyle, including smoking and a poor diet, whereas it is considered relatively uncontrollable if hereditary factors have played a major role in the illness.

Affective and Behavioral Reactions It has been documented that the perceived controllability of a social stigma determines disparate affective reactions toward the target person and different behavioral responses as well (e.g., Dejong, 1980; Weiner et al., 1988). More specifically, uncontrollable origins of stigmas tend to elicit pity and offers of help, whereas controllable origins tend to elicit anger and no help (see Reisenzein, 1986; Schmidt & Weiner, 1988; Weiner et al., 1988). Hence, it has been shown that experimentation with drugs and an unhealthy lifestyle as causes of stigmas yield much anger, little pity, and relative neglect, whereas drug problems due to medical treatment, and heart disease derived from genetic factors, give rise to little anger, much pity, and prosocial responses. Perhaps more than in any other area within the
field of social motivation,

investigators of helping behavior have assumed that emotions play an important motivational role (see review in Carlson & Miller, 1987). These emotions have included discomfort (e.g., Cialdini, Darby, & Vincent, 1973), distress (e.g., Batson, O’Quinn, Fultz, Vanderplas, & Isen, 1983), empathy (e.g., Batson, 1990; Hoffman, 1975), gratitude (e.g., Goranson & Berkowitz, 1966), guilt (e.g., Hoffman, 1982), as well as pity and anger (Schwarzer & Weiner, 1990, 1991).

While there is strong support for an attribution-emotion-helping link, there are also studies that have failed to demonstrate this effect. Capitalizing on a real-life event, Amato, Ho, and Partidge (1984) sent survey questionnaires to residents living near the setting of a major bushfire which killed 46 people and destroyed over 2,000 homes. The questionnaire addressed perceptions of causality and responsibility, affective reactions, and helping behavior. Most people reported donating to the victims regardless of the amount of responsibility attributed to them. The obvious high degree of need in this context seemed to have overpowered the attribution of control effects. Jung (1988) presented subjects with vignettes depicting a close friend experiencing a variety of common problems, with manipulations of the responsibility
for the problem. For each vignette, subjects rated the
target person’s
deservedness of fate, perception of how helpful social
support would be for the
problem, and their likelihood of providing social support.
Perceived deservedness
of fate was greater for those viewed as having high
responsibility. Perceived
benefits of social support were also higher in this case.
However, neither factor
affected the likelihood of social support provision.
Skokan (1990) examined the affective responses and support
behaviors
extended towards a roommate who is dealing with either
cancer or the death of
her father. Subjects were presented with scenarios which
depicted the roommate
as either responsible or as not responsible for the onset
of the critical event. In
her initial within-subjects analysis, controllability was
associated with more
anger, less sympathy and less social support; however, when
reanalyzed as a
between-subjects design because of order effects, the
impact of controllability on
sympathy and support disappeared. Perceived Coping It
remains unclear whether stigma onset, which is a distant
event, is the sole
or main determinant of affective and behavioral reactions
toward the stigmatized
or whether subsequent events, controllable or
uncontrollable, alter the causal
sequence. Drug experimentation and poor life-style, for
example, might be weak
predictors of the emotions and behaviors of observers when compared with the present efforts of the target person to cope with the consequences of the stigma.

In the achievement domain, it is obvious that even after failure due to lack of effort, present expenditure of effort to compensate or recover generates positive affect and rewards for the failed student (Karasawa, 1991; Weiner, 1985). When generalized to the health domain, this finding suggests that positive coping attempts with a serious health condition could play an important role in determining the affective and behavioral reactions of others. Skokan (1990) distinguished in her scenario experiment between adaptive coping and maladaptive coping. In the adaptive condition, the target person who either had cancer or was bereaved, tried to stay optimistic and to look for ways to go on with her life and to grow from the experience. In the maladaptive condition, she dwelled on the negative aspects of the situation and did not try to overcome the crisis instrumentally. Adaptive coping of the target was related to less anger in subjects but had mixed effects on their willingness to offer social support. In the bereavement condition, poor coping elicited less support, but in the cancer condition, unexpectedly, poor coping elicited even more support. Silver, Wortman, and Crofton (1990) studied subject reactions to a cancer
patient who was portrayed either as a "good coper," a "bad coper" or a "balanced coper." In the good coping condition, the target person expressed an optimistic view of her illness and appeared to be coping well. In the balanced coping condition, she conveyed distress about what was happening, but also indicated that she was trying her best. In the poor coping condition, she displayed distress about what was happening and appeared to have difficulty coping. In nine out of ten comparisons, the responses to confederates who were portrayed as having positive or balanced coping styles were significantly more favorable than were responses to poor copers. In sum, both the origin of a problem and its solution are hypothesized to be important when examining reactions of others toward the stigmatized person (Brickman et al., 1982). That is, the responsibility for causing a problem should be separated from the responsibility for maintaining or not alleviating it. This important distinction has been ignored in prior research on attributions (see also Karasawa, 1991; Schwarzer & Weiner, 1991). The present studies compare the effects of perceived onset controllability with those of perceived coping efforts on pity, outcome expectancy, and social support towards the stigmatized and examines the mediating role of pity and expectancy.
Expectancies The focus of the present paper is on the role of mediating factors that link attributions and affect regarding a social stigma to behavioral intentions or to actual support behavior. Bandura (1977, 1986, 1991) has convincingly demonstrated that expectancies are very important social-cognitive mediators of action.

There are two major cognitions of this kind, outcome expectancies and self-efficacy expectancies. In the first experiment, we deal with outcome expectancies that refer to the possibility of improvement of a condition. The subjects were asked how likely it is that a target person's condition would improve under particular circumstances. It is hypothesized that an individual's active coping with an ailment will trigger positive outcome expectancies in the observer. Coping behavior implicitly refers to the stability of a stigma. If the victim is not actively involved in alleviating the distress, maintaining functioning and moving on with daily life, one would have little reason to expect an improvement; support may be seen as wasted labor. If, however, a great deal of effort is expended by the victim in solving the problem, one can expect that changes are more likely and that supplementary contributions would be a worthwhile investment. This reasoning does not apply to situations that require acceptance; that is, we are likely to help
people who behave passively when passivity is required in
the situation. In the second experiment, the focus is on
self-efficacy expectancy in terms of
one’s helping capabilities. Empathy, perspective taking,
comforting skills and so
on, not only facilitate social support in an objective
sense (Batson, 1990; Clary &
Orenstein, 1991); these abilities also have to be perceived
by the help provider in
order to establish a motivation to help. Help-specific
self-efficacy deals with cog
nitions about one's capability to support others and to
make a difference with this
support; it refers to one’s perceived personal resources
to provide competent
assistance and to achieve relief for a sufferer. Social
Support Social support has been defined as an exchange of
resources “perceived by
the provider or the recipient to be intended to enhance the
well-being of the
recipient” (Shumaker & Brownell, 1984, p. 13). This
definition requires that
either the provider or the recipient must perceive that the
provider has a positive
intent. Intentions have also been claimed as being the best
predictors of a variety
of behaviors; this is well-documented in research based
upon the Theory of
Reasoned Action (Fishbein & Ajzen, 1975) and the Theory of
Planned Behavior
(Ajzen, 1980). Evidence of the influence of help
intentions on actual helping
behavior has been found by Borgida, Simmons, Conner, and
Lombard (1990) and
Dalbert, Montada, and Schmitt (1988). Whether intentions to help are accurately perceived by the provider or by the recipient is a related but different question (Dunkel-Schetter & Bennett, 1990; Dunkel-Schetter, Blasband, Feinstein, & Bennett, 1991). Several factors determine the likelihood that a supportive exchange actually takes place. Stress factors, relationship factors, recipient factors, and provider factors have been discussed and somewhat studied (Dunkel-Schetter & Skokan, 1990). We will deal here with the latter two exclusively. Recipient factors are critical determinants of support. Victims who are not only distressed, but are also not responsible for the event, and who invest a great deal of effort to manage their condition, are apt to elicit more help than those who are responsible for their misfortune and who do not take action to solve their issue (Bennett-Herbert & Dunkel-Schetter, in press; Brickman et al., 1982). Creating frustration and helplessness in the potential provider leads to a lesser likelihood of support (Dunkel-Schetter & Wortman, 1981, 1982). The expression of too much distress strains the social network, evokes negative reactions, and turns those away who would have been supportive if the distress level had only been moderate. Another reason why the network may not be
mobilized is if a victim is not coping adaptively. Passive, depressive and ungrateful victims or patients are seen as socially unattractive and, therefore, receive less support in the long run (Barbee, 1990; Gurtman, 1986; Notarius & Herrick, 1988). Paradoxically, those subjects who have valuable personal resources such as competence, high self-esteem, locus of control, and optimism and who make use of their resources seem to elicit a stronger tendency in others to extend support. Provider factors have been intensively studied in social psychology research on helping (Batson, 1990; Berkowitz, 1987; Dovidio, 1984; Eisenberg & Miller, 1987; Jung, 1988). It makes a difference how the cause of the problem is attributed. If it is seen as controllable then the victim is blamed and negative emotional reactions are aroused such as anger, leading to neglect of the sufferer. If, on the other hand, the cause is seen as uncontrollable and the person does not seem to be responsible for the problem, then positive emotions such as pity emerge, which make help more likely (Weiner, 1985). Thus, emotions are mediators of attributions and behavioral intentions. According to Batson (1990), empathy predicts altruistic motivation to help, whereas a provider's distress tends to elicit egoistic motivation, which does not induce help. These two theories by Weiner and
Batson are closely related in terms of emotional mediators of motivation. Pity can be matched to empathy as a predictor of help, and anger parallels distress in predicting neglect. Betancourt (1990) has attempted to integrate both views by manipulating experimentally the controllability of onset of a problem as well as inducing different perspectives in the potential support provider. He found that both experimental factors influenced perceived controllability and empathic emotions that, in turn, influenced helping. In the present chapter, the focus is on experimentally manipulated recipient factors, but it is kept in mind that these do not operate in an isolated manner. Rather, they interact with on-going responses by the provider during a specific social encounter. It is only of secondary importance whether the victim is actually responsible for the problem and whether active coping is executed. Moreover, the degree to which the provider makes these attributions, is considered to be critical. The perception in the beholder may be more relevant than the actual cause of the onset of the stigma or the actual coping behavior. The present experiments were designed to examine the effects of perceived controllability and perceived coping on pity as an affective reaction and on expectancies that, in turn, were hypothesized to exert an influence on support.
intent. The studies differ in terms of the scenarios used and in terms of the expectancy variables. While Study I deals with outcome expectancy, Study II deals with self-efficacy expectancy. STUDY I Method

Sample. The subjects were 84 male and female students at the University of California, Los Angeles, who received credit in an introductory psychology course for their participation. They were randomly assigned to one of four groups (see below) and given questionnaires in small group sessions with anonymity assured. I Design. Eight health-related stigmas were selected, each of which was manipulated with respect to onset controllability and coping effort. Each subject received four of the eight stigmas paired uniquely with one of the four control lability conditions (2 Levels of Onset Responsibility x 2 Levels of Coping). Sub jects were divided into four groups that received different combinations of stigmas and conditions (see Table I).

Table I

Experimental Design Onset Responsible Onset Irresponsible No Coping Coping No Coping Coping

Group 1 Aids Cancer Drug abuse Heart disease
Group 2 Cancer Drug abuse Heart disease Aids
Group 3 Drug abuse Heart disease Aids Cancer
Group 4 Heart disease Aids Cancer Drug abuse
Group 1 Anorexia Child abuse Depression Obesity
Group 2 Child abuse Depression Obesity Anorexia
Group 3 Depression Obesity Anorexia Child abuse
Group 4 Obesity Anorexia Child abuse Depression

1 Study I was conducted by Ralf Schwarzer and Bernard Weiner. As shown in Table 1, one part of the design included four stigmas (AIDS, cancer, drug abuse, and heart disease) paired with the four conditions, while a second part replicated the first but used another four stigmas (anorexia, depression, obesity, and child abuse). Thus, there were two within-group factors (onset controllability and coping) and one between-group factor (stigma set). This design allowed for an overall analysis as well as for stigma-specific subanalyses. Four vignettes were created for each stigma consisting of: (a) onset responsibility and low coping; (b) onset responsibility and high coping; (c) no onset responsibility and low coping; and (d) no onset responsibility and high coping. As an example, the obesity vignettes are given:

1. Maladaptive coping, controllable. Your roommate has become excessively overweight, and is experiencing severe problems in social and work-related activities. Excessive eating and lack of exercise have been the primary contributors to the obesity. This roommate does not take any steps to lose weight, either by dieting, exercising or by following a medical regimen.

2. Adaptive coping, controllable. Your roommate has become excessively overweight, and is experiencing severe problems in social and work-related activities. Excessive eating and lack of exercise have been the primary contributors to the obesity. Recently this roommate has commenced a new diet prescribed by a physician, and is
3. Maladaptive coping, uncontrollable. Your roommate has become excessively overweight, and is experiencing severe problems in social and work-related activities. Glandular dysfunction has been identified as the reason for the obesity. This roommate does not take any steps to lose weight, either by dieting, exercising or by following a medical regimen.

4. Adaptive coping, uncontrollable. Your roommate has become excessively overweight, and is experiencing severe problems in social and work-related activities. Glandular dysfunction has been identified as the reason for the obesity. Recently this roommate has commenced a new diet prescribed by a physician, and is regularly exercising.

Measures. The dependent variables were the following 9-point rating scales, anchored with extremes such as not at all and very much so. Pity was assessed by the single item "How much pity would you feel?" Typically, outcome expectancies are worded in an "if-then" manner." In the present experiment, however, the if-component was given by the four experimental conditions such as: "If the stigma is uncontrollable and if the victim is actively coping with it, then ..." Because of these implicit assumptions, the measurement of the outcome expectancy was restricted to the then-component and simply worded: "How likely is it that the condition will improve?" Social support intention was measured by seven items representing different kinds of social support. However, this was a homogeneous scale (Cronbach's alpha for the seven social support items was .91), and, therefore, the aggregated score was used as an indicator of support intentions. The items were: 1. How much would you like to extend support...
to your roommate? 2. How much time would you be willing to spend talking and listening? 3. How much money would you be willing to donate in order to provide the best possible treatment? 4. How much would you like to go on a holiday trip with your roommate? 5. How much would you be willing to give advice and information? 6. How much would you be willing to console and reassure your roommate when being upset? 7. How willing would you be to assist with a small problem? Other dependent variables were analyzed previously within the framework of analysis of variance, and some of the results are published elsewhere. However, we have only reported about the stigmas of heart disease (Schwarzer & Weiner, 1990), AIDS and cancer (Schwarzer & Weiner, 1991). Results To examine the role of pity and outcome expectancy as mediators of the relationship between victim characteristics and provider support intentions, a structural equation model was specified with controllability and coping as exogenous variables and pity, expectancy, and support as endogenous variables. This is a straightforward single indicator model with manifest variables. The two orthogonal experimental factors were believed to influence emotions and cognitions, whereas emotions and cognitions were specified to influence the behavioral intention directly. Controllability and coping, therefore, could exert indirect effects on support intent through pity and expectancy but were constrained not to exert direct effects, because this would not be in line with theory or past research.

The two alternative mediating factors were pity and expectancy, and for both of
them the size of their mediating effect was computed in addition to their direct impact on support intent (see Figures 2 to 9). This procedure was repeated eight times, for each stigma individually. Eight path analyses were carried out with the LISREL VII program (Joreskog & Sorbom, 1988). First, the degree to which the experimental data fitted the structural equation model was examined. Several indices of fit have been suggested in the literature (cf. Bentler, 1980). We have used five of them in this study, (a) the chi-square test which, if significant, indicates that the data deviate from the model, (b) the chi-square Idf ratio which takes the degrees of freedom into account \((df = 3)\) and which should be as low as possible; ratios above 3.0 are usually seen as unsatisfactory, (c) Joreskog's Goodness of Fit Index (GFI) which should be close to unity, (d) his Adjusted Goodness of Fit Index (AGFI) that makes an adjustment to the degrees of freedom and also should be as high as possible, and (e) the Root Mean Square Residual (RMSR) which is an index derived from the deviations of the original correlation matrix from the reproduced correlation matrix on the basis of the estimated parameters; this index should not exceed .05. Table 2 summarizes the results of all eight path analyses. In six of eight cases, an excellent fit emerged, whereas the stigmas "Cancer" and "Child Abuse"
turned out to be associated with a less appropriate fit. Overall, these satisfactory results indicate that the model specification is in line with the experimental data, but also that the specific stigma context makes a difference.

Table 2
Goodness of Fit for the Eight Path Models

<table>
<thead>
<tr>
<th>Stigma</th>
<th>chi2</th>
<th>p</th>
<th>chi2/df</th>
<th>OFI</th>
<th>AOFI</th>
<th>RMSR</th>
</tr>
</thead>
<tbody>
<tr>
<td>AIDS</td>
<td>4.36</td>
<td>.23</td>
<td>1.45</td>
<td>.98</td>
<td>.90</td>
<td>.05</td>
</tr>
<tr>
<td>Cancer</td>
<td>9.49</td>
<td>.02</td>
<td>3.16</td>
<td>.96</td>
<td>.79</td>
<td>.07</td>
</tr>
<tr>
<td>Drug abuse</td>
<td>1.46</td>
<td>.69</td>
<td>0.49</td>
<td>.99</td>
<td>.97</td>
<td>.03</td>
</tr>
<tr>
<td>Heart disease</td>
<td>2.44</td>
<td>.49</td>
<td>0.81</td>
<td>.99</td>
<td>.94</td>
<td>.04</td>
</tr>
<tr>
<td>Anorexia</td>
<td>0.92</td>
<td>.82</td>
<td>0.31</td>
<td>.99</td>
<td>.98</td>
<td>.02</td>
</tr>
<tr>
<td>Child abuse</td>
<td>15.18</td>
<td>.002</td>
<td>5.06</td>
<td>.94</td>
<td>.69</td>
<td>.08</td>
</tr>
<tr>
<td>Depression</td>
<td>1.50</td>
<td>.68</td>
<td>0.50</td>
<td>.99</td>
<td>.97</td>
<td>.03</td>
</tr>
<tr>
<td>Obesity</td>
<td>4.65</td>
<td>.20</td>
<td>1.55</td>
<td>.98</td>
<td>.90</td>
<td>.05</td>
</tr>
</tbody>
</table>

Note. OFI == goodness of fit, AOFI == adjusted OFI, RMSR == root mean square residual.

Table 3
Percent of Explained Variance Endogenous Factor Stigma

<table>
<thead>
<tr>
<th>Pity</th>
<th>Expectancy</th>
<th>Support</th>
</tr>
</thead>
<tbody>
<tr>
<td>AIDS</td>
<td>22 1 31</td>
<td>1 31 21</td>
</tr>
<tr>
<td>Cancer</td>
<td>6 29 21</td>
<td></td>
</tr>
<tr>
<td>Drug abuse</td>
<td>9 51 15</td>
<td>Heart disease 1 31 11 Anorexia 4 51 6 Child abuse 9 36 29 Depression 16 14 Obesity 38 11</td>
</tr>
</tbody>
</table>

This is corroborated by the explained variance for the three endogenous variables pity, expectancy and support (Table 3). The model succeeded in explaining a great deal of the variance of expectancy and support but much less so of pity.
This shows that the emotion of pity is not sufficiently predicted by controllability and coping. Other factors, not under scrutiny here, must be responsible for the variation in pity. The stigma-specific path coefficients are displayed in Figures 1-8; Table 4 contains the decomposition of total effects into direct and indirect effects. Results for each stigma will be described briefly. Coefficients above .21 are significant.

Table 4
Decomposition of Effects on Social Support Intention

<table>
<thead>
<tr>
<th>Stigma Predictor</th>
<th>Direct</th>
<th>Indirect</th>
<th>Total Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>AIDS Control</td>
<td>0</td>
<td>21</td>
<td>21</td>
</tr>
<tr>
<td>Expectancy</td>
<td>0</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>AIDS Coping</td>
<td>0</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>Pity</td>
<td>55</td>
<td>0</td>
<td>55</td>
</tr>
<tr>
<td>Expectancy</td>
<td>7</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>Cancer Control</td>
<td>0</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Expectancy</td>
<td>0</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Cancer Coping</td>
<td>0</td>
<td>13</td>
<td>13</td>
</tr>
<tr>
<td>Pity</td>
<td>43</td>
<td>0</td>
<td>43</td>
</tr>
<tr>
<td>Expectancy</td>
<td>7</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>Drug abuse Control</td>
<td>0</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Expectancy</td>
<td>0</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>Drug abuse Coping</td>
<td>0</td>
<td>29</td>
<td>29</td>
</tr>
<tr>
<td>Pity</td>
<td>14</td>
<td>0</td>
<td>14</td>
</tr>
<tr>
<td>Expectancy</td>
<td>40</td>
<td>0</td>
<td>40</td>
</tr>
<tr>
<td>Heart disease Control</td>
<td>0</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Expectancy</td>
<td>0</td>
<td>26</td>
<td>26</td>
</tr>
<tr>
<td>Heart disease Coping</td>
<td>0</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>Pity</td>
<td>19</td>
<td>0</td>
<td>19</td>
</tr>
<tr>
<td>Expectancy</td>
<td>26</td>
<td>0</td>
<td>26</td>
</tr>
<tr>
<td>Anorexia Control</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Expectancy</td>
<td>14</td>
<td>0</td>
<td>14</td>
</tr>
<tr>
<td>Anorexia Coping</td>
<td>0</td>
<td>17</td>
<td>17</td>
</tr>
<tr>
<td>Pity</td>
<td>14</td>
<td>0</td>
<td>14</td>
</tr>
<tr>
<td>Expectancy</td>
<td>24</td>
<td>0</td>
<td>24</td>
</tr>
<tr>
<td>Child abuse Control</td>
<td>0</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Expectancy</td>
<td>37</td>
<td>0</td>
<td>37</td>
</tr>
<tr>
<td>Child abuse Coping</td>
<td>0</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>Pity</td>
<td>37</td>
<td>0</td>
<td>37</td>
</tr>
<tr>
<td>Expectancy</td>
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<tr>
<td>Expectancy</td>
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</table>

In the case of AIDS, a substantial causal path leads from controllability to pity (p = -.39) and another from pity to support (p = .55). Coping has a somewhat lower impact on pity (p = .25). Expectancy does not play a
role: it is predicted

neither by controllability nor by coping, and it does not predict support. Since

AIDS is a terminal disease, it is not surprising not to find a large variation in outcome expectancy. Pity appears to be the appropriate emotional reaction which facilitates the likelihood to extend support (see Figure 1 and Table 4).

Figure 1 Pity and expectancy as mediators between controllability and coping and social support in the AIDS scenario. For cancer, pity was again the best predictor of support ($p = .43$), whereas expectancy failed to contribute anything ($p = .07$). But the antecedents were different; controllability had no significant impact on pity or expectancy, whereas coping had a strong path to expectancy ($p = .52$) and a moderate one to pity ($p = .22$). Although cancer can be a terminal disease in many cases, there are better survival chances for those who comply with treatment. This explains the association between coping and expectancy, but, surprisingly, there was little effect on support intentions that were based more on pity (see Figure 2 and Table 4).

Figure 2 Pity and expectancy as mediators between controllability and coping and social support in the cancer scenario. In case of drug abuse, variations in controllability elicited no effects reactions but coping did. A strong path from coping to expectancy emerged ($p = .70$), Control -.39 Pity .55 .25 Support .06 .00 Coping .07 -.12 Control Pity .43 .2 2 .13 Coping .52 Expect .07 Support Expect
accompanied by another strong path from expectancy to support \( (p = .56) \) making this the major pathway to help intentions. A minor pathway was added from coping through pity \( (p = .25, P = .13) \). Drug abuse is a rather unstable condition and appears to be modifiable. Whether one is ready to support a drug user mainly depends on the likelihood of perceived change based on his or her coping efforts.

no matter how the problem was originally caused (see Figure 3 and Table 4).

Figure 3 Pity and expectancy as mediators between controllability and coping and social support in the drug abuse scenario. In case of heart disease, there was no effect of controllability, and pity also had no significant relationships (see Figure 4 and Table 4. The only pathway to support led from coping via expectancy \( (p = .56, p = .26) \). Heart disease is interpreted as a modifiable condition that varies with one's health behavior such as nutrition, exercise, and relaxation. The origin of this condition seems to be unimportant for a decision to help the patient.

Figure 4 Pity and expectancy as mediators between controllability and coping and social support in the heart disease scenario. Anorexia nervosa can also be regarded as an unstable condition where active coping makes a difference. Controllability had no influence but coping deterred expectancy \( (p = .70) \) and pity \( (p = .20) \) (see Figure 5 and Table 4).
Anorexia is considered a highly modifiable condition. If a patient copes well it will vanish, no matter how controllable the origin was.

Figure 5 Pity and expectancy as mediators between controllability and coping and social support in the anorexia scenario. A different picture emerged for child abuse. Both direct effects on support were almost equal, with pity (e = .37) and expectancy (e = .31) accounting for a similar amount of variation in support. The key antecedent factor, however, was coping which was closely related to expectancy (p = .60). Compared to drug abuse, child abuse is not a health-compromising behavior but more a socially deviant act that elicits emotions such as either outrage or pity towards the actor, the latter emotion only if there was not much control over the behavior (see Figure 6 and Table 4).

Figure 6 Pity and expectancy as mediators between controllability and coping and social support in the child abuse scenario. In case of depression, the predictors controllability and pity turned out to be irrelevant, whereas expectancy had an influence on support (p = .34), based on the coping efforts of the target person (p = .38). This clearly documents that an active contribution on behalf of the mental health patient is required in order to make the condition look changeable, so that support would not be in vain. Only expectancy had an effect on support (see Figure 7 and Table 4).
Finally, in case of obesity, an almost identical result emerged. Again, control lability and pity were negligible factors but expectancy ($p = .30$), based on coping ($p = .61$), made the difference. Obesity is an unstable condition, and those who do not counteract their problem cannot count on help from others. Only active coping efforts elicit expectancy which in turn trigger readiness for social support (see Figure 8 and Table 4).

Figure 7 Pity and expectancy as mediators between controllability and coping and social support in the depression scenario.

Figure 8 Pity and expectancy as mediators between controllability and coping and social support in the obesity scenario. In sum, in five of the eight stigmas, outcome expectancy was the main predictor of support intention. These five were drug abuse, heart disease, anorexia, depression, and obesity. The two terminal diseases, AIDS and cancer, differed from the majority by their conspicuous pathway from pity to support intent. In these two cases, one's intention to help was almost exclusively based on pity. For child abuse, a balanced influence of pity and expectancy emerged. Coping was a stronger antecedent than controllability in seven out of eight cases. The exception was AIDS. The overall picture corroborates the assumption that outcome expectancy is a critical mediator between target coping and social support intention.
tion. From these results, whether one extends help or not is primarily dependent on the expectancies aroused by the victim characteristics, and particularly the person's way of coping.

Control Pity Support Coping Expectation 
-.01 .12 .14 .38 .34 .08 .04 -.09 .61 .30 .38 .34 .09 .61 .30 Support Discussion Each of the eight stigmas was examined in separate path analyses with respect to the two experimental factors, controllability and coping as antecedents, and pity and expectancy as mediators. The model fit the data and expectancies were a major direct source of support variation. Pity was a direct predictor of social support only in three specific contexts. It is noteworthy that there was a high degree of variation between the eight stigmas, indicating that the specific circumstances decide whether the willingness to help is primarily based on either pity or expectancy. In terminal diseases such as AIDS or cancer, pity appeared to be more influential than expectancy, whereas for unstable health conditions such as drug abuse, anorexia or obesity the coping-expectancy-support link was obvious. It might be, therefore, that the perceived stability of a condition is a critical underlying dimension that affects judgments of help. Controllability was less influential compared to coping which, in turn, partly determined expectancy. The most conspicuous pathway led from coping via expectancy to support intent. 

STUDY II In the first experiment, the expected improvement of the target's condition
was one of the mediators under investigation. In the second experiment, the attention was shifted to a support provider characteristic to address the question of whether the perception of one's ability to help would make it more likely that a support intention occurs. In other words, self-efficacy expectancy, one's perceived personal capability of extending effective support, was the focus. It was hypothesized that self-efficacy expectancy played the same role as a mediator that outcome expectancy did in the first experiment.  

Method Design. The path-analytic model was the same as in the first study but there were some differences in the experimental manipulations and in the measures involved. Only one problem situation was selected, a sexual assault scenario, that was varied with respect to controllability and coping. A rape victim in the uncontrollable condition was described as a student who studied one night at the library and was raped on the way to her car by a stranger. In the condition designed to seem slightly more controllable she was described as someone who attended a party where she drank too much and flirted with the males; when she was taken home by one of them, she invited him up to her apartment and was raped. The adaptively coping victim was characterized as one who was trying
hard to go on with her life after the assault, having
joined a support group and

seeing a counselor each week. The maladaptively coping
victim did not try to

2 Study II was conducted by Grace Woo, Christine
Dunkel-Schetter, and Ralf

Schwarzer.

overcome her problem situation. She had withdrawn from
friends and did not eat;

she also refused to attend a support group meeting and to
see a counselor. The experiment was arranged as a 2 x 2
between-subjects design; 70 under

graduate students responded to the vignette randomly
assigned to one of four

conditions. There were 55 males and only 15 females, but
their distribution over

the four cells was about equal, with cell sizes of 19, 17,
18 and 16. Measures. Pity, self-efficacy expectancy and
support intentions were the

dependent variables used in this report. All were rated on
a 5-point scale. Pity

was assessed by four adjectives as part of a checklist,
namely empathy, sym

pathy, pity, and compassion. Emotional support intent was
measured by four

items such as "Would you be willing to try to console and
reassure your friend

when she is upset?" and "Would you spend time listening to
her emotional reac

tions to the assault?" Tangible support intent was
measured by six items such as

"Would you be willing to offer her help with her school
work if she needed it?"

and "Would you lend her money to see a therapist?"
Self-efficacy expectancy was measured by a newly developed 10-item scale that was employed for the first time. Its psychometric properties were satisfactory with an average item-total correlation of .55 and an internal consistency of Cronbach's alpha = .85. The items were worded in the following way:

1. I possess the necessary social skills to alleviate the distress of a sexual assault victim.
2. It is easy for me to comfort someone in distress.
3. I am capable of providing the appropriate resources for a rape victim.
4. It is difficult for me to communicate empathic understanding. (-)
5. I could make someone feel better no matter how depressed she is.
6. When it comes to comforting someone, I feel awkward. (-)
7. I am not sensitive enough to meet the support needs of a sufferer. (-)
8. I do not trust my skills to communicate in a beneficial way with a sexual assault victim. (-)
9. I am not the kind of person who can meet the emotional needs of others who are in a crisis. (-)
10. I have sufficient communication skills to cheer up someone who is experiencing stress. Results A structural model was specified with the two experimental factors as antecedents, and with pity, self-efficacy expectancy, and support as the dependent variables. In contrast to the previous study, this is a multiple indicator model. The three endogenous variables were specified with two
indicators each. The four pity items were divided into two sets (each pity indicator had two items); support was specified by the emotional support scale as well as the tangible support scale, and the two self-efficacy indicators were two 5-item subsets of the instrument described above. The results of the LISREL analysis are depicted in Figure 9.

Figure 9 Pity and expectancy as mediators between controllability and coping and social support in the rape scenario. The fit of the model was chi-square = 17.4 (15 df, \( p = .295 \)) with a chi-square/df ratio of 1.16. Goodness of fit was GFI = .94 and adjusted goodness of fit AGFI = .87. The root mean square residual was RMSR = .09. Although the latter two indices fall short of the usual requirement, the overall fit can be regarded as satisfactory, based on the other indices. The explained variance for social support was 34%, which is quite good, whereas those for pity and for self-efficacy expectancy were low (7% each). Decomposing the effects on support led to substantial direct effects for pity (\( e = .44 \)) and for self-efficacy expectancy (\( e = .36 \)), and to smaller indirect effects for controllability (\( e = .03 \)) and for coping (\( e = .17 \)). Pity and expectancy were very good predictors of support intent, but the underlying experimental factors (control, coping) were of lesser influence.

Discussion

The second experiment has replicated the general causal model leading from
victim characteristics to support provider emotional reactions or cognitions,
resulting in an intention formation. Pity emerged here as the strongest predictor of support, but self-efficacy expectancy also contributed substantially. Controllability turned out to be negligible, whereas coping exerted a weak, but statistically significant, influence on pity and self-efficacy. However, it is difficult to construe a sexual assault as controllable, and the two conditions differed in ratings of controllability only by one point, although significantly. In addition, the rape scenario is quite different from the eight stigma scenarios described in Study I. There is no disease or bodily condition Control -.12 .86 .70 Pity .23 44 Coping .06 Self-eff. Expectancy .25 .62 95 .36 Support .90 80 involved but a single violent act caused by an external agent. An assault is likely to be viewed generally as less controllable than other social stigmas such as obesity or drug abuse. The degree of controllability only varied in the study from uncontrollable to somewhat controllable; there was not really a "controllable" experimental condition. Adverse chance events seem especially likely to trigger pity, whereupon the victim is not blamed. GENERAL DISCUSSION The present findings from Studies I and II are based on hypothetical scenarios with students. Therefore, the results can be generalized neither to actual helping situations nor to other populations. This procedure also has some inher
ent limitations in that respondents may be unable to judge accurately their affective reactions and whether they would or would not offer help to particular individuals. In addition, some key variables that affect emotion and social support certainly are excluded from the manipulated factors. However, as noted by Cooper (1976), "when looked at from the point of view of generating hypotheses, finding new leads, and initiating models of behavior, role playing may be the best method" (p. 605). In addition, in the investigations presented here and by Weiner et al. (1988), the stimulus configurations examined could not be found without overwhelming difficulty in field research, with the consequences that variables would be confounded. Finally, prior research has suggested that role enactment strategies in the study of help-giving have yielded data comparable with observations of actual behavior (see review in Weiner, 1986). For these reasons, and particularly in light of the relatively recent growth of the study of social support, we used a hypothetical scenario method. Research must extend theoretical and experimental analyses within the current framework before applying these research questions to real-life situations. The present studies have underscored the notion of emotional and cognitive
mediators in the process of forming behavioral intentions. When dealing with
victims of life events including medical patients, the likelihood of mobilizing
help is dependent on a number of recipient and provider characteristics (Dunkel
Schetter & Skokan, 1990). The controllability of the cause of the problem ap
pears to playa role in the determination of help. Moreover, the changeability or
instability of the problem as reflected in coping efforts seems to elicit positive
expectancies in the observer and motivation to help. Such efforts may create both
a sense that the situation can be improved and a belief that one can effectively as
sist the victim. Thus, outcome expectancy as well as self-efficacy expectancy are
useful cognitive mediators. They are part of a mechanism that governs the trans
lation of thought into action. Both studies have dealt with one of these cognitions
exclusively, and it would be worthwhile to integrate both concepts into one
empirical framework in a subsequent study. One conclusion of the first experiment concerns the specificity of the result
pattern to individual situations. To what degree pity or expectancy mediate
recipient characteristics and support intent depended on the particular
circumstances, i.e., the stigma chosen and, probably, the unique wording of the
vignettes. In the second experiment, there was only one
context provided, namely the rape scenario. Therefore, it remains unclear, as to whether these circumstances have affected the results. It could be, for example, that for a divorce or an accident, completely different path coefficients would emerge. The evidence for self-efficacy expectancy as a mediator is limited to the context chosen, and further research should make use of a number of different problem domains. There are underlying similarities, however, between the selected problems that may suggest a common pattern of reactions to victims. For AIDS, cancer, and rape, the emotion of pity appears to be a stronger mediator than expectancy. These problems are loss/harm situations, whereas contexts such as anorexia, obesity, drug abuse, child abuse, depression and heart disease are more like threats (see Dunkel-Schetter et al., 1991; Hobfoll, 1988; Lazarus, 1990; Lazarus & Folkman, 1984). Different stress appraisals may determine the amount of pity and specific expectancies in potential support providers. If a victim is severely harmed or if the physical integrity of a victim is lost, then pity prevails; if, however, an on-going risky or threatening behavior is the topic, it is seen as more unstable and modifiable and, therefore, gives rise to a greater role for expectancies. Expectancies can be pessimistic or optimistic. Pessimism undermines the
motivation to help because the investment of further support efforts appears to be wasted; optimism, however, assumes that the victim will be responsive to future support attempts and thereby render them worthwhile. Optimism, as a psychological construct, has been defined as "generalized outcome expectancies" (Scheier & Carver, 1985, 1987). This construct has recently become one of the key issues in research on stress, coping, and mental health as well as physical health (Scheier et al., 1989; Seligman, 1991). The present studies have underscored the role of situation-specific outcome expectancies and self-efficacy expectancies after Bandura (1977, 1991). Further research should address the notion of specificity versus generality of expectancy, with dispositional optimism being one example of a more general construct. Jerusalem and Schwarzer (this volume) have developed a global self-efficacy scale that has demonstrated high predictive and construct validity in several field studies. Although specific measures are preferred in clinical intervention studies of behavioral change, there might be an advantage to global measures in other research domains. Although the present studies have provided preliminary evidence for the role of expectancies as mediators in the helping process, it remains undetermined how
outcome expectancy and self-efficacy expectancy are interrelated. Each experi-
ment has dealt with only one of these cognitions but failed to account for their
joint influence. It would be premature to conclude from the above findings that
outcome expectancy exerts a stronger influence on support intent than self
efficacy expectancy. There might be a causal order among the two. For example,
it might be that a support provider does not scrutinize her helping capability
unless being faced with a target's condition that is improving or one that is, at
least, modifiable. A third variable could be critical here, namely one's personal
experience with (a) crisis situations that require support, and with (b) the effec
tiveness of one's previous helping attempts (Dunkel-Schetter & Skokan, 1990).

Self-efficacy expectancy is shaped by context-specific mastery experiences,
among others, and therefore it would be necessary to investigate expectancies
Press.


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II Self-Efficacy and Human Development


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APPENDIX I


Control Beliefs If I decide to learn something hard, I can. (+) I can't get good grades, no matter what I do. (-)

Strategy Beliefs Effort: Ability: Powerful: Others: Luck: Unknown:

Capacity Beliefs Effort: Ability: Powerful: Others: Luck: For me to do well in school, all I have to do is work hard. If I get bad grades, it's because I don't work hard enough. I have to be smart to get good grades in school. If I'm not smart, I can't get good grades. If I
want to get good grades, I have to get along with my teacher. If my teacher doesn't like me, I won't do well in that class. For me, getting good grades is a matter of luck. If I get bad grades, it's because I'm unlucky. When I do well in school, I usually can't figure out why. I don't know how to keep myself from getting bad grades. When I'm in class, I can work hard. (+) I can't seem to try very hard in school. (-) I think I'm pretty smart in school. (+) I don't have the brains to do well in school. (-) I can get my teacher to like me. (+) I just can't get along with my teacher. (-) I am lucky in school. (+) When it comes to grades, I'm unlucky. (-) APPENDIX II

SAMPLE ITEMS AND PSYCHOMETRIC PROPERTIES FOR THE COPING CATEGORIES (From Skinner & Wellborn, 1991)

When something bad happens to me in school (like not doing well on a test or not being able to answer an important question in class)...

Strategizing (5 items, alpha = .68):

Perseverance (5 items, alpha = .73):

Avoidance (5 items, alpha = .62):

Delegation (5 items, alpha = .63):

Projection (5 items, alpha = .66):

Confusion (5 items, alpha = .66):

Impulsivity (6 items, alpha = .68): I try to see what I did wrong. I slow down and think carefully. I go over the problem again and again. I can't go on until I've solved it. I try not to think about it. I put it out of my mind. I get the teacher to solve the problem. I want the teacher to tell me the answer. I get real mad at other people. I say the teacher didn't cover the things on the test. My mind goes blank. I get all confused. I just say the first thing that comes into my head. I just do anything. ADULTS' EXPECTANCIES ABOUT DEVELOPMENT AND ITS CONTROLLABILITY: ENHANCING SELF-EFFICACY BY SOCIAL COMPARISON (From Heckhausen, 1991)

The human life span with its radical changes and structured constraints in control potential confronts the individual with a highly taxing coping task. If developmental tasks and everyday challenges are to be tackled successfully, not only at one point in the life span, but across shifting developmental
ecologies, the individual has to maintain and balance two requirements. On the one hand, expectations, plans, and evaluations have to reflect reality, so as to allow appropriate action planning. On the other hand, conceptions about life-span change need to be biased so as to protect self-efficacy, and thus maintain motivational prerequisites of action. One way to balance both these apparently contradictory requirements is strategic social comparison. Social comparison in terms of age-graded phenomena is based on normative conceptions about life-span development. Such normative conceptions help generate age-graded social reference groups, which provide both, a realistically tailored and a self-enhancing framework for personal evaluations and aspirations. Recent research is presented, which demonstrates the structure and consensual nature of normative conceptions about adult development. Moreover, development-related expectations for the self entail substantial congruence with those ascribed to "most other people," thus exemplifying a focus on validity, rather than on excessive self-serving illusion. However, differences between normative and self-related expectations reflect a self-enhancement strategy, particularly with regard to old age, which is regarded a more threatening period of the life span.

The present chapter addresses adults' expectancies about age trajectories and controllability of adult development. Conceptions about one's own personal development are contrasted with conceptions about "most other people's" development. Accordingly, beliefs about self-efficacy (i.e., controllability for self) are juxtaposed to beliefs about general controllability (i.e., for "most other people") of developmental processes. Distinct patterns of self/other differences in development-related conceptions reflect different strategies of using social comparison to enhance feelings of self-efficacy in either past, current, or future personal development (J. Heckhausen & Krueger, 1991).
Self-efficacy, in turn, is a fundamental requirement for the potential to act and exert control over one’s environment and self (Bandura, 1982). The human life course can be conceived as a context for action, action directed at development (J. Heckhausen, 1990a). Across the life course, an individual’s potential to actively control her environment undergoes dramatic changes (Baltes & Baltes, 1986; Baltes, 1987). At birth and during early infancy the individual is almost completely unable to manipulate and change objects in the external world. Control during this time of life is, to the most part, exerted by getting more mature others such as caregivers, to act (J. Heckhausen, 1987; Kaye, 1982). During childhood and adolescence the individual rapidly gains motor abilities, skills, knowledge, and understanding, and thereby becomes increasingly aware of his own competence (Harter, 1975; J. Heckhausen, 1988) and autonomy from caregivers and other socialization agents (e.g., Steinberg & Silverberg, 1986). In early adulthood it is not only increasing motorphysical and cognitive abilities but also the age-graded allocation of multiple social roles in the work and family domain (Marini, 1984) which increase the individual’s scope for exerting control over various life ecologies. During middle adulthood control
potentials in many domains of life reach their maximum, but thereby also render over-ambitious life goals out of reach due to a lack of remaining life time (Brim, 1988; Neugarten, 1968). Finally, during old age physical powers decline, motor and mental activities become slowed (Salthouse, 1985), and social roles allocated by society diminish (Riley & Riley, 1986). If self-efficacy beliefs would simply reflect absolute levels of personal control, such radical shifts in control potential as experienced throughout the human life course would render self-efficacy a very unstable feature of the human mind.

Self-efficacy, however, has been shown to be a key resource for motivated action in humans (Bandura, 1977, 1982, 1986). Self-efficacy can only serve this important function if it is a stable and reliable resource, that is not jeopardized by obstacles and drawbacks, but instead helps to overcome difficult spells in life.

The present paper attempts to line out and demonstrate some of the ways in which the human mind uses secondary, as opposed to more direct primary, control strategies (Rothbaum, Weisz, & Snyder, 1982) in order to maintain long-term self-efficacy in spite of constrained and declining control potential over the life course (J. Heckhausen & Schulz, 1991; Schulz, Heckhausen, & Locher, in press).
Special emphasis is given to strategies of secondary control relying on selective social comparison. These issues are discussed with regard to the role of lay persons' normative conceptions about development in adulthood. The life course provides a unique time-graded structure of opportunities and risks for developmental gains and losses. Attempts to actively influence one's own development are constrained in specific age-related ways. Some of these restrictions are fairly rigid, such as the timing of school entry or retirement, some are more lenient. In any event, these age-related constraints provide guideposts for assessing an individual's current developmental status in the life course, and for advising future life planning. Three types of life course constraints can be discerned: (I) constraints in terms of the life time remaining till death (absolute),

(2) constraints associated with chronological age (cross-sectional or vertical), and

(3) constraints resulting from sequential patterns (longitudinal or horizontal)

(J. Heckhausen, 1990a; J. Heckhausen & Schulz, 1991). First, life time remaining till death restricts the potential future time extension of developmental goals and life plans. This is relevant, for instance, when in midlife the feasibility of career changes is considered. Second, age norms set deadlines for various life events, and thereby slice the life span in vertical
segments. Such norms can be set on a societal level, such as in the case of school entry or retirement (Hagestad & Neugarten, 1985; Neugarten, Moore, & Lowe, 1965), or be the product of universal biological processes such as in the case of puberty as the onset and menopause as the close of fertility. Third, age-sequential (horizontal) constraints can also be identified on the societal and the biological plane. Biologically they are shown in universal sequential patterns of maturation and aging. On the societal plane, age-sequential constraints result from the canalization of development and life course patterns into developmental or biographical tracks, involving more or less fixed sequences and timing of life events (Geulen, 1981; Mayer, 1986), for instance during the transition to adulthood (Marini, 1984; Modell, Furstenberg, & Hershberg, 1976). These constraints in and of themselves—not even considering the substantial losses associated with aging—reveal that we are far from being in complete control over our lives. Instead, we have to adapt our hopes, goals, and plans to a fairly restricted repertoire of options over which we have at least some control. If our feelings of self-efficacy were perfect reflections of all these constraints we would be close to paralytic helplessness. In order to generate and maintain the
potential for action directed at development and the life course, two requirements have to be fulfilled. On the one hand, the individual needs a fairly valid conception about options, possible life paths, suitable action means, and probability of success, in order to generate effective action. On the other hand, the motivational management of action requires feelings of self-efficacy and thus, hope for success; otherwise the individual would be overwhelmed by uncertainty and fear of failure. Given the constraints and radical life-span shifts in control potential, these two requirements are bound to get into conflict (J. Heckhausen & Schulz, 1991). When, for instance, physical strength drastically declines in old age, personal aspirations for athletic activities have to reflect this loss in order to keep in touch with reality. However, feelings of self-efficacy and self-worth also have to be protected in order to motivate the individual to keep up appropriate activity. One most effective way in which both partly contradictory requirements can be met is strategic social comparison. Festinger (1954) has proposed that social comparison may serve self-assessment and self-improvement functions. In order to assist self-assessment the individual compares with others who are similar on relevant performance dimensions, so that the evaluation of one's own performance is calibrated. Self-improvement is
promoted if one compares
with others who are a little superior on a relevant
dimension. Incidentally, such
upward social comparison converges with the selection of a
just-above-medium
level of aspiration, which is identified as most promotive
for performance and
learning by achievement motivation research (see review in
H. Heckhausen,
1991). Wood (1989) has recently proposed a three-fold model
of social comparis
son adding self-enhancement as a major function of
comparison to self
assessment and self-improvement, as proposed by Festinger
(1954). Self
enhancement via social comparison is achieved by selecting
a reference group
which is inferior to oneself on relevant dimensions.
Vis-a-vis such a reference
group one can see oneself in a more favorable light, even
if one has experienced
a loss of self-esteem. In fact, recent empirical research
has shown that such
"downward comparisons" (Wills, 1981) are particularly
sought out under condi
tions of threatened life or self-esteem, and impaired
health. Severe disability
(Schulz & Decker, 1985), life-threatening illnesses (Taylor
& Lobel, 1989;
Taylor, Wood, & Lichtman, 1984), or crime-related
victimization (Burgess &
Holmstrom, 1979) represent such eliciting conditions for
"downward
comparisons. " With regard to age-graded phenomena strategic social comparison is espe

cially suitable. Throughout their life course individuals experience major intra

individual changes, for better and worse. Many of these changes are universal

and, thus, shared with age peers. Therefore, the peer group provides a most suit

able reference for self-assessment. If one compares oneself with age peers the standards of aspiration become realistic. At the same time feelings of self-efficacy are protected, because one

compares oneself with others who undergo similar age-related changes (Baltes, in

press; Baltes & Baltes, 1990). The self-enhancement function of social compari

son becomes especially salient in old age, when self-esteem is threatened by

aging-related decline. Selecting a suitable comparison group for downward

comparison in old age, however, is hardly a problem, since old age and aging is

viewed in a negative stereotype manner. Survey research about the image of old

age and aging has revealed that old people view old age as a bleak period of the

life span for "most old people," yet see themselves as favorable exeptions (Harris


showing that elderly estimated "most other old people's" problems in various life

domains (e.g., health, finances, loneliness) higher, if they themselves reported
experiencing the respective problem. Thus, self-enhancement via downward social comparison may be a common and effective way of coping with aging related decline (J. Heckhausen & Krueger, 1991). Generalized images of age groups are needed to generate mental representations about a social comparisons group. In this context, normative conceptions about development play a crucial role, because they provide common reference frames for expectations and evaluations of developmental change. One of the unique features of the life course as a context for action is that, although the III developmental tasks involved might not be currently relevant to anyone of us, they will be or have been at some point in our life course. The life course and its various challenges are therefore personally relevant to everyone. Some of its periods, such as old age, might seem somewhat far away for a young person, for instance. However, they will eventually become the critical context for that person's own life management. Expectations for oneself as well as social comparison with regard to age-graded phenomena is based on normative conceptions about development in adulthood. The human life course provides a more or less common repertoire of sequential developmental tasks to the members of a given
society (J. Heckhausen, I 990b). Therefore, it is essential both, for the individual

and for the society at large to have conceptions about development and the life

course which are commonly shared. Such normative conceptions about develop

ment and the life course represent "social constructions of reality" (Berger &

Luckmann, 1966). They provide the reference frame for the developmental

changes in oneself and for social comparisons both within and across age groups. Normative conceptions about life-span development probably influence our

thinking and actions with respect to all three planes in time, future, present, and

past. With regard to the future, they set the stage for one's own developmental

prospects. Certain developmental changes, such as learning a language, might

appear more obtainable at some ages than at others. The individual will therefore

try to time respective efforts accordingly, or if that is unfeasable, will know that

special effort has to be invested to bring about the untimely change. Moreover, if

certain changes, such as becoming forgetful, are expected to occur inevitably at a

certain age, the individual will not expect to modify his or her developmental tra

jectory and thus will not invest effort. This way, normative beliefs about develop

ment form our expectations about what we can do, what we cannot do, and where

to invest special effort in trying to take charge of our
developmental future. Moreover, normative beliefs about development could serve as a frame of reference for evaluating current developmental change in the self. Think, for instance, of undesired developmental changes, such as becoming forgetful in advanced age, or being worn out by mid-life crisis. Here, normative expectations might lead to a downgrading of one's peer reference group, and thereby may help us to maintain self-esteem and well-being in spite of unpleasant developmental experiences. If we believe that most of our peers are experiencing the same, we are less likely to blame ourselves; and if we suffer less decline than, we think, most of our age peers do, we actually could pride ourselves to have come up against the stream of aging. Finally, normative beliefs about development might help us to reconstruct and interpret our biographical past. The sequence of biographical events we encountered in our lives appears as one path in a limited repertoire of life courses possible or likely in a given socio-cultural context (Kohli, 1981). This way, normative conceptions of the life course provide structure to individuals' biographies. They inform us, in what ways we are the same, and in which ways we are different from most other people. Both aspects are critical for our personal well-being. We want to be connected to the social world around us, but still we also
want to be unique and somehow different from others (Campbell, 1986; Snyder & Fromkin, 1980). Thus, the optimal relation between what is perceived to be normative or typical and what is descriptive of the self probably is one which strikes the balance between consensus and uniqueness. The examples just given about the role of normative conceptions about development for future life planning, current life management, and past life review, illustrate two types of phenomena. On the one hand, normative developmental conceptions are used to provide valid information about chances and risks, so that the individual could optimize his or her active developmental interventions. On the other hand, normative conceptions serve to console the person by favorable comparison with less fortunate others, or by fending off blame.

These two modes of exerting control exemplify the distinction between primary and secondary control (Rothbaum et al., 1982) for the context of development related conceptions and action. Primary control refers to direct action on the external world. Conversely, secondary control refers to cognitive adjustments in terms of mental representations. The target of primary control is the external world, whereas the target of secondary control is the own self, one's goals, well
being, interpretations, and most importantly one’s
tself-efficacy. This distinction
between primary and secondary control is related to
Piaget’s conceptual distinc
tion between assimilative and accommodative processing
(Piaget, 1985). Brandt
stadter and Renner have used these Piagetian concepts to
characterize primary
and secondary modes of coping in middle-aged adults, and
identified comple
mentary age trends in a cross-sectional study covering
middle adulthood
(Brandtstadter & Renner, 1990; see also Brandtstadter, this
volume). Given the radical life-span changes in the
potential to control one’s environ
ment and development, it would appear functional if there
was a gradual shift
from a preference for primary control strategies to a
predominance of secondary
control strategies at later periods of the life course (J.
Heckhausen & Schulz,
1991; Schulz et al., in press). This hypothesis converges
with Brandtstadter and
Renner’s finding of decreased importance of assimilative
as compared to accom
odative control strategies throughout middle adulthood
(Brandtstadter & Renner,
1990). To be sure, at each period of the life span both
strategies are necessary to
cope with the challenges and constraints characteristic for
that life-span segment.
Moreover, primary and secondary strategies of control have
to be balanced such
that action is optimized, while self-efficacy is protected.
Leaning too much into either direction bears major hazards to developmental potential. Being too realistic about the constraints in control exposes the individual to depression (Alloy & Abramson, 1979; Lewinsohn, Mischel, Chaplin, & Barton, 1980; Taylor, 1989), and thus reduces motivational resources for action. Conversely, if self-efficacy is boosted so much that the individual loses contact to reality, cognitive requirements for planning and execution of action are jeopardized. Some recent empirical work at the Max Planck Institute will be reported to demonstrate, how in the context of adult development primary and secondary control strategies are balanced in a functional way, such as to optimize long-term action potential in terms of both, its cognitive and motivational requirements. In this research, primary and secondary control strategies are identified in social comparison as operationalized in differences between development-related expectations for the self as compared to “most other people.” We can expect to find both strategies of successful life management reflected in people’s conceptions about development, and particularly in the way they view their own developmental status vis-a-vis the non-native context of developmental expectations for “most other people.” Specifically, one can expect primary control to be reflected in a focus on the veridicality of
development-related conceptions. An effort to arrive at veridical conceptions about development would be shown in largely similar conceptions for the self and "most other people." Thus, developmental expectations for the self would not be unrealistically biased towards optimism. Expected developmental trajectories for self and others should be largely congruent. And perceived controllability for late life change should be lower than for early onset developmental change. However, conceptions about development should, to some degree, also reflect secondary control processes. First, an overall optimistic view of developmental prospects in adulthood can be expected. This would be shown in a pre-dominance of expected desirable as compared to undesirable developmental changes. Second, with regard to the comparison of self and other, more developmental gains should be expected for the self than for "most other people." And third, especially with regard to old age, when expected developmental losses might prevail, self-related expectations should be more optimistic than expectations held for "most other people." Before dealing with these specific findings, the first question in our research is of course: Are there at all common normative conceptions about development in adulthood that most members of a given
society would agree on? And if yes, what do these conceptions entail? Three studies were conducted. The first two dealt with adults’ and adolescents’ expectations about developmental gains and losses in adulthood (J. Heckhausen, Dixon, & Baltes, 1989; J. Heckhausen, Krueger, & Hosenfeld, 1989; Hosenfeld, 1988). The third one focused on the perceived controllability of such expected changes (J. Heckhausen & Baltes, in press). The procedures and materials used in these studies were similar. The sample contained young adolescents between 11 and 17 years of age (Hosenfeld, 1988), young adults between 20 and 35 years of age, middle-aged adults between 40 and 55 years, and old adults above 65 years (J. Heckhausen, I 990c; J. Heckhausen & I. Baltes, in press; J. Heckhausen, Dixon, & Baltes, 1989).

It should be noted at this point that we have no means of knowing to what degree conceptions about development are veridical (i.e., mirror reality), and whether optimistic or self-enhancing views of development are true or false. Life-span developmental psychology is far from being able to chart all relevant developmental trajectories; and most likely this will never be possible nor make sense. Moreover, all relevant assessments biases (Krueger & Heckhausen, 1991).

Baltes, in press; J. Heckhausen, Dixon, & Baltes, 1989). Subjects were given a large list of adjectives denoting a variety of psychological attributes, for instance,
intelligent, wise, forgetful, bitter, and mentally healthy. The subjects were asked to rate each of these attributes with regard to the following questions: (1) How much does this attribute increase in strength across the adult life span, or does it not increase? (2) How desirable versus undesirable is a developmental increase in this attribute? (3) At which mental increase typically begin, and at which age does it end? And finally, (4) to what extent can one control, that is promote or hinder, the developmental increase in this attribute? We had expected to find a pattern of life-span expectations which would reflect a negative view of aging, that is, a target-age related shift from a predominance of gains to a predominance of losses. However, the image of old age should not be entirely bleak, so that the elderly would not be left to despair. Figure I shows the overall ratio of gains and losses across the life span. Note that the abscissa shows the target ages, not the subjects' ages. As shown in Figure I, there is, as expected, a gradual shift from a predominance of gains expected for early adulthood to a predominance of losses in old age. Thus, people's conceptions about adults' developmental prospects reflect aging-related decline. However, Figure I also shows
something else. Overall, the expected gains greatly outnumber the losses. Even in the 80s, about 20% of

2 Perceived controllability was not assessed in the study on adolescents (Hosenfeld, 1988). Gains Losses

<table>
<thead>
<tr>
<th>Percentages of Gains and Losses</th>
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| Total changes are expected to be gains. Thus, although the general pattern of normative beliefs about adult development reflects a negative view of aging, people of all age groups see some potential for growth even in advanced age. What about the perceived controllability of these expected changes? Controllability

would appear to be the key variable to ameliorate the pretty unfavorable view of developmental prospects in old age.

Figure 2 Three-dimensional representation of mean ratings of perceived controllability, desirability, and expected onset age for 163 change-sensitive attributes (from: 1. Heckhausen & Baltes, in press). Figure 2 provides a three-dimensional display of each attribute's mean ratings on three variables: Expected age of change onset, perceived controllability, and desirability. Each of the arrows refers to one attribute. The onset ages 20 through 60 years are shown on the horizontal scale in front, desirability from low (very undesirable = 1) to high (very desirable = 9) at the side, and controllability on the vertical scale, ranging from somewhat below medium (medium controllability = 5) to high (very controllable = 9).
controllability scale itself, which
starts at a value of 4, shows that no attributes were
perceived to be really low in
controllability. Most mean ratings in fact were above the
level of "medium con
trollability." This speaks to a fairly optimistic view
about the scope of controlla
bility, and thus plasticity of developmental change
overall, even for advanced age. Second, developmental
changes expected to occur later in life were expected
to be less desirable: As shown in Figure 2, arrows at the
later target ages origi
nate in front segments which correspond to low levels of
desirability. This illus
trates the shifting ratio of gains and losses, also
depicted in Figure I. 4 9 8 7 6 5 4 3 2 1 20 30 40 50 60
Onset Age 7 6 5 4 3 2 1

t r o
l l a
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y 7 D e s i r a b i l i t y F i g u r e 3 M e a n r a t i n
g s o f p e r c e i v e d c o n t r o l l a b i l i t y a n
d d e s i r a b i l i t y f o r 1 6 3 c h a n g e s s e n s i
t i v e a t t r i b u t e s ( f r o m : J . H e c k h a u s
en & B a l t e s , i n p r e s s ) . h i g h r = . 6 4 7 6
Controllability medium bossy stilted mora
listic bitter absent minded forget
ful complicated queer disturbed very
undesirable 2 3 4 5 Desirability
sensitive 6 7 8 very desirable intel
ligent mentally healthy wise inter
ests wide educated organized thrif
ty well read knowledgeable With regard
to perceived controllability there is also an age-related
shift. At
increasing target ages the arrows become shorter and shorter, indicating lower degrees of perceived controllability. Thus, later age periods in the adult life span are associated with less desirable and less controllable developmental changes.

Note however, that even for changes expected very late in life a substantial degree of control was still expected, since even the short arrows indicate about medium controllability. In order to illustrate more specifically the relationship between the perceived controllability and the desirability of developmental changes, Figure 3 provides a two-dimensional plot showing mean ratings of controllability and desirability for each attribute. In Figure 3 some of the attributes are identified. The undesirable and less controllable ones in the lower left corner, such as disturbed, absent minded, and forgetful, are prototypical features of decline in old age. Interestingly enough, the opposite cluster, that is those attributes which are very desirable and appear most controllable (see upper right corner), are virtues of life-long further education: well-read, knowledgeable, educated, wide interests; but not wisdom, which is highly desirable but appears by far not as controllable. Figure 3 also illustrates the strong positive relation between desirability and perceived controllability of attributes. Desirable psychological features appeared
clearly more controllable than undesirable features. This is reminiscent of the well known "attributional bias": People like to take credit for the positive events, but do not want to be blamed for negative ones (Bradley, 1978; H. Heckhausen, 1987; Kelley & Michela, 1980; Snyder, Stephan, & Rosenfield, 1978; Zucker, 1979). Such an attributional pattern is, of course, conducive to successful life management. It encourages the striving for improvement, but also consoles and avoids self-blame at times of losses. Thus, it is characteristic of the dual function of development-related conceptions: information and consolation, primary and secondary control. Interestingly, the relationship between desirability and perceived controllability was closer for the old and the middle-aged when compared to the young adults (J. Heckhausen & Baltes, in press). For old adults, who are surely confronted with more losses than younger adults, this attributional bias would be more essential than for younger people. The age difference in the degree of the attributional bias demonstrates the functionality of normative conceptions about development in terms of buffering potential negative effects of aging on self-efficacy. In sum, on the one hand, normative conceptions about developmental change and its controllability do reflect a negative view of aging. With regard to old age
processes of decline clearly predominate over processes of growth, and less controllability is expected for losses, losses that occur increasingly in old age.

On the other hand, at all age periods some, however restricted, potential for growth is expected. And what is more, even the most severe losses seem not in evitable, but instead leave some hope for plasticity subject to active intervention. In a second step in our research program, we extended our research paradigm to include self-related conceptions about development. In a recent study, our major goal was to explore how expectations about one's own development are related to normative conceptions about the development of "most other people" (J. Heckhausen & Krueger, 1991; Krueger & Heckhausen, 1991). As mentioned before, we view normative beliefs about development as social constructions of reality (Berger & Luckmann, 1966), which acquire the function of reference frames. They can guide action directed at the future, they help us in evaluating current developmental change, and they provide the scaffold to build interpreta
tions of the past. We therefore predict that expected developmental trajectories for the self are similar to expected trajectories for "most other people." However, in certain respects self-related trajectories should differ from those attributed to
"most other people." As argued already, normative beliefs about development might also serve to foster self-enhancement. For instance, if the developmental course of the typical age peer is expected to show decline, the self might be viewed as a praisable exception to this normative age trend. Thus, via social comparison with the expected typical age-related change, self-esteem is enhanced or at least maintained, even when facing actual age-related decline in functioning. These theoretical expectations were investigated in a study comparing development-related conceptions regarding the self with those ascribed to "most other people" (J. Heckhausen & Krueger, 1991; Krueger & Heckhausen, 1991).

The subject sample included 180 subjects with 60 subjects from each of three adult age groups: young (age range: 20 to 35 years), middle-aged (age range: 40 to 55 years), and old adults (age range: above 60 years). The age groups were equally divided by gender and by three levels of educational background: People who finished high school, people with some lower college education, and people who had earned college degrees. For reasons of parsimoniousness, between-subject differences due to age, sex, or educational background will not be discussed here but elsewhere (J. Heckhausen & Krueger, 1991; Krueger & Heckhausen, 1991). Instead, this article focuses on the within-subject
factors in our design, that is, the difference between self and other, and the different changes expected for various decades of the adult life span. Like in the first set of studies we used an attribute rating format. The variables, on which the attributes were rated, included "self description at present," "desirability," "perceived controllability" rated separately for the self and for "most other people," and the "expected change from 20 to 90 years of age" also rated separately for the self and "most other people." Ratings of expected change could be given as increases, ranging from +1 to +3, stability given as 0, or decreases, ranging from -1 to -3. Finally, we asked the subjects to indicate up to ten "developmental intentions," that is, to select attributes on which they intended to strive for a change (see also Hundertmark, 1990). The pool of attributes was structured by five major psychological dimensions: Extraversion, Agreeableness, Conscientiousness, Emotional Stability, and Intellectual Functioning---commonly known as Norman's Big Five (Norman, 1963). Each of these factors consisted of two scales with ten attributes each, one scale for the desirable attributes, and one for the undesirable attributes. Analyses of the data showed that our previous finding of a shifting ratio of expected gains and losses across the adult life span was replicated. At
increasing target ages, less
and less gains, and more and more losses were expected,
although as in our
previous studies, some potential for growth was envisaged
even for old age. Q,I 01) C C':I .c U "0 ~ Col
<II Q. >( "-l 0.5 <II ~ 0.4 C':I .c U "0 0.3 ~
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Emot. Intel!. Dimension Self Olier Self Other

Figure 4 Expected change for self and "most other people"
on five psychological dimensions, separately for desirable
(upper panel) and undesirable (lower panel) attributes
(from: J. Heckhausen, Krueger, & Hosenfeld, 1989). 0.5
With regard to the comparison between self and "most other
people" in terms
of expected developmental prospects, one should first
consider the net change,
that is, the expected change averaged across age decades
in adulthood. In
accordance with the self-enhancement hypotheses, people
should expect more in
creases for the self as compared to other people in the
case of desirable attributes,
and less increases or more decreases for the self when
undesirable attributes are
concerned. Figure 4 shows developmental expectations for
self and "most other
people" relating to desirable (upper panel) and
undesirable attributes (lower
panel) of the five Nonnan dimensions. Ratings for the self
are shown in the dark
bars; those for "most other people" are given in lighter
bars. On the vertical scale
the expected net increase (i.e., averaged across decades)
is plotted. As one can see in the upper panel of Figure
More increase in the desirable attributes were expected for the self than for "most other people." However, separate analysis for each dimension revealed that this difference held statistically only for the dimensions Extraversion and Intellectual Functioning. The lower panel shows the complementary picture for undesirable attributes. Here, the vertical scale represents the expected net increase or decrease in undesirable attributes. For "most other people" more increases in undesirable attributes were expected than for the self. And accordingly for the decreases: Less decreases in undesirable features were expected for "most other people" than for the self.

This pattern of finding holds statistically for each dimension, except for Conscientiousness. Hence, we find evidence for a self-enhancement effect, both for the desirable and for the undesirable attributes. The developmental prospects for the self are consistently seen more positively than those for "most other people." Would this self-enhancement tendency also be reflected in perceptions of self-efficacy versus general controllability? Figure 5 gives the mean perceived controllability of desirable and undesirable attributes for the self and "most other people." We see here again a self-enhancing tendency in perceptions of controllability. More controllability is ascribed to the self as compared to "most other
people" both, for undesirable and desirable features. Moreover, our previous finding of an attributional bias, that is, desirable attributes appear more control lable than undesirable attributes, is replicated. The next question is, how this self-enhancing view is reflected in the curves of developmental change across decades, expected for the self and for "most other people." We would expect to find a pattern of curves that reflects a post ponement of developmental decline, and an extended maintenance of develop mental growth for the self than for "most other people." Figure 6 depicts the expected change curves for self and "most other people" separately for desirable and undesirable attributes. The ordinate indicates the tion of change: Expected increases are shown above the dotted line, and expected decreases below. The trajectories expected for the self are plotted in solid lines. Those expected for "most other people" are shown in dotted lines.

Figure 5 Perceived controllability of desirable and undesirable attributes for self and "most other people." Figure 6 Expected change for self and "most other people" across the adult life span in desirable and undesirable attributes (from: 1. Heckhausen. Krueger, & Hosenfeld, 1989). 7 6 5 desirable undesirable Attributes Self Other P erceived C on trolloa bility desirable attributes for self for others 2 1 0 -1 D ecreases I ncreases E xpected C hange undesirable attributes for self for others 20's 30's 40's 50's 60's 70's 80's Age Period in Decades 1. Heckhausen At first
glance, one is struck by the high degree of similarity between the
expected trajectories for the self and "most other people"..

This suggests that developmental expectations for the self closely reflect common and general conceptions about what normally or typically happens as people grow older. It thus seems that conceptions about development in "most other people" might indeed serve as a normative framework for sketching one's own development. However, there are also some differences. In fact, the pattern of curves confirms our prediction both for the desirable and the undesirable attributes. Starting from the age period of the 50s, the decline in the desirable attributes is viewed as less severe for the self than for "most other people." And also as early as for the 50s, increases in undesirable attributes are expected to be greater in "most other people" than in the self. To summarize our findings: In a sequence of studies we have shown that normative beliefs about development reflect common knowledge, widely shared among people varying in age, gender, and social strata. According to this common knowledge about development, aging throughout adulthood is a process of ever increasing risks for losses, and ever decreasing chances for gains. However, in spite of this negative view of the aging process, common conceptions about life-span development also involve optimism. Optimism with
regard to potential

for growth even in very advanced age, and optimism with regard to personal

control to counteract decline. Expectations about one's own developmental prospects largely follow similar

trajectories as those expected to hold for "most other people." However, one's

own development is viewed more optimistically. We believe to have more per

sonal control over our own development than we ascribe to "most other people.

We expect more gains and fewer losses for the self than for "most other people."

This self-enhancement tendency is particularly salient for the second half of the

adult life span, when increases in undesirable attributes are expected to occur

earlier in "most other people" than in the self; likewise decline in positive

features appears delayed for the self when compared to "most other people." To conclude, I would like to briefly recapitulate what was said at the begin

ning of the chapter. The life course has a unique age-related structure of chal

 lenges. It confronts us with ever-changing demands, some of which we can face

and meet with active attempts to intervene; but others seem to or actually do

 leave little scope for active, assertive control. Instead it seems they require some

 sort of re-interpretation, in order to protect a sense of self-efficacy, and thus

 safeguard motivational prerequisites of successful action. To successfully master a life course one needs to have two
sides. On the one hand, the efficient agent, who holds realistic expectations about his development and strives for attainable goals. But also, on the other hand, the skillful self-manipulator, who always, even when confronted with losses, manages to maintain a balance of affect, and keeps up perceptions of self-efficacy. The task of balancing the two needs throughout the life course and in spite of radical changes in actual control potential, may sometimes appear like fitting a square peg in a round hole. However, the human mind finds ingenious ways to resolve the apparent paradox. One most suitable way is the strategic use of social reference groups, such that under conditions of stress one can make oneself feel better by downward comparison. In the service of control and agency we need to hold fairly realistic expectations about potential gains and losses. However, the constraints and losses encountered throughout the life span are so manifold that one cannot afford to be a realist. It looks like, the trick is to strike the balance. And that, I believe, the Alloy, L. B., & Abramson, L. Y. (1979). Judgement of contingency in depressed and non-depressed students: Sadder but wiser? Journal of Experimental Psychology, 108, 441-485.


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PERSONAL CONTROL OVER DEVELOPMENT: SOME DEVELOPMENTAL IMPLICATIONS OF SELF-EFFICACY by Jochem Brandts-Hidter

The present contribution explores the various ways in which self-referential beliefs of efficacy and control are of key importance in maintaining an optimistic perspective on personal development during middle and later adulthood. Notions of control and efficacy, however, cannot fully account for the mechanisms of coping with uncontrollable events and irreversible losses that typically cumulate in later phases of life. It is argued that besides self-percepts of efficacy, the capability or readiness to disengage from blocked developmental options and to flexibly readjust one's developmental goals is an important factor that reduces the risk of dissatisfaction and depression in later life. Empirical findings indicate that this second, accommodative mode of coping becomes increasingly dominant in later adulthood.

The present contribution attempts to highlight some implications that notions of
personal control and self-efficacy have for issues of optimal development and successful aging. Such implications become readily apparent from an action perspective of development that focuses on the individuals' active contribution in shaping their personal development and circumstances of living (cf. Bandura, 1981; Brandtstädter, 1984). From this perspective, development over the life span has to be conceived as a process that to a large extent depends on the developing subject's self-referential cognitions, evaluations and actions. Life is a history of gains and losses in diverse areas of life and functioning (cf. Heckhausen, Dixon, & Baltes, 1989), but also a history of more or less successful attempts to keep this balance of gains and losses favorable. We are of course not the omnipotent producers of our development, as Bandura (1982a) has reminded us in his notion of "chance encounters." Schopenhauer, in his counsels and maxims concerning the wisdom of life, expressed this insight as follows: "... the course of a man's life is in no wise entirely of his own making; it is the product of two factors—the series of things that happened, and his own resolves in regard to them, and these two are constantly interacting upon and modifying each other" (Schopenhauer, 1851/1951, p. 84). Extending notions of
control and self-efficacy to the developmental domain

spawns many interesting questions: e.g., how do self-beliefs of efficacy and control over development influence the person's construction of developmental gains and losses over the life span? How and to what extent do such self-referential beliefs determine the person's motivation of readiness to counteract anticipated developmental losses? What is their functional role in coping with critical life transitions, especially with those partly irreversible and uncontrollable losses that characterize the later phases of life? The following sections will address these questions.

PERCEIVED EFFICACY IN INSTRUMENTAL COPING EFFORTS: AN ACTION-THEORETICAL PERSPECTIVE

The action-theoretical model shown in Figure 1 may help to elucidate the functional role of self-efficacy beliefs in the context of personal control over development (see also Brandtstadter, 1989; Brandtstadter & Renner, 1991). The scheme roughly delineates cognitive, affective and behavioral factors involved in the process of coping with developmental losses and deficits. More specifically, it portrays a first phase or mode of coping where the individual actively tries to alter his or her behavior or developmental circumstances so that they match with, or are assimilated to, his or her developmental goals, life themes and desired "possible selves" (Markus & Nurius, 1986). We have denoted
this stage in the coping process as the assimilative mode, in contrast to a second, accommodative circumstances (cf. Brandtstadter, 1989; Brandtstadter & Renner, 1990). This second mode or phase of coping, and its relation to self-referential efficacy beliefs, will be considered more closely in a later section. As shown in Figure I, active-assimilative modes of coping are initially motivated by a perceived discrepancy or mismatch between factual and desired developmental prospects (the corresponding self-monitoring process is addressed in the Components I and 2 of the model). The ensuing affective and behavioral consequences now will critically depend on the individual's appraisal of his or her potentials for altering this unsatisfactory state. The different branching points in the scheme (4,7,9) denote different courses of events (for clarity, the branching points are conceived as alternatives: yes/no, +/-). If personal control potentials for altering the situation are seen as sufficient (5,+), the person will take measures to ameliorate his or her developmental circumstances and prospects (6). If, in contrast, personal potentials for action are seen as deficient (5,-), this will temporarily block development-related change efforts, but may not immediately bring about a state of helplessness or depression. Rather, it seems plausible to
assume that at this stage of the coping episode, individuals will first try to augment their capacities and resources of action by searching for relevant

Figure 1 The assimilative mode of coping with developmental losses and deficits. Different active-assimilative strategies of coping are denoted by the paths < 1 ~ 2 (-) ~ 4 ~ 5 (+) ~ 6 >, < 1 ~ 2 (-) ~ 4 ~ 5 (-) ~ 7 (+) ~ 8 ~ 4 ~ 5 (+) ~ 6 >, < 1 ~ 2 (-) ~ 4 ~ 5 (-) ~ 7 (-) ~ 9 ~ 10 >. Efficacy beliefs intervene at the branching points of the scheme, which are linked with characteristic emotional states (according to this model, resignation and depression mark the shift from assimilative to accommodative processes of coping; see text for further explanations).


information, acquiring new skills, and so on—provided that such options are seen as available (5, -; 7, +). If such additional efforts turn out as unavailing, the individual may finally try to engage external support (7, -; 9, 10) or use some kind of proxy control (Bandura, 1982b) to manage the problem. Feelings of helplessness and hopelessness will arise when the different options for meliorative intervention depicted at various levels of the scheme seem exhausted (2, -; 5, -; 7, -; 9, -). Obviously, self-percepts of
efficacy and control, which of course themselves will be influenced by experiences of success or failure in the assimilative phase of coping, function as differential moderating parameters at the different branching points of the modeled sequence. Persons harboring doubts about their potentials and resources to prevent personally unwanted developmental outcomes and anticipated developmental losses will generally be less prone to engage in active efforts to ameliorate their developmental prospects or, if confronted with obstacles, to enhance their control potentials. In brief, the model shows how self-percepts of low efficacy pave the way into depression, or, conversely, how self-efficacy beliefs may enhance maintaining or regaining a positive, optimistic outlook on personal development. PERCEIVED CONTROL OVER DEVELOPMENT AND QUALITY OF LIFE PERSPECTIVES Against the backdrop of the action-theoretical model depicted above, it seems plausible to assume that differences in perceived self-efficacy or control over personal development should be closely related to indicators of optimal development and successful aging, and that strong percepts of efficacy will, at least in the long run, payoff in a more favorable balance of developmental gains and losses. In the following, I will present some selected findings that lend support to this general assumption. Before turning to
results, let me briefly
describe the research project where these findings come
from. The project I focuses on issues of personal
self-regulation of development in
adulthood. Our panel involves over 1,200 participants in
the age range from 30 to
60 years. Within a cross-sequential research design which
combines cross
sectional and longitudinal comparisons, structured
questionnaires were used to
assess various facets of the individual’s appraisal of his
or her own develop
mental situation. The ratings were done with respect to
different goal dimensions
(e.g., subjects were asked to rate the perceived importance
of goal, the subjective
distance from goal, the extent to which attainment of goals
depends on personal
efforts). We also asked our participants to describe their
feelings with regard to
their past and future development on selected adjective
scales. From the basic rat
ings, various global indicators of development-related
perceptions, beliefs and
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Bernhard Baltes-GlHz, Werner
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who assisted in various
phases of this research.
action tendencies were derived. Further measures were
included to assess inter
individual differences in personality traits, generalized control beliefs, marital adjustment, and life satisfaction. The longitudinal replications were separated by a two-year interval; to date, three waves have been completed which together span a longitudinal interval of four years (for more detailed descriptions of the research approach, see Brandtstadter & Baltes-Gotz, 1991).

Development-Related Control Beliefs and Perceived Developmental Deficits A first series of analyses centered on the question of how self-percepts of control over development relate to perceived developmental deficits, or distances from developmental goals. Figure 2 summarizes the findings for the first wave, which were found to be stable across all longitudinal replications. The figure relates the distance ratings for 17 different goal dimensions of personal development ("How far are you presently from achieving this goal?") to an index variable of personal control over development (peD; the two profiles shown in Figure 2 compare subgroups equal to or above and below the median of the PCD variable). The PCD index was aggregated from ratings concerning the perceived impact of controllable or autonomous and uncontrollable or heteronomous factors on personal development; validation studies have confirmed its usefulness as a measure of perceived control or development-related self-efficacy (see Brandt...
stadter, 1989). Across all goal dimensions, individuals scoring low in perceived
control over development report significantly higher developmental deficits.

There is also a control by goal dimensions interaction: Subjects having self
percepts of low control over development were found to report greater deficits
above all on dimensions related to health, occupational efficiency, prosperity, and
intellectual efficiency. A quite similar pattern of findings emerges when we take
as a dependent variable the self-attributed potential for further developmental
progress on the different dimensions (see Brandtstadter, Krampen, & Greve,
1987). These results indicate that subjects having self-percepts of high personal
control over development give a more favorable account of their actual develop
mental situation. At the same time, they also see a greater latitude for improving
their situation through determined efforts. Since no interactions involving age or
gender were observed, it seems that we can generalize our findings across these
factors. Emotional implications of Perceived Control Over Development As may already be extrapolated from the previous findings, self-percepts of
control over development should go with an optimistic and zestful outlook on
personal development. Persons with self-confident action-outcome expectancies
should be less threatened by aversive developmental
prospects, and less vulnerable to feelings of despondency and depression. Parenthetically, we may note that such feelings may not only result from distinct "bad events" (Peterson & Seligman, 1984) that are perceived as irreversible, but also from the experience of a gradual worsening in the balance of gains and losses with advancing age (cf. Heckhausen, Dixon, & Baltes, 1989). To some extent, the emotional implications of perceived control potentials or deficits are already revealed by analyzing the conceptual structure of emotion terms (e.g., Brandtstätter, 1985).

Figure 2 Perceived distance from developmental goals as a function of personal control over development (PCD). The profiles of means compare subgroups equal to or above (e) and below (0) the median of the PCD index (Brandtstädter, Krampen, & Greve, 1986). In our research, the postulated cognitive-emotional relationships were borne out in many convergent observations. As a paradigm case, we may consider the multiple regression of perceived control over development (as measured by the PCD index, see above) on ratings of emotional attitudes towards past and future development. The findings are based on data from the third wave (1987), but are
highly consistent across all measurement points (Brandtstadter & Baltes-Gotz, 1991). Inspection of the regression structures shows that subjects scoring high in perceived control over development (PCD) tend to describe themselves proud, happy, glad, satisfied, grateful when looking back on their past development; looking toward their future, they feel more hopeful, calm, confident, venturesome.

To get a more detailed picture, we have decomposed here the aggregated index of personal control (PCD) into its separate components of Autonomous Control and Heteronomous Control over Development (in the aggregation procedure, Table I

Multiple Regression of Personal Control Over Development (PCD), Autonomous Control Over Development (CDA), and Heteronomous Control Over Development (CDH) on Ratings of Emotional Attitude Toward Past and Future Personal Development (Multiple Correlations and Regression Structure Coefficients) Predictor variables PCD CDA CDH

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R
PCD was constructed as the difference between the indexes of Autonomous and Heteronomous Control). For Autonomous Control, we find largely the same pattern of relationships as for the global PCD index, whereas Heteronomous Control predicts a converse pattern of depression, worry and despondency (distressed, exhausted, depressed, discouraged, fearful, etc.). The finding of diametrically opposed correlational patterns for Autonomous and Heteronomous Control is not trivial, because these indicators do not form the opposite poles of a one-dimensional construct, but, on the contrary, were found to constitute statistically independent aspects of perceived control. This means, for example, that people who consider their personal development as strongly influenced by external and uncontrollable factors may nevertheless be convinced that they can play an active role in optimizing their balance of gains and losses. According to our observations, especially older people tend to adopt such a two-sided view, which obviously does not easily fit with traditional bipolar (e.g., internal versus external) conceptions of control. A very similar pattern of relationships emerges when we correlate longitudinal change scores in the control and emotion variables.
Over a longitudinal inter
val of four years, positive changes in self-percepts of Autonomous Control over
Development are generally accompanied by shifts toward a positive evaluation of personal developmental achievements and prospects, as well as by other favor able changes in developmental circumstances and development-related beliefs (e.g., increases in general life satisfaction and perceived marital support, de creases in various indicators of depression; see Brandtstadter & Baltes-Gotz, 1991). Conversely, increases in Heteronomous Control over Development go with a general worsening of developmental prospects. Inspection of cross-lagged panel correlations, however, did not suggest a specific causal ordering. As al ready mentioned above, self-percepts of low control over development should perhaps be considered as constitutive, rather than as causal, conditions of despondency and depression. Self-Percepts of Control and Subjective Impact of Stressful Events Critical or stressful life events-especially events or life changes which, from the subject’s point of view, involve a worsening of personal developmental prospects—are generally seen as risk factors for depression and for a broad spectrum of pathophysiological changes, even if the mechanisms that mediate the documented statistical relationships are yet under dispute
(e.g., Schroeder & Costa, 1984). Control-theoretical approaches have underscored the potential buffering effect of action-outcome expectancies on this relationship. As argued above, such expectancies should determine how much effort people will expend and how long they will persist in active-assimilative coping efforts; furthermore, self-percepts of efficacy and control should enhance threat-reducing interpretations of the impending situation (cf. Bandura, 1981; Lazarus & Folkman, 1984; Peterson & Seligman, 1984; Rodin, 1986; Scheier & Carver, 1985). Generally, the belief that one cannot improve one's developmental prospects or cannot attain personally valued goals is—almost by definition—an essential feature of helplessness, depression and alienation. Besides the assessments already described, we have asked the participants in our panel study to report critical or stressful events that they had experienced in the recent past and to rate the degree of strain experienced during the episode. In a first exploratory step, we correlated these ratings with age, depressive outlook on personal development and different measures of perceived control. Together with the indicators of Autonomous and Heteronomous Control over Development, a German adaptation of Levenson's scales (IPC-questionnaire; Krampen,
1981) was included in this analysis as a measure of
generalized control beliefs.

Depressive tendencies were measured by an index variable
derived from self
ratings on selected adjective scales (cf. Brandtstadter &

Table 2 shows the relationships for different categories
of events (the data come
from the third wave, 1987; similar findings were obtained
for the earlier waves). First of all, the findings
presented in Table 2 confirm the expected relation
ship of experienced strain in critical episodes with
depressive tendencies; the
event categories of unemployment, conflicts in familial or
occupational contexts,
change in financial state, change in residence and
personal illness seem to stand
out in this relationship. To further trace the effects of
critical events reported for a
given two-year longitudinal interval, we also looked at
changes in depression rat
ings over that interval. Persons afflicted by personal
illness, occupational con
flicts and by conflicts with family members or friends
showed a significantly
greater increase in depressive tendency (and a
responding decrease in life
satisfaction) than the complementary subsample of
individuals not reporting the
given event. For the other categories of events,
longitudinal changes mostly
pointed in a similar direction but-partly due to
restrictions in sample size for the
given event type-fell short of significance (noticeable exceptions are the cate
gories pregnancy/birth of child, change of residence and occupational change,
which tended to go with a reduction in depressive tendencies over the
corresponding longitudinal interval). The focus of interest here, of course, is on the associations of experienced
strain with indicators of control and self-efficacy. As a general tendency, control
beliefs indicating low self-efficacy or an extern allocus of control (Heteronomous
Control, IPC-Powerful others, IPC-Chance control) seem positively related to the
strain experienced in a given critical episode. This relationship appears most
clear-cut for personal illness, unemployment, and occupational conflicts. Inter
estingly, these data also hint that in specific cases, self-percepts of control over
development may go with greater emotional strain in critical situations. A plausible post factum explanation would be that persons attributing themselves a high
degree of control over their development may to a greater extent feel personally
responsible for failures and setbacks. Within a hierarchical regression format, we further looked for moderating
effects of control beliefs on the relationship between exposure to critical events
and emotional strain, using simple and autoregressively residualized differences Table 2 Subjective Impact of Stressful Events: Relatio
n With Age, Depressive Outlook, and Measures of Control Type of Event Reference Variable: 1: 2: 3: 4: 5: 6: 7: 8: 9: 10: 11: 12: (82) (254) (426) (204) (29) (40) (195) (109) (191) (388) (193) Age .01 .03 .18** .00 .24 .22 .03 .02 .01 .01 .04 Depressive outlook (DEP) .31 ** .27** .15** .17** .08 .44** .36** .10 .33** .31** .38** .17** Autonomy control over development (CDA) .07 .00 .12*. .11 .12 .22 .22** .13 .02 .16** .09 .02 Heteronomy control over development (CDH) .02 .24** .2 2** .07 .04 .35*. .14 .20** .27** .09 .02 Personal control over development (PCD) .00 .16*. .06 .08 .11 .09 .03 .07 .17*. .05 .03 .05 Internality (IPC1). 26*. 07 .02 .12 .30 .04 .02 .09 .14 .04 .01 .06 Powerful others (IPCP). 10 .24** .09 .08 .06 .38*. 18*. 2 3*. 23** .01 .16*. 12** Chance control (IPC2). 10 .22** .18** .03 .09 .22 .28** .08 .24** .08 .19** .10** Note: a1: Change in residence, 2: Personality, 3: Illness off family member, 4: Death off family member, 5: Pregnancy/birth of child, 6: Unemployment, 7: Change in financial state, 8: Occupational change, 9: Occupational conflicts, 10: Conflicts with family members or friends, 11: Other stressful event (open category), 12: Sum of reported critical events. Numbers in parentheses refer to frequency of the given event within the sample (N = 998). ** p < .01; . p < .05.

between pre- and post-event depression ratings (obtained at the second and third occasion of measurement, respectively) as dependent variables. Space considerations allow for only a condensed overview here. Observed moderation effects were highly specific for the type of event considered. In part, the effects were
consistent with the presumed buffering effect of perceived control; for example,

it was found that higher scores on IPC-internality and on Autonomous Control

over Development dampen the negative emotional impact of occupational con-

flict. Such effects came out more clearly when pertinent domain-specific ratings

of perceived control over development were considered (considering, e.g., the

emotional impact of personal illness, health-related control beliefs seem to have a

stronger moderating effect than general indicators of perceived control). The

global picture of our findings, however, does not support the unconditional

conclusion that self-percepts of control and self-efficacy are under all circum-

stances contributive to emotional resilience and effective coping. For example,

our results hint that the emotional impact of the event “death of family member”

is not mitigated, but rather aggravated by perceived control or self-efficacy. This

indicates that active-assimilative efforts at control may be dysfunctional in situa-

tions of loss which are factually irreversible. It is possible, then, that the arguments considered so far, which largely cen-
tered on salutary effects of self-efficacy, give only an incomplete grasp of the

factors that help individuals to cope with life crises and make them less vulner-
able to depression in situations of loss. In the
following, I will briefly sketch the
outlines of a more comprehensive theoretical perspective.
BROADENING THE THEORETICAL SCOPE: TENACIOUS PURSUIT AND
FLEXIBLE ADJUSTMENT OF DEVELOPMENTAL GOALS To sum up,
there are good empirical and theoretical reasons supporting
the
view that self-referential beliefs of efficacy and control
are of key importance in
maintaining a positive and optimistic outlook on personal
development in middle
and later adulthood. But-as intimated above-I think that
this is only one ele
ment of a more complex story. We have a thorough
theoretical understanding of
the different ways in which self-percepts of efficacy may
contribute to effective
coping, and why persons entertaining doubts in their
control potentials are more
vulnerable to helplessness and depression when faced with
obstacles or failures.

From a control-theoretical or learned helplessness
perspectives, however, it is by
far less clear how people manage to recover from
resignation and depression, es
pecially in cases where they are confronted with permanent
and definitely
irreversible loss. Accommodative Modes of Coping To
approach this question theoretically, we should recognize
that a discrep
anc-y between actual and desired developmental prospects may
be handled in two
basically different ways: on the one hand, the situation
may be transformed-in
the sense of assimilative efforts given above-to correspond
more closely to per
sonal goals and aspirations; on the other hand, the discrepancy may be neutral

ized by alterations in the system of personal goals, aspirations and evaluative
cognitions that make the previously aversive situation more acceptable. It follows that besides self-referential beliefs of control and efficacy, the cap
ability or readiness to disengage from thwarted developmental options and to
flexibly revise and readjust one's developmental goals and life design may be an
important (and hitherto largely neglected) factor that serves to diminish the
impact of aversive and stressful experiences and to reduce the individual's vul
nerability to depression. Apparently, we are dealing here with a mode of coping
that is basically different from active-assimilative efforts. This second mode of
coping, which I have termed as accommodative, should become predominant to
the extent that active, instrumental efforts to master the situation seem futile, or
when generalized or specific beliefs of self-efficacy have been eroded through
repeated unsuccessful attempts. In a certain sense, these considerations lead us
beyond notions of control and learned helplessness. Note that accommodative
readjustments of goals, aspirations and evaluative standards involve to a con
siderable extent reactive, automatic or effortless processes that do not involve
intentional action. There are of course techniques of self-management and self-instruction that may be deliberately applied by the individual in an attempt to alter aversive cognitions and emotional states (e.g., Karoly & Kanfer, 1982; cf. also the notions of "emotion-focused coping" by Lazarus, 1977, or of "secondary control" by Rothbaum, Weisz, & Snyder, 1982). The fact, however, that we can to some extent modify our cognitive and emotional processes does not imply that these processes should be considered as intentionally controlled actions (just as the fact that we can deliberately bring about some bodily reflexes does not mean that these reflexes are intentional acts). We cannot give up our beliefs and commitments merely because it seems advantageous to us; if we could, problems of depression and despair would presumably not exist. To make a longer story short: The paradigm of intentional action does not apply to the cognitive and motivational processes that form the basis of intentional actions (see also Lanz, 1987). Rather, the process of generating palliative cognitions in aversive situations depends on their availability in a given situation; research on the mood congruence of cognitions has shed some light on the subpersonal mechanisms involved (for an overview, see Blaney, 1986). It becomes apparent at this juncture...
ture that feelings of hopelessness and helplessness are not simply the deplorable end state of unavailing efforts to master a problem, but may be important parameters in the shift from assimilative to accommodative phases of coping. When faced with factually uncontrollable events and irreversible losses, persons having a strong sense of personal control and self-efficacy may even have greater difficulties in adjusting their goals and life plans to the new circumstances (cf. Brandtstädter & Renner, 1990; Janoff-Bulman & Brickman, 1982). The accommodative phase of coping involves a reorganization of goals, beliefs, aspirations and evaluational standards on different levels. We assume that, on a first level, reappraisals of the situation are activated; as the emotional evaluation of a given situation largely depends on the expectations and meanings (semantic and instrumental) associated with that situation, changes in subjective probabilities of specific consequences may have a palliative effect and enhance disengagement from blocked goals and action tendencies (cf. Klinger, 1975). Such palliative processes critically depend on the subjective availability of alternative interpretations, which may be enhanced by exploratory and ruminative processes (search for new information, consideration of new arguments, changing the ana
lytic focus, etc.). Within the boundaries of rationality, there is usually some latitude for alternative interpretations of a given situation (cf. also Taylor & Brown, 1988): when alternative interpretations are available, individuals usually tend to endorse those that are consistent with, and have positive implications for, their self-conception and personal view of the world (cf. Greenwald, 1980). If palliative interpretations are not accessible, individuals may alter their evaluative standards and reference points. For example, developmental losses in old age may seem more acceptable to individuals who compare themselves with same aged rather than with younger persons. Generally, a situation may appear less aversive when we contrast it with some worse alternative or, conversely, avoid contrasting it with a counterfactual better world (cf. Kahneman & Miller, 1986; Taylor, Wood, & Lichtman, 1983; Wills, 1981). Bandura (1982b, 1989) has discussed the mediating role of such processes in selective activation of self-corrective tendencies; here, the emphasis is on their functional role in the process of disengaging from barren goals and in revising developmental perspectives. On a final level, accommodative processes may eventually involve a radical shift in the person's conception of self and the world, comparable to a paradigm shift in
science. Such more radical changes may be expected in cases when palliative
reappraisals and readjustments of aspirations are not available for the individual

(for further theoretical elaborations, see Brandtstiidter & Renner, 1991). Age-Related Changes in Coping Style: From Active-Assimilative to Accommodative Modes of Coping The theoretical perspective outlined provides a conceptual scheme for dealing with some notorious puzzles of successful aging. How can we explain that older people do not report a general or dramatic loss in life satisfaction, even though they face morbidity, death, and an increasingly unfavorable balance of developmental gains and losses (Stock, Okun, Haring, & Hinter, 1983)? Why is there no increase in the prevalence rates of depression in old age (cf. Bolla Wilson & Bleeker, 1989; Kasl & Berkman, 1981; Lewinsohn, Hoberman, Teri, & Hauzinger, 1985; Neumann, 1989)? As Blazer (1989, p. 198) summarizes the evidence, we should "seriously consider the possibility that older adults ... may be ... protected from the development of major or clinical depression." To illustrate this point, Figure 3 shows cross-sequential gradients for self-reported life satisfaction that were obtained from the first and third wave of our panel study (N = 998). The gradients span a cross-sectional range from 30 to 63 years and a longitudinal interval of four years (as a measure of life
satisfaction, we used an item selection from scales developed by Neugarten, Havighurst, & Tobin, 1961).

Apart from a slight decrease in subjective quality of life for the early phase of middle adulthood (30-41 years), the general picture from both cross-sectional and longitudinal comparisons is one of stability over the age range considered. Even for the cohorts approaching later adulthood, there is no indication of a decrease in life satisfaction.

Figure 3 Subjective quality of life in adulthood: cross-sectional comparisons and four-year longitudinal changes in life satisfaction (occasions 1983 and 1987; age ranges for cohorts refer to first occasion). From a control-theoretical or learned helplessness point of view, these facts become even more puzzling when we assume that older people see their life and personal development as increasingly dependent on factors beyond personal control, as several studies have documented (cf. Brandstätter & Baltes-Goetz, 1991; Lachman, 1986; Rodin, 1987). These apparent inconsistencies may be resolved when we assume a gradual age-related shift from assimilative to accommodative modes of coping. We have investigated this assumption by means of a question accommodative modes of coping on a dispositional level. The instrument comprises two nearly orthogonal scales that we have denoted as “Tenacious Goal Pur
suit" and "Flexible Goal Adjustment." Tenacious individuals cling to goals and commitments even in the face of obstacles or under high risk of failure (e.g., "When faced with obstacles, I usually double my efforts"; "Even when a situation seems hopeless, I still try to master it"). Flexible individuals disengage easily from barren commitments, and try to see the best in difficult situations (e.g., "I adapt quite easily to changes in plans or circumstances"; "If I don't get something I want, I take it with patience"). In spite of their statistical independence, both scales correlate consistently and positively with indicators of successful development such as optimism, life satisfaction, absence of depressive tendencies, and greater resilience in stressful life situations (see Brandtstadter & Renner, 1990). Figure 4 shows cross-sectional age gradients for Flexibility and Tenacity for a large sample (N = 1,433). These results are obtained by pooling observations from our panel study (third wave, 1987; cf. also Brandtstadter & Renner, 1990) and several independent investigations in which the Flexibility and Tenacity scales were used. Over the age range considered, the age cohort by coping style (Flexibility, Tenacity) interaction is highly significant and clearly corresponds to
the predicted shift from assimilative to accommodative modes of coping; the

linear correlations of Flexibility and Tenacity with age are -.23 and +.23,

respectively (the difference between these coefficients is highly significant).

Inspection of the data for the oldest cohort indicates that these trends continue

beyond the age of 65. The pattern of clearly opposite regressions of Flexibility

and Tenacity on age is all the more noteworthy considering the independence of

the scales (for the total sample, the correlation is .12). These findings seriously

call into doubt widespread assumptions according to which "... older people ... cope

in much the same way as younger people" (McCrae, 1982, p. 459); at the same

time, they underscore the importance of dispositional factors that have been

hitherto largely neglected in coping research (see also Carver, Scheier, &

Weintraub, 1989).

Figure 4 Age gradients for Tenacious Goal Pursuit and Flexible Goal Adjustment. In ~ In .1!! 1z (1) c 0z 0 .u (2) .1!!

Figure 5 Conditional regressions of Life Satisfaction (LS) on subjective developmental deficits (sum index of
perceived distances from 17 developmental goals, GO) for different levels. Analyses of moderation effects further support this line of argument. Considering the presumed palliative functions of accommodative processes, we should expect that for highly flexible persons, perceived developmental losses or deficits should be less detrimental to subjective quality of life. Figure 5 shows the conditional regressions of life satisfaction on the sum of perceived goal distances over 17 developmental goals for different levels of Flexibility (N = 885; these data come from the third wave of our panel study where the Flexibility scale was first introduced; see also Brandstädter & Renner, 1990). While being significantly negative (-.43) for the total sample, the correlation between life satisfaction and the sum of perceived distances from developmental goals is less pronounced for higher levels of Flexibility (this moderation effect is also obtained when age is statistically controlled). Apparently, the observed age-related shift from assimilative to accommodative modes of coping should not be interpreted as reflecting an insidious trend toward resignation and apathy, but rather as a process that is functional in maintaining an optimistic perspective, perhaps also a sense of power and self-efficacy, in old age. At this juncture, the question may be raised whether the notions of power and
self-efficacy should not be considered as diametrically opposed to the accommodative adjustments. But if getting what one wants is central to the concept of power, it follows that a way to retain a sense of efficacy may be to adjust one's


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Author Notes: The preparation of this paper and much of the research reported in it was
There is now substantial support for a correlation between depression and reduced judgments of self-efficacy. However, there are several possible paths to this result: For example, lower self-efficacy may be making people depressed, the depression may be undermining their self-efficacy, or depression may be indirectly affecting self-efficacy through an impact on performance attainments. The current evidence suggests that all three effects are probably occurring. A model is presented, where self-efficacy judgments, performances and moods have reciprocal influences on each other, and limiting conditions for the effects are discussed.

"I am totally hopeless," a depressed woman said to me recently. "I'm no good at anything. I can't get any good ideas for my projects, I keep saying dumb things when I'm around other people. I look at my friend-she has a great job, she's popular, she always seems to know what to say. I'm never going to be like her. There's no point in trying." An important aspect of this person's cognition is her low self-efficacy. This may be a major factor in her depression being maintained, since it is likely to influence the activities that she chooses to engage in and the effort and persistence she invests in them (Bandura, 1982; Kavanagh, 1983). When she gives up trying, it reduces the opportunities for her to experience positive outcomes, and increases the frequency of aversive events for her (Lewinsohn & Libet, 1972). Her low self-efficacy does not just seem to affect her performance: It also seems to be affecting her emotional state directly. When she talks about her per
ceived incapability in areas that she values highly, she
becomes visibly upset.

This does not seem to be solely because she anticipates
negative external out
comes, but because she is violating her own standards. The
impact appears to be
compounded by an unflattering comparison with other people
and a sense that
this is a permanent problem. The phenomenon is modelled
in Figure I. Depressive feelings that are trig
gered by cognitions, aversive events or physiological
states is thought to have a
reciprocal relationship with both self-efficacy and
performance. As with the cli
ent just described, a low sense of self-efficacy often
deepens the person's
sadness, especially when it makes the opportunity for
positive outcomes seem
remote or when the performance domain is crucial to the
person's self-esteem.

When aversive outcomes occur, these also feed into the
depressive mood (the
arrow on the bottom right). Emotional states are expected
to affect self-efficacy
both directly and through an impact on performance. Aspects
of this model are
supported by the current state of the research, although
some of the influences ap
pear to be less strong than others, and some only occur in
restricted circumstances. SELF-EFFICACY EMOTIONAL STATES

Figure] Theorized relationships between self-efficacy,
performance accomplishments and depression. From Yusaf and
Kavanagh (1990). Is Depression Associated With Low
Self-Efficacy? Depressed people often display reductions
in self-efficacy (Cane & Gotlib, 1985; Davis & Yates, 1982; Kanfer & Zeiss, 1983; Miller, 1984). However this could arise from a number of processes: The depressive mood might be reducing self-efficacy, self-efficacy may be producing sadness, or the effects may be mediated by differences in performances. It may even be the case that something outside the model is producing the effects. To determine whether emotional states are influencing self-efficacy we need to manipulate the emotion. In Kavanagh and Bower (1985), students were asked to visualize three situations under hypnosis. One of these was neutral in tone (sitting at home reading a textbook). The other two were more emotive situations, involving an interaction with a romantic partner. In one they had communicated well and had a successful interaction, in the other they had failed completely and had been rejected. They were asked to re-create the feelings of sadness or happiness that they had experienced in the situation. Then, they were asked to rate their self-efficacy on a wide range of activities. Students who had visualized a positive romantic event had higher average levels of self-efficacy than those who recalled a disastrous experience (Figure 2). This effect did not only occur on activities that were associated with romantic relationships, but also
on more general social skills, and on miscellaneous activities from athletic tasks to weight reduction or handling snakes. Since the change in self-efficacy ratings did not significantly differ across these domains, we argued that the results were PERFORMANCE ACCOMPLISHMENTS unlikely to be due to a generalization of self-efficacy (which would be expected to produce a generalization gradient). 65 w 60 ø: ø U (/) >55 u « u u. u. 50 w 45 SAD NEUTRAL HAPPY MOOD

Figure 2 Efficacy scores averaged across items for judges who were happy, neutral, or sad. From Kavanagh and Bower (1985). Later experiments have attempted to confirm that the effects could be obtain
ed if the emotion induction had no mention of success or failure (Kavanagh,
1983; Kavanagh & Hausfeld, 1986). The outcome has been that the effect is obtained on some tasks, but-at least for emotions that are induced in the labora
tory-the impact of the emotions is relatively small. For example, in Kavanagh and Hausfeld (1986) happiness produced higher self-efficacy than sadness on one of the tasks (push-ups), but not on the other (handgrip). When subjects were happy they thought they could do 2.6 more push-ups than when they were sad.

Since differences of this size are liable to be overshadowed by within-group vari
ation, the phenomenon is more easily observed in repeated measures on the same subjects than in between-subject designs (Kavanagh, 1987).
What then is producing the self-efficacy changes, and why aren't they strong?

There is some evidence that the changes in self-efficacy are mediated by differences in recalled performances under happy and sad moods. In Wright and Mischel (1982), sadness or happiness was induced, and then subjects were given bogus feedback about performance on a perceptual task. At the end of the task, self-efficacy was assessed and subjects were asked to recall their success over the session. When the affective tone of the feedback was consistent with their mood, the subjects' predictions about future performances were close to the actual feedback information they had received. However, a mismatch between the emotion and the feedback information skewed the subjects' predictions. Happy subjects who had "failed" predicted higher future performance than their feedback suggested, and sad subjects who had "succeeded" thought they would do worse.

Since the recalled feedback was similarly skewed, the self-efficacy effect appeared to be based on differences in memory for the performance information. The Wright and Mischel study (1982) did not clarify whether the impact of the emotions was primarily occurring at encoding or at retrieval. We know from other research that substantial effects can be observed on encoding. People who are sad or depressed attend to negative aspects of their
experience more than happy people do (Bower, 1983; Lishman, 1972; Lloyd & Lishman, 1975). They also evaluate their own performance more negatively (Forgas, Bower, & Krantz, 1984; Lobitz & Post, 1979; Smolen, 1978) and reward themselves less readily (Gotlib, 1981), although they are not necessarily less "accurate" in their self evaluations (Lewinsohn, Mischel, Chaplin, & Barton, 1980; cf. Dykman, Horowitz, Abramson, & Usher, 1991). But influences on self-efficacy that arise from the encoding of performance information rely on the person having undertaken the activity while sad. Sometimes this has not occurred—for example, the person may have never felt sad when playing billiards. Or their performance on this particular task may not have been poorer than usual at times when they were sad. Selective retrieval of mood-consistent information can also occur (e.g., Clark & Teasdale, 1982; cf. Bower & Mayer, 1985), and current thinking suggests that it is mediated by a differential evaluative response to the judgment target under happiness or sadness (Bower, 1991; Schwartz & Bless, 1991). There is still substantial controversy about the nature of this phenomenon. In the view of Schwartz and Clore (1988), people often misread their current affective state as a response to the target. This predicts that the effects of current emotions on both
evaluations and retrieval of consistent memories will be greater when the reason
for the person's affective state is not salient, and there is some evidence to sup
port that idea (e.g., Schwartz & Clore, 1983). Bower's network theory predicts
an impact of the emotion whether the reason for the emotion is salient or not
(Bower, 1981, 1991). Bower (1991) has drawn attention to the parallels between cognitive disso
nance and effects of emotions on judgments. But the situation where people make successive judgments under different moods is somewhat different from the traditional dissonance paradigm. If subjects become aware of the discrepancy between their judgments over different days, this might itself create cognitive dissonance. This new dissonance might only be resolved by discounting the mood effects. Such an effect could explain the results of Schwartz and Clore (1983). Verbal reports from subjects suggest that this is precisely what has occurred in some of my mood induction experiments: A very common statement was along the lines, "I felt that I couldn't do the task, but then I realised that it was just because I was feeling unhappy just now, so I put down what I usually can do." That is, some subjects seem to be aware of the effect that the emotion has had on their judgments or recollections, and actively
adjust for it. The example also suggests that these subjects have access to performance information that conflicts with their prevailing emotion. This illustrates the point that both encoding and retrieval effects from emotions may be overridden by other salient performance information (Bandura, 1982). I vividly recall another subject's response to a self-efficacy question about lifting weights. "This ques tion's easy," he said. "I've just come from the gym and I know what I can lift today." It would be very difficult for a change in his mood to affect that self efficacy judgment! Sometimes the impact of emotions on self-efficacy may be produced by mechanisms that have little to do with recall. In this case, the different recollections of performance may follow the judgment, rather than producing it. There are at least two candidates for the alternative mechanisms. One is that cognitions about low generalised capabilities have been rehearsed so frequently in the negative mood that they have become very highly available in that mood. For example, the statement "I am totally hopeless" by the client at the beginning of the chapter was made several times during the first interview. When she made a judgment about a specific capability, this general proposition may have imme diately sprung to mind. This would tend to act as a low anchor for the self
efficacy judgment. We know from data on numerical anchors (Cervone & Peake, 1986) that people do not correct sufficiently for changes in their starting point when they judge their self-efficacy. As a result, her self-efficacy when she felt "totally hopeless" would be lower than when she felt happy and "reasonably competent." A final possible source of the reductions in self-efficacy is that people may feel unable or unwilling to muster the effort that will be required to perform the task. This will be more likely when the task is expected to require substantial effort for success (see below). Major depressive episodes and dysthymia may be especially prone to lower self-efficacy because the conditions for all of these processes may often be present. The aggregated duration of the disorder makes it very likely that a wide range of activities will have been experienced under a dysphoric mood. If the depression has strong endogenous features, its origin will often be unclear to the person—the situation where Schwartz and Bless (1991) predict that judgmental effects will be most prominent. Depressed people are prone to rehearse generalized negative cognitions about themselves (Beck, 1991), and their judgments may well be subject to anchoring effects. Unlike the mood induction subjects, they also know that their emotional state will probably
continue for some time,

and as a result it may not seem adaptive for them to adjust
their expectations

upwards. No wonder that they feel unable to do well!
Effects of Depression on Performance Low expectations of
depressed people are rendered even more plausible
when they notice reductions in their performance. Poorer
performance is often

observed in depression (e.g., Cohen, Weingartner,
Smallberg, Pickar, & Murphy,
1982; Miller, 1975). Some tasks involve a non-depressed
presentation for opti
mal performance: For example smiling often enters an
assessment of social per
formance, and a reduction of smiling by depressed people
may partially explain
their poorer social performance scores (e.g., Lewinsohn et
aI., 1980). In addition,

depressed people are more self-absorbed (Ingram & Smith,
1984), and this de
creases their ability to pay attention to others’
contributions and offer empathic
responses. Perhaps because of the preoccupation with
negative thoughts, depres
sed people also do poorly on complex laboratory tasks that
make high attentional
demands (Cohen et aI., 1982). People who are suffering from
a severe Major
Depressive Episode may also feel lethargic (e.g., because
of sleep disturbance
and a reduced food intake) and physiological effects on
psychomotor speed can
occur: These features have a direct impact on timed
responses. However, most depressive deficits occur in
situations (a) where subjects can withdraw from the activity, or (b) where effort makes an impact on the performance (Ciminero & Steingarten, 1978; Loeb, Beck, & Diggory, 1971; Miller, 1984). Frequently an apparent deficit can be eliminated by just encouraging people to persist in their attempts (e.g., Friedman, 1964). These reductions in persistence and effort resemble deficits that are produced by self-efficacy (Bandura, 1982). In terms of the model in Figure 1, the route of influence for these particular performance deficits may be primarily through the changes in self-efficacy discussed in the previous section. Kavanagh (1987) examined this possibility in a mood induction experiment.

Happy and sad moods were induced by using a combination of appropriate music and recollections of romantic experiences in which connotations of success or failure were minimized. A between-subjects design was used, and a neutral mood condition was also included. Strong behavioral differences resulted from the mood inductions: Subjects who were happy persisted 50% longer at solving anagrams than did those who were sad (Figure 3), and spent a smaller proportion of their time on the easiest anagrams. Happy subjects also solved more anagrams, but this was mainly due to the women. Sad women not only worked on
the task for a shorter time, they also took four times longer on average to solve each anagram. On the other hand, men responded to both happiness and sadness by increasing their efficiency. Despite the occurrence of at least some of the expected performance effects, there were no parallel effects on self-efficacy before the anagrams task. In fact, rather than demonstrating the mediation of self-efficacy on the performance changes, the performance attainments produced alterations in self-efficacy. After the task, happy subjects did have higher self-efficacy than those who were sad. While later performances may be affected by flow-on effects from these self-efficacy changes, the initial impact of the emotions on the anagram performance seemed to be produced by other mechanisms. What could these other mechanisms be? One possibility is the maintenance of positive mood. In Kavanagh (1987), verbal reports suggested that some subjects terminated the anagrams task because it was giving an insufficient rate of positive outcomes, and they anticipated more positive experiences (and hence a better chance of improving their mood) from other activities. In the case of women, there was also an impact on cognitive efficiency—perhaps because of cognitive intrusions that were triggered by the sad recollection. Why this did not occur for men is unclear. Other data suggests that they are
more likely to active

ly correct for mood effects on self-efficacy and
performance (Kavanagh, 1983),

and may become more task-oriented as a way of distracting
themselves from

negative recollections. If so, this may be an important
reason for the lower risk

of depression that is observed in men (Nolen-Hoeksema,
1987). Where the pre

dominant incentives for performance are positive, there may
also be an effect on

performance through a reduction in expected pleasure
during sadness. When

subjects are in a negative mood, they expect less enjoyment
from activities

(Carson & Adams, 1980). Positive incentives therefore have
less weight.

Figure 3 Persistence on an anagrams task under sad, neutral
and happy moods. From Kavanagh (1987). Self-Efficacy and
Skills as Determinants of Depression In the example at the
beginning of the chapter, the client reported feeling

worse when she thought about her lack of capabilities.
This suggests that asso

ciations between depression and self-efficacy may partly be
due to an influence

of self-efficacy on emotion. If so, this has important
implications for the treat

ment and prevention of depressive episodes. Despite
considerable debate over the role of cognitions in
depression (e.g.,

Coyne & Gotlib, 1983), cognitive-behavioral approaches to
depression have a 24 22 20 18 M I N U T E S 16 menu 14 12
10 SAD NEUTRAL HAPPY women

strong influence on current psychological theory and
practice (e.g., Beck, 1991;
Beck, Rush, Shaw, & Emery, 1979; Rehm, 1977). One of the influential theories has been learned helplessness theory (Abramson, Seligman, & Teasdale, 1978; Seligman, 1975). In the original theory, an independence of responses and outcomes was seen as a cause of depression. When people experienced negative outcomes that were not contingent on their responses, they displayed cognitive, behavioral and emotional responses that were similar to those of depressed people. However, Bandura (1978) argued that the experience of non-contingent negative outcomes only produces despondency when the person ascribes the negative outcome to their personal inefficacy. This was highly consistent with the results that were emerging from the laboratory research on learned helplessness (e.g., Klein, Fencil-Morse, & Seligman, 1976). In response to the evident inadequacies of the original theory, Abramson et al. (1978) advanced a revision distinguishing "universal helplessness"—approximately the same as the old helplessness concept—from "personal helplessness." In personal helplessness, people expect that the outcome is contingent on the responses of relevant others, but is not contingent on any response in their own repertoire. Except in cases of personal victimization, this is approximately
equivalent to the concept of low comparative self-efficacy: Like the client at the beginning of the chapter, these people usually see themselves as being unable to achieve the outcome solely because of their own inability. In Abramson et al. (1978), either type of helplessness was expected to produce despondency if the outcome was sufficiently aversive, but greater negative affect was predicted in personal helplessness, and an association between internal attributions and depression was expected. Bandura has continued to assert that personal inefficacy is the key to despondency. In his own words: "When people have a low sense of personal ef
ficiency and no amount of effort by themselves or comparative others produces results, they become apathetic and resigned to a dreary life. The pattern in which people perceive themselves as ineffectual but see similar others enjoying the benefits of successful effort is apt to give rise to self-disparagement and depression. Evident successes of others make it hard to avoid self-criticism"
(Bandura, 1982, p. 141). So, the distress of the client at the beginning of the chapter appears to be exacerbated by the comparison with her friend’s capabilities and achievements ("I look at my friend-she has a great job, she’s popular, she always seems to know what to say. I’m never going to be like her."). Bandura’s emphasis on personal ineffectiveness is supported by
the observation
that depressed and nondepressed people do not differ in their predictions of how others will do—only on how well they themselves will perform a task (e.g., Garber & Hollon, 1980). In particular, depressed people lose the self-enhancing bias in efficacy judgments that is seen when nondepressed people make social comparisons (Ahrens, Zeiss, & Kanfer, 1988). Pessimism about future outcomes is also linked to the degree of illusory personal control: If someone else throws some dice, depressed people expect a higher degree of success than when they throw the dice themselves (Golin, Terrell, Weitz, & Drost, 1979). In contrast, nondepressed people are more optimistic when their personal control seems higher. An emphasis on personal inefficacy is also supported by a relationship between proneness to depressive mood and a tendency to ascribe poor performance to oneself (Seligman, Abrams-on, Semmel, & von Baeyer, 1979). Further more, improvements in depressive mood during treatment appears to be correlated with increases in perceived mastery or self-efficacy (e.g., Teasdale, 1985; Zeiss, Lewinsohn, & Mufioz, 1979). While these studies support the focus on personal self-efficacy in depression, a critical test of self-efficacy as a determinant of depressive mood would require
an examination of the effects from manipulating self-efficacy. Studies that have
reduced self-efficacy do demonstrate that a depressive mood can be triggered,
and the effect is more likely when others appear able to emit the response (e.g.,
Davis & Yates, 1982). The focus on self-efficacy rather than just on attributions draws attention to
the fact that depressed people are not only concerned about
the cause or blame
for past events-as important as this can be. They are also concerned about the
implications of the events for the future (cf. Beck et al., 1979). This is a similar
point that Abramson et al. (1978) made when they emphasised attributions to
"stable" factors. If the person expects that potentially aversive situations may
recur, and that they will once again be unable to prevent a negative outcome, this
is likely to compound their reactions to a current event. As a result, depression
levels are expected to be related both to the aversiveness of past events and to
self-efficacy about control of situations they will be facing in the future. The
point is illustrated in a study by Cutrona and Troutman (1986). As any new par
tent will attest, the sound of their crying infant induces significant emotional
distress in the parents (Frodi, Lamb, Leavitt, & Donovan, 1978). When the baby
has a more stormy temperament, the mother is expected to be at a greater risk of
postpartum depression, and this was indeed the case in the Cutrona and Troutman study. But at least some of the relationship between infant difficulty and depression was mediated by changes in parenting self-efficacy. When the infant's crying was seen by the mother as showing her lack of capability as a parent, the risk of depression was amplified. Low self-efficacy about future situations can of course produce a range of negative emotional responses apart from sadness. For example, anxiety or fear seems to occur when people anticipate that they may be unable to control a potentially aversive situation (Bandura, 1988). On the other hand, the focus in sadness appears to be the anticipated loss of positive or pleasurable experiences (Bandura, 1982). The reductions in self-efficacy achieve special significance when these expected losses are greater—for example, when the self-efficacy deficit covers a wide range of task domains and the person sees no chance of future improvement. Unfortunately global deficits are very likely in sadness (Kavanagh & Bower, 1985), and like the woman at the beginning of the chapter, many depressed people say they are "no good at anything" and they will "never" improve. Not only are the losses predicted from external sources: Sadness is often triggered by the person's self-reactions. In this case, the expected loss involves a
withdrawal of self-valuation. While the self-standards of depressed people may not exceed those of other people, they frequently are below the level they think they can achieve (Kanfer & Zeiss, 1983). When the performance domain is central to the person's self-esteem, awareness of the discrepancy between the standard and the self-efficacy level may have a powerful immediate impact on the emotional state. When we take a view of depression that emphasises both the aversiveness of experiences and the self-efficacy and skills that people have in dealing with the situation, this opens up exciting possibilities for predicting the course of depression and for developing better methods to prevent its recurrence. In considering these issues, I have recently become interested in the process of recovery from a bereavement (Kavanagh, 1990). Here is a situation that generates extremely strong emotional reactions and often produces major changes to goals and incentives. Yet even after the death of a spouse, only about a third of people develop a major depressive episode (Bomstein, Clayton, Halikas, Maurice, & Robins, 1973) and most people report some relief from dysphoria within 1-3 months after the bereavement (Parkes, 1970). This is an extreme example of the low correspondence that is typically found between life events.
and depression, where events per se account for only about 10% of the variance in depression (Brown & Harris, 1986). Some of the reasons for recovery probably include features of the bereavement situation such as the difficulty in avoiding extended stimulus exposure and resultant habituation. It is also difficult to avoid some re-engagement in activities. But a substantial contributor to the high recovery rate seems to be the skills that survivors already have in dealing with aversive events—coping skills that they have developed from their previous encounters with a variety of situations, from broken love affairs to failed examinations or job retrenchment. At least some of the existing coping skills can be applied to the bereavement and moderate its aversive emotional impact. Consistent with this idea, Bomstein et al. (1973) found a lower risk of depression among widows who had experienced a previous bereavement than for those who had not (4%, compared with 25%). The tasks that are posed by a bereavement seem to fall into four groups. One group involves attacking cognitive sources of negative mood (Beck, 1991; Beck et al., 1979). This consists of paying attention to negative cognitions and examining their evidence base. A second group involves solving practical problems and coping with day-to-day demands such as managing finances, finding new employment, or arranging child care (D’Zurilla &
Goldfried, 1971).

Both of these task areas involve thinking about the bereavement and its effects.

However in the short term these thoughts will invoke sadness, especially since many of the negative cognitions are not easily discounted and the central problem is not readily resolved ("the person is gone and will never come back"). Therefore a third set of tasks involves restoring a more positive mood through attention diversion and enjoyable activity (Lewinsohn & Libet, 1972). Here, people use both activities and cognitive strategies such as fantasy or humour to divert their attention from depressive thoughts and to invoke positive emotion. Finally, the person may need to be mobilising assistance from other people, to supplement deficiencies in their performance of the other tasks (Cohen & Wills, 1985). When the circumstances of the death make it very difficult to successfully undertake these tasks, we would expect people to be more at risk of depression.

This does seem to be so. When the death involves some blame being attached to the survivor-such as when a child dies accidentally (Nixon & Peam, 1977), or a spouse suicides (Parkes & Weiss, 1983)—there is a severe challenge to cognitive restructuring skills, and the survivor is at special risk of depression. If the death was violent the grief reaction can last for many years (Lehman, Wortman, &
Williams, 1987): In this case, the person is often plagued by vivid and extremely distressing images of the death that are very difficult to suppress. Ongoing legal action offers further complications by reinvoking the negative emotions and continuing to disrupt activities. While the specific challenges in bereavement are often different from other instances of sadness or depression, the same task areas apply. There is often a set of problems to be resolved, negative thoughts are triggered, the person needs to find ways to restore a positive mood, and assistance from others may be required.

Consistent with this view, cognitive-behavioral treatments of depression that build skills and performance in these task domains have achieved impressive results in controlled trials (Wilson, 1989). We can also predict future occurrences of depression from reports of past achievements in handling daily hassles and life events, even when the effects of current depression levels are taken into account (Holahan & Holahan, 1987). Other research demonstrates that depressed people who use active coping strategies (increasing activity levels, engaging in interpersonal activity, or rehearsing positive cognitions) have shorter and less severe depressive episodes than those who ruminate about their depression (Morrow & Nolen-Hoeksema, 1990). From studies of
unselected subjects we
also know that most people have intrusive negative thoughts
from time to time
and that they regularly use cognitive restructuring,
problem solving and attention
diversion strategies to deal with them (Edwards &
Dickerson, 1987). Given these data, self-efficacy
judgments about depression-related task
domains have special significance for understanding the
process of recovery from
depression and predicting its later course (Kavanagh &
Wilson, 1989; Yusaf &
subjects were
treated with cognitive therapy, and their outcomes over a
12-month follow-up
period were observed. Self-efficacy questions asked about
the subjects' expected
self-control of emotion and cognition over the next 12
months, and attempted to
capture both their capabilities in attacking cognitive
sources of depression and in
positive mood induction. The questions were: (a) "How much
time can you
make at least moderately enjoyable?", (b) "How much time
can you have without
any sad, discouraging or unpleasant thoughts," and (c)
'What percentage of the
negative thoughts that pop into your mind can you
effectively challenge?" In
each case, there were ten levels of performance, from 30
minutes each day to 12
hours or more (or from 0 to 100% in the case of the last
question). Confidence
ratings on the three skill areas were averaged to form a single score of self-efficacy strength for each subject. Changes in these self-efficacy scores over the course of treatment accounted for 50% of the variance in the depression improvement. Furthermore, the self-efficacy scores at post-treatment strongly predicted the number of three-month periods that the subjects were in remission ($r = .59$), and the prediction remained significant even after the post-treatment depression level was taken into account. The results parallel work that suggests self-efficacy about control of anxious thoughts is an important determinant of anxiety reactions (Kent, 1987; Kent & Gibbons, 1987; Ozer & Bandura, 1990). They also join a range of studies in other problem domains that have attested the importance of self-efficacy for predicting sustained behavioral improvement after treatment (e.g., Kavanagh, Pierce, Lo, & Shelley, 1991; Sitharthan & Kavanagh, 1990). The precise tasks that will be important for the depression will of course alter according to the circumstances that the person is facing. So, for example, self-efficacy for assertion turned out to be a very powerful predictor of follow-up status in the sample used by Yusaf and Kavanagh (1990). In Cutrona and Troutman's (1986) sample of postpartum women, parenting
self-efficacy appeared especially important. Up to now, I have not been examining the role of self-efficacy about mobilising assistance, but this would appear to be a useful area to begin looking at. We know that social support can moderate the aversive impact of life events (e.g., Cohen & Wills, 1985) and that it has a function in reducing the risk of relapse after recovery from a depressive episode (Belsher & Costello, 1988). We also know that people often find it aversive to talk with people who are depressed (Coyne, 1976), and that depressed college students offer negative self-disclosures in situations that others find inappropriate (Jacobsen & Anderson, 1982; Kuiper & McCabe, 1985). While most of the literature has focused on initial acquaintances among college students, it suggests that skills in effectively eliciting support and in preserving the sources of support for future crises may turn out to be an important focus for assessment and intervention.

Summary There is now substantial support for the model described in Figure 1, and we now know in more detail what the limiting conditions are for the effects that are described. Reductions in self-efficacy and performance appear to be both consequences of depression and determinants of it. The direct influence of sadness on self-efficacy is broad in scope but—at least in studies on induced moods—it is
often small in degree. The impact of depression on
performance occurs primarily
through an impact on task selection, persistence and
effort, although some direct
effects from depressive symptoms may also be observed.
Poorer performances
are most likely to affect later depression (a) when they
mean that a valued extern
al outcome is not obtained (or an aversive situation is not
terminated), (b) when
they induce negative self-reactions, or (c) when the task
involves the control of
negative mood. These are also the conditions in which low
self-efficacy has an
emotional impact. Self-efficacy judgments appear to affect
emotional state both
directly (when people imagine the future consequences of
their inefficacy), and
through their effect on later performance. However, these
indirect effects of the
self-efficacy judgments are better substantiated by studies
on the prediction of
depressive episodes than by laboratory experiments on
induced mood. The work on sadness and self-efficacy has
contributed to the theory and
research on self-efficacy in two ways. First, it has
extended the role that emotion
has on the formation of self-efficacy judgments. We now
know that emotions
not only act as one of the pieces of information that
people use (as in Bandura,
1977), but that within constraints, they have the potential
to color the other infor
mation that is gained from the other sources (Bandura, 1986). The second con
tribution is the extension of self-efficacy theory on the prediction and causation
of depressive episodes. The current data provide further evidence of the signifi-
cance of self-efficacy for the production and maintenance of behavioral change,


gist, 37, 122-147.


gist, 46, 368-375.


Cutrona, C. E., & Troutman, B. R. (1986). Social support, infant temperament, and


solving and behavior modification.


Dissertation Abstracts International, 44, 2922B.


Lobitz, W. C., & Post, R. D. (1979). Parameters of
self-reinforcement and depression.


in either challenge, threat, or harm loss. It is undetermined, however, how these appraisals are interrelated over time and whether they can occur simultaneously. An idealized motivation model has been established to stimulate research on this issue. The present experiment has been set up to assess the dynamic pattern of cognitive appraisals at nine points in time under stress, defined as continuous failure at demanding academic tasks. General self-efficacy is considered to represent a personal resource among other antecedents of appraisals. Therefore, self-efficacy was used as a between-groups factor. Very different patterns of appraisals emerged for low and high self-efficacious subjects, indicating that high self-efficacy buffers the experience of stress, whereas low self-efficacy puts individuals at risk for a dramatic increase in threat and loss appraisals.

The present study deals with the prediction of cognitive appraisal processes by dispositional antecedents and by stressful conditions. It is based on the cognitive relational theory which defines stress as "a particular relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being" (Lazarus & Folkman, 1984b, p. 19). Appraisals are determined simultaneously by perceiving environmental demands and personal resources. They can change over time due to coping effectiveness, altered requirements, or improvements in personal abilities. The cognitive-relational theory of stress emphasizes the continuous, reciprocal nature of the interaction between the person and the environment. Since its first publication (Lazarus, 1966), it has not only been further developed and refined, but it has also been expanded recently to a
meta-theoretical concept of emotion and coping processes (Lazarus, 1991a; Lazarus & Folkman, 1987). The present paper deals with an experimental study based partly on this meta-theory of emotions and coping. Therefore, it is necessary to describe briefly some aspects of this theory that are relevant for the understanding of the study. Meta-Theoretical Considerations Within a meta-theoretical system approach, Lazarus and Folkman (1987) conceive the complex processes of emotion as composed of causal antecedents, mediating processes, and effects. Antecedents are person variables like commitments or beliefs on the one hand and environmental variables, such as demands or situational constraints, on the other. Mediating processes refer to cognitive appraisals of situational demands and personal coping options as well as to coping efforts aimed at more or less problem-focused and emotion-focused behavior (Jerusalem & Schwarzer, 1989; Krohne, 1988; Laux & Weber, 1987; Lazarus & Folkman, 1987; McCrae & Costa, 1986). Stress experiences and coping results bring along immediate effects, such as affects or physiological changes, and long-term results concerning psychological well-being, somatic health and social functioning (Lazarus & Folkman, 1984a, 1984b). There are three meta-theoretical assumptions: transaction, process, and
context. It is assumed, first, that emotions occur as a specific encounter of the person with the environment and that both exert a reciprocal influence on each other; second, that emotions and cognitions are subject to continuous change; and third, that the meaning of a transaction is derived from the underlying context, i.e., various attributes of a natural setting determine the actual experience of emotions and the resulting action tendencies (Lazarus, 1991a, 1991b). For obvious reasons, prior research has mostly neglected these meta-theoretical assumptions in favor of unidirectional, cross-sectional, and rather context-free designs. Within methodologically sound empirical research it is hardly possible to study complex phenomena such as emotions and coping with out constraints. Also, on account of its complexity and transactional character leading to interdependencies between the involved variables, the meta-theoretical system approach cannot be investigated and empirically tested as a whole model. Rather, it represents a heuristic frame that may serve to formulate and test hypotheses in selected subareas of the theoretical system only. Thus, in practical research one has to compromise with the ideal research paradigm. Investigators have often focused on structure instead of on process, measuring single states or aggregates of states. In the present study, however,
stress is analyzed and investigated as an active, unfolding process. More precisely, stress appraisal processes are predicted by environmental and personal variables as antecedents, whereas coping strategies and long-term effects are not considered. From the meta-theoretical system perspective, the study concentrates on stress antecedents and actual stress as a process, but has its limits with respect to transaction and context. In view of the research intention and the variables involved in the present empirical study, the concept of stress appraisals will be discussed first. Second, some environmental and personal antecedents of stress evaluations are considered. Finally, we will refer to the phenomena of mixed appraisal patterns and their development over time. Stress Appraisals The cognitive relational theory (Lazarus & Folkman, 1984a, 1987) defines stress as an encounter in which the demands tax or exceed the available resources. Cognitive appraisals include two component processes, primary and secondary appraisals. Primary appraisal refers to the stakes a person has in a certain encounter. In primary appraisals, a situation is perceived as being either irrelevant, benign-positive or stressful. Those events classified as stressful can be further subdivided into the categories of challenge, threat and harm/loss. A stress-relevant situation is appraised as challenging when it mobilizes phy
sical and psychological activity and involvement. In the appraisal of challenge, a person may see an opportunity to prove herself or himself, anticipating gain, mastery or personal growth from the venture. The situation is experienced as pleasurable, exciting, and interesting, and the person is hopeful, eager, and confident to meet the demands. Threat occurs when the individual perceives being in danger, and it is experienced when the person anticipates future harm or loss. Harm or loss can refer to physical injuries and pain or to attacks on one's self-esteem. Although in threat appraisal future prospects are seen in a negative light, the individual still seeks ways to master the situation faced. The individual is partly restricted in his or her coping capabilities, striving for a positive outcome of the situation in order to gain or to restore his or her well-being. "Rather, threat is a relational property concerning the match between perceived coping capabilities and potentially hurt ful aspects of the environment" (Bandura, 1991, p. 90). In the experience of harm/loss, some damage to the person has already occurred. Damages can include the injury or loss of valued persons, important objects, self-worth or social standing. Instead of attempting to master the situation, the person surrenders, overwhelmed by feelings of helplessness. Beck's cognitive theory of anxiety and depression (Beck & Clark,
these assumptions, mentioning threat as the main cognitive content in anxiety compared to loss as its counterpart in depression. Primary appraisals are mirrored by secondary appraisals which refer to one's available coping options for dealing with stress, i.e., one's perceived resources to cope with the demands at hand. The individual evaluates his competence, social support, and material or other resources in order to readapt to the circumstances and to reestablish an equilibrium between person and environment. In academic situations mostly the task-specific competence or the prerequisite knowledge to cope with the task is of primary importance. There is no fixed time order for primary and secondary appraisals. The latter may come first. Moreover, they depend on each other and often appear at the same time. Instead of primary and secondary, the terms "demand appraisal" and "resource appraisal" might be more appropriate. Hobfoll (1988, 1989) has expanded the stress and coping theory with respect to the conservation of resources as the main human motive in the struggle with stressful encounters. Antecedents of Stress Appraisals Stress appraisals result from perceived situational demands in relation to perceived personal coping resources. Despite this relational conception one can imagine environmental conditions that are more likely to
induce stress than others, provided the same person is confronted with them. One can also imagine individual differences in perceived personal resources that make people more or less vulnerable to the same environmental requirements. With respect to the relevance of situational stressors, Lazarus and Folkman (1984b) mention formal properties, such as novelty, event uncertainty, ambiguity and temporal aspects of the stressing conditions. For example, demands that are difficult, ambiguous, unannounced, not preparable, to be worked on both for a long time and under time pressure, are more likely to induce threat perceptions than easy tasks which can be prepared for thoroughly and can be solved under convenient pace and time conditions. Regarding content, environmental aspects can be distinguished with respect to the stakes involved by the kind of a given situation. For example, threatening social situations imply interpersonal threat, the danger of physical injury is perceived as physical threat, and anticipated failures endangering self-worth indicate ego-threat (McGrath, 1982; Spielberger, 1985). Lazarus (1966) additionally distinguishes between task-specific stress, including cognitive demands and other formal task properties, from failure induced stress, including evaluation aspects such as social feedback, valence of
goal, possibilities to fail, or actual failures. By and large, unfavorable task conditions combined with failure-inducing situational cues are likely to provoke feelings of distress. With respect to the relevance of perceived personal resources, Lazarus and Folkman (1984b) mention commitments and beliefs. Commitments represent motivational structures such as personal goals and intentions that in part determine mine perceptions of situational stress relevance and the stakes at hand (Novacek & Lazarus, 1990). Provided the stakes are really relevant, beliefs as personal antecedents of stress appraisals come into play. Beliefs are convictions and expectations of being able to meet situational requirements. With "generalized beliefs"—as opposed to situation-specific appraisals of control-dispositional resource or vulnerability factors are meant, such as locus of control, general self-efficacy, trait anxiety, or self-esteem (Folkman, 1984; Hobfoll, 1989; Jerusalem, I 990a, I 990b; Lazarus & Folkman, 1987). Given a stressful situation, low dispositional control expectancies make people vulnerable to distress, whereas perceptions of high dispositional competence represent a positive resource factor. Since the present study is concerned with achievement tasks to be solved under ego-threatening conditions, general self-efficacy can be conceived of as a
personal resource or vulnerability factor (Bandura, 1986, 1989, 1991, 1992; Jerusalem, 1990a). People who generally trust in their own capabilities to master all kinds of environmental demands also tend to interpret difficult achievement tasks as more challenging than threatening. Their generalized belief of a positive self-efficacy in this sense serves as a resource factor that should buffer against distress experiences furthering "eustress" perceptions instead. Individuals, however, who are characterized by generally low self-efficacy expectations are prone to self-doubts, state anxiety, threat appraisals and perceptions of coping deficiencies when confronted with critical achievement demands. Moreover, previous research on anxiety and self-related cognitions has demonstrated that generalized beliefs of weak self-efficacy make persons vulnerable toward distress experiences because they tend to be permanently worried, have weak task-specific competence expectancies, interpret physiological arousal as an indicator of anxiety, regard achievement feedback as social evaluations of their personal value, and feel more responsible for failure than for success (Bandura, 1992; Carver & Scheier, 1988; Dweck & Wortman, 1982; Epstein, 1986; Jerusalem, 1990a, 1990b; Ozer & Bandura, 1990; Sarason, 1988; Schwarzer, 1986;
Like other trait-like person characteristics, weak general competence expectancies have numerous causes. A history of success and failure combined with a lack of supportive feedback and an unfavorable attributional style by parents, teachers and peers may lead to the development of a tendency to scan the environment for potential dangers ("sensitizing"), to appraise demands as threatening, and to cope with problems in a maladaptive way. In the present context it can be summarized that general self-efficacy is seen as a personal resource factor with respect to distress experiences such as threat and loss perceptions, which are assumed to come up faster and to a higher degree for low compared to high self-efficacious subjects. The latter are expected to feel more challenged instead. These assumptions do not apply to the absolute level of each distinct stress appraisal, but rather to the prediction of appraisal patterns and their changes over time. For a better understanding of this phenomenon, the issue of appraisal patterns and processes is to be discussed in more detail. Appraisal Patterns and Processes The experience of challenge, threat or loss does not happen exclusively, but can overlap or even occur simultaneously. Challenge, threat and loss are not to be
considered as clearly distinct modes of experience, but rather as interrelated cognitive-emotional states that exist simultaneously. For example, a person might be challenged by the demanding characteristics of a situation, while expecting injury to his or her well-being at the same time. Since life often confronts us with situations that are unforeseen, difficult, novel or ambiguous, the corresponding appraisals can be complex states with more or less favorable and unfavorable evaluations of these environmental demands. Moreover, the structure of this mixture is likely to change over time unless the problem is solved immediately. Once a transactional stress process has commenced, the pattern of positive and negative evaluations changes from one encounter to the next. Challenge appraisals might be stronger than threat at one time, both could be perceived as equal size the next time, and another time threat might exceed challenge. The actual pattern at each point in time reflects the momentary subjective uncertainty of being able to cope with the demands at hand. In a study by Folkman and Lazarus (1985), for example, 94% of a student sample facing an examination experienced feelings of both threat and challenge two days before the exam. Afterwards these appraisals diminished; in case of poor grades they were replaced by
loss perceptions. Similar patterns were found for emotions connected to cognitive appraisals (Folkman & Lazarus, 1985; Gall & Evans, 1987; Smith & Ellsworth, 1985, 1987). According to these research findings, stressful encounters are dynamic, unfolding processes that imply complex appraisal patterns, rather than static, unitary events. More scientific knowledge is required about the nature of the interrelationships among challenge, threat, and loss over time under certain precisely defined environmental conditions in general, and about the role of individual differences in particular. The following theoretical considerations lead to an idea of the potential development and change of appraisal processes under certain environmental circumstances and for specific individual differences. A Process Model We have developed a process model of cognitive appraisals (Schwarzer, Jerusalem, & Stiksrud, 1984; Jerusalem, 1990a) which extends Lazarus' original stress theory by integrating ideas from Seligman's helplessness theory (Abramson, Seligman, & Teasdale, 1978; Brown & Siegel, 1988; Seligman, 1975). A state of helplessness is predicted as a long-term consequence of cumulative experience of personal uncontrollability. Accordingly, the theoretical model of appraisal processes was built for the special case of continuous failures.
Its purpose was to describe the potential development of loss of control and personal helplessness by means of cognitive appraisal processes in academic failure situations. We argue that at almost any point in time, all three cognitive appraisals may occur simultaneously, but to differing degrees, therefore leading to different emotions: Challenge causes curiosity, exploration and productive arousal; threat causes anxiety and loss of control causes helplessness or even depression. Looking at the process model in Figure 1, the x-axis represents the number of failures. The curves characterize the idealized potential development and change of challenge, threat and loss perceptions. With continued experience of failures, challenge diminishes, while loss enhances from one point in time to the next.

Threat perceptions first increase and then decrease. Unexpected failures might be interpreted as challenges to one's competence, whereas threat or even loss are less relevant. If this happens repeatedly, the person will begin to feel more threatened than challenged, but will still persist with the task. The highest degree of threat is located at the point where complete subjective uncertainty about the next outcome prevails. Later, when subsequent failure is expected with higher certainty, the individual will experience loss of control while feeling less threatened because the loss becomes certain. According to this model, four idealized motivational stages can be distinguished: 1. The Challenge Stage is a kind of “reactance stage.” Although the person is challenged by one or more failures, she retains confidence in her ability to cope with the demands. High self-efficacy may be combined with productive arousal, i.e., the tendency to explore the nature of the task. 2. The First Threat Stage occurs when failures mount and threat surpasses challenge.
appraisal anxiety is the dominant emotion. The combination of anxiety with productive arousal here can be called "facilitating anxiety" because the person is still self-confident and persists with the task. 3. The Second Threat Stage occurs at the culminating point, when there is complete uncertainty about the next outcome. The threat appraisal is combined with less challenge and some loss of control. This mode can be called "debilitating anxiety state" because intrusive self-related cognitions distract from the task. The person worries about his or her performance, capability, and the potential for further failures. 4. Finally, there is a Loss-of-Control Stage. Loss of control is dominant, replacing the appraisal of threat. The student becomes helpless and disengages; the next failure is almost certain. Cognitive appraisals cannot be predicted by the situation at hand exclusively, for example by task-specific failure experiences. Development of Primary Appraisals Challenge Threat Loss Failure Experiences Figure I Idealized process model of the development of cognitive appraisals under continuous failure. The model is restricted to the special case of continuous failures, a condition which is rather exceptional than commonplace under real-life circumstances. Besides, human beings confronted with achievement demands differ with respect to their acquired competencies and their generalized beliefs. Thus, there are also subject-matter-specific factors producing differences with respect to the proportional amounts of challenge, threat and loss. Life-long learning experiences establish subjective perceptions of individual resources in the sense of more or less stable personality traits. For example, anxious individuals or those with unfavorable generalized expectancies of self-efficacy often have a learning history which includes a number of individual failures or perceived threats in a variety of
more or less taxing situations. High trait anxiety or low general self-efficacy make one vulnerable to demands which endanger self-worth. When confronting stressful academic demands, individuals with high general self-efficacy expectancies or low trait anxiety will most likely start at the left side of the model curve. Positive self-evaluation retains the confidence in the ability to cope with the demands. This is the reactance stage. Less self-efficacious people, however, are more likely to display state anxiety and develop only little, if any, positive competence expectancies. When failures mount and the task is perceived as becoming more difficult, incremental threat instead of challenge would be experienced but the person can still be self-reliant and persistent with the task. This person may arrive at the first threat stage. Supposing she suffers from her generalized belief of low self-efficacy to such a degree that her expectancy for failure is stronger than that for success, she would start the sequence at a point where more loss than challenge is experienced. She then worries about performance, has self-doubts and is not at all confident about her competence.

This refers to the second threat stage. For depressed individuals or those with high helplessness scores, a dominance of loss perceptions can be expected. Only few failures suffice for them to give up further efforts
because the next failure is almost certain. This is equivalent to the loss-of-control stage. Similar stages have been proposed by Wortman and Brehm (1975) and by Heckhausen (1991). Empirical evidence was obtained in a study with high-school students (Schwarzer et al., 1984). Within a two-year period, different student subpopulations became more or less anxious and more or less helpless over time. As predicted, the anxiety level of some subjects declined, but only at the expense of helplessness. Particularly long-term low achievers developed a tendency to perceive less threat and more loss of control in face of academic demands. Regarding the model of appraisal processes, this was a preliminary pilot field study. The present research questions are how far similar processes can be observed within a laboratory experiment and whether general self-efficacy as a resource factor serves to predict the hypothesized appraisal patterns and processes. Only some few longitudinal field studies have addressed cognitive appraisal processes (e.g., Covington, Omelich, & Schwarzer, 1986; Folkman & Lazarus, 1985; Jerusalem, 1990a; Schwarzer et al., 1984). The strength of these studies was that they tried to capture the dynamic character of the theory by measuring cognitions in naturalistic settings at different points in time, but the joint consideration of
individual differences and experimental factors is still lacking. Research Question In the present study, the research question is directed at appraisal processes depending on experimental treatment and personality traits. Stress appraisals are linked to one personal resource factor (general self-efficacy) and to one environmental demands factor (difficult academic tasks). When the tasks become more complex and failures mount, all subjects should lower their initial level of challenge appraisal and experience more threat and more loss of control until a person's maximal level is attained. It is also expected that low general self-efficacy represents a major vulnerability condition which predisposes the corresponding individuals to appraise the situation as little challenging, but more threatening, and later as uncontrollable. Thus, two independent factors, general self-efficacy and demanding experimental tasks are seen as influential for the development of three cognitive appraisals over nine points in time. Further research questions are the following: Can overlapping appraisal patterns be observed, i.e., do different cognitive appraisals turn up at the same time? Do cognitive appraisals change during a stressful encounter? How do appraisals of challenge, threat, and loss develop over time in face of continuous failure? Is there a differential
development with respect to dispositional self-efficacy levels? How is continuous failure experienced by low self-efficacious subjects?

METHOD Sample and Procedure Subjects were 210 adults (108 females and 102 males between 21 and 52 years, with a mean age of 29.8 years) who responded to advertisements in city magazines and newspapers. The design of the study is depicted in Figure 2. Subjects filled in a series of various personality scales, among them a general self-efficacy scale. They were then confronted with nine series, each consisting of difficult performance tasks, performance feedback, and self-report items. The experimental setting contained task-specific stressors (ambiguity, time pressure, difficulty, etc.) and ego-threatening failure conditions. Each of the first six task sequences was composed of 15 anagrams presented on a computer screen. Within each set of anagrams the degree of difficulty increased from the first to the fifteenth, and all but the last ones were solvable. Three further task sequences, consisting of intelligence test items, were given by the experimenter in a paper-and-pencil version. All tasks were described as cognitive problem solving, to be performed under time pressure, designed to measure the more academic and the more practical aspects of intellectual ability, respectively. Each anagram was presented individually on the computer monitor with a number.
appearing under each letter. Subjects were to type a new sequence of numbers: Personal Resources/ Vulnerabilities Self-Efficacy Experimental Tasks Feedback Stress Appraisals Anagrams Success Challenge Threat Intelligence Tasks Failure Loss 9 Seque 6 Anagrams and 3 Intelligence Tasks.

Figure 2 Design of the experiment.

According to the correct order of the letters forming the word that was looked for.

A maximum of 40 seconds was allowed for each anagram. Subjects were instructed to call the next item by pressing a certain key if they found the solution before the time was up. Otherwise, a tone was sounded and the next anagram appeared automatically. The introductory information on how to work with the computer was provided by the computer program.

Paper-and-pencil intelligence items were given under comparable difficulty and time conditions. After each task episode, one group consistently received fictitious success feedback and the other group fictitious failure feedback. The feedback was partly related to actual performance by a programming device so the outcome seemed more credible. The feedback referred both to individual performance (number of points achieved) and to the performance within their age group (social comparison information). In the success group, subjects were told that the number of points achieved was above average; in the failure group, individual performance was reported as being below average. Achievement feedback
was followed by 21 items addressing various aspects of self-related cognitions, among them perceptions of challenge, threat and loss. This cycle (experimental tasks, feedback, stress appraisals) was repeated nine times, six with anagrams and three with intelligence items. Afterwards, subjects were paid and debriefed about the manipulated feedback. The whole procedure lasted about three hours. The present analysis deals with the failure condition and with general self-efficacy as a resource/vulnerability factor for individual appraisal processes. The failure group consisted of half the sample (105 subjects). Instruments General self-efficacy was measured by a scale we developed with respect to the self-efficacy theory of Bandura (1977, 1986; Jerusalem & Schwarzer, 1986).

In this study a six-item version was used (e.g., "When facing difficulties, I can always trust my abilities."). Its internal consistency was alpha = .82. In order to assess cognitive appraisals as dependent variables, we developed psychometric scales which had to be short because they were presented nine times; appraisals should not take more time and should not be emphasized more than the problem solving itself. The Challenge scale consisted of four items, such as "I am already curious about how I will manage the next tasks" (alpha = .78); the Threat scale
contained three items, such as "I am afraid of not being equal to the next tasks" (alpha = .8); and the Loss scale was represented by four items, such as "I feel discouraged and depressed now" (alpha = .83). The internal consistencies within each appraisal category were averaged over time. The response format was a four-point-scale ranging from not at all to a great deal.

RESULTS The failure group was subdivided by use of median split of the self-efficacy scores. Scores below average are conceived of as weak resources indicating high vulnerability (n = 46), those above average as strong resources indicating low vulnerability accordingly (n = 59). By use of 2 x 9 analyses of variance with repeated measurements, the self-efficacy factor then served as one predictor of the intensity and change of primary appraisals over time. At any point in time, the three cognitive appraisals occurred simultaneously.

Throughout the nine sequences, all appraisals remained present, but to different degrees. In short, as predicted, there were patterns of appraisals to be observed instead of mutually exclusive states of challenge, threat or loss perceptions. First, the overall results are given separately for the experimental and the personality factors. Analyses of repeated measurements revealed that all appraisals were changing over time. The corresponding F values were computed according to the correction procedure proposed by Geisser and Greenhouse (1958). Due
to continuous failures, challenge appraisals declined
(FI8, 8241 = 20.32, P < .001), whereas threat and loss perceptions increased
over time (FI8, 8241 = 1.98, p < .05 for threat and Fr8, 8241 = 5.45, p < .001 for
loss). The nature of all
changes can be characterized by linear trend components
(Challenge: F[I, 1031 =
78, p < .001; Threat: FrI, 103J = 6.7,p < .05; Loss: F[I, 1031 = 10.8, p < .001). As expected, general
self-efficacy turned out to be an important predictor of
subjective perceptions following failure experiences. With
respect to all appraisal
qualities, low self-efficacious subjects reported less
favorable stress cognitions
than high self-efficacious subjects. Low self-efficacy was
accompanied by con
siderably lower challenge and higher threat and loss
evaluations (challenge: F[ 1,
1031 = 17.5, p < .001); threat: F[ I, 1031= 10.5, p < .001;
loss: F[ I, 1031 = 14.9,
p < .001). There were even additional Self-Efficacy x Time
interactions predict
ing both threat and loss appraisals and indicating a
stronger increase of these
unfavorable distress experiences for low self-efficacy
compared to high self
efficacy subjects (threat: FI8, 824] == 4, p < .001; loss: 
FI8, 8241 == 3.1, P < .01 ).
The observed interaction effects are mainly due to linear
trend differences (threat:
F[ I, 1031 == 6.7, p < .05; loss: F[ 1, 1031 == 9.8, p <
.05). In sum, both environ
mental failure conditions and individual self-efficacy
differences were powerful

antecedents of the unfolding process of stress appraisals.
The dominance structure of primary appraisals was affected
by the two stress

factors, too. At the beginning, different structures were
observed for both self

efficacy groups. High self-efficacy individuals felt more
challenged than threat

ened, and they perceived more threat than loss, as
predicted by the theoretical

model. This was similar for low self-efficacy subjects, but
the difference between

challenge on the one hand and threat or loss on the other
hand was to a lesser ex

tent. Compared with the high self-efficacy group, low
self-efficacy subjects

reported less challenge and more threat and loss-at the
very beginning as well

as overall (when summed up over all points in time). The
results for high self-efficacious persons are presented in
Figure 3, those

for low self-efficacious persons in Figure 4. The

corresponding means and stand

ard deviations are reflected in Tables I and 2,
respectively. Scores in challenge,

threat and loss were each divided by the respective number
of scale items in

order to attain the same unit of measurement.

Table I

Means and Standard Deviations of Challenge. Threat and
Loss for High Self-Efficacy

and Failure Experiences (n = 59) Challenge Threat Loss
Points in Time M SD M SD M SD 1 2.96 .56 1.85 .65
Table 2

Means and Standard Deviations of Challenge, Threat and Loss for Low Self-Efficacy

<table>
<thead>
<tr>
<th>Points in Time</th>
<th>M</th>
<th>SD</th>
<th>M</th>
<th>SD</th>
<th>M</th>
<th>SD</th>
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<td>.84</td>
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<tr>
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<td>.76</td>
<td>2.33</td>
<td>.82</td>
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<td>.70</td>
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<td>2.50</td>
<td>.63</td>
<td>2.55</td>
<td>.70</td>
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<tr>
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<td>.82</td>
<td>2.55</td>
<td>.70</td>
</tr>
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<td>.71</td>
<td>2.39</td>
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</table>

With respect to changes over time (linear trend components), both groups can clearly be differentiated. For high self-efficacy subjects, challenge perceptions decreased with continued failure experiences (F[1, 58] = 15.2, p < .001). However, threat and loss did not change significantly but remained on a low and constant level, although failures were repeatedly reported. Throughout the entire sequence, challenge cognitions exceeded threat and loss appraisals. In contrast, low self-efficacy subjects were much more affected by failure.

Challenge perceptions declined (F[1, 451] = 34.5, P < .001), whereas threat and loss perceptions increased over time (threat: F[1, 45] = 9.8, P < .01; loss: F[1, 45] = 18, P < .001). The strength of these temporal trends is slightly weakened by motions that take place after measurement point six: Contrary to the trend an increase in challenge perceptions and a similar, but comparably smaller, de
crease in threat evaluations was observed. These effects were probably due to the fact that at this point the task material changed from anagrams to intelligence items. In face of the altered demands, both reappraisals of coping options and corresponding primary reappraisals occurred. Accordingly, subjective evaluations were not generalized from anagrams to intelligence tasks, at least not for challenge. However, these "recovery effects" were limited to a short time period.

Due to the fact that failure feedbacks did not dissipate—although the task quality was different—appraisals again became less favorable. Looking at the results in terms of temporal patterns, it is obvious that the appraisal pattern remained stable for high self-efficacy subjects in the sense that challenge exceeded threat and loss perceptions at all nine points in time. In comparison, the results for low self-efficacy subjects were completely different. The temporal dominance structure of stress appraisals in this group was reversed: At 2

Figure 3 Temporal pattern of cognitive appraisals for high self-efficacy subjects.

Figure 4 Temporal pattern of cognitive appraisals for low self-efficacy subjects.

first challenge clearly dominated threat and loss, but at the end threat and loss had become the prevailing appraisals. Accordingly, two intersection points were
observed: Challenge was surpassed by threat at Point 2 and by loss at Point 4.

Referring to the theoretical model, these intersection points indicate shifts from

the reactance stage (Stage 1) to the first threat stage (Stage 2), and from the first
to the second threat stage (Stage 3), respectively. However, loss never exceeded

threat perceptions, which would have been required to indicate a state of

helplessness (Stage 4). Temporal Pattern of Primary Appraisals Challenge Threat Loss 1 2 3 4 5 6 7 8 9 High Self-Efficacy / Failure Condition Temporal Pattern of Primary Appraisals Challenge Threat Loss 1 2 3 4 5 6 7 8 9 Low Self-Efficacy / Failure Condition DISCUSSION The reported findings demonstrate mainly that situation variables and person variables are prominent predictors of perceived challenge, threat and loss in stressful situations. In an experimental setting these appraisals differed in dependence on evaluative feedback and general self-efficacy. In face of con tinuous failures stress appraisals changed from favorable to unfavorable evalua
tions in the long run. At the same time, low self-efficacious individuals felt more distressed than high self-efficacious individuals. As predicted, stress appraisals did not come up as single states that are switched either "on" or "off." Instead, dynamic patterns of appraisals do exist that are related to each other and that are also changeable according to the transactional processes involved. By this, the
entire pattern is continuously changing, but at no time will any of the appraisals disappear unless the situation is no longer perceived as stressful. With respect to these complex and dynamic appraisal processes the role of general self-efficacy as a resource/vulnerability factor could be clearly demonstrated. Moreover, the results could be mostly explained with the help of a theoretical model. In general, high self-efficacious individuals seem to be scarcely vulnerable to the stressing situational conditions since they hardly show any reactions to experimental manipulations. Obviously, high general self-efficacy is equivalent to or leads to positive personal beliefs providing people with good capacities to resist stress. Even though failures are consistently given at nine points in time, appraisals remain predominantly positive, and their relative strengths do not change. During the whole time sequence, subjects remain within the challenge or reactance stage, and they do not enter threat or loss stages at all. The stressing situational conditions do not take much effect because they are confronted with a personality who can resist on account of his or her powerful resources and low vulnerability, respectively. By and large, the experimental situation faced by low vulnerability persons seems not to be stressful enough to induce strong negative emotional experiences. Contrary to
this obvious stress resistance, low self-efficacious subjects seem to be especially vulnerable for difficult demand characteristics and failure experiences. They come up with less favorable evaluations, consistently developing to a more negative way of appraising situational demands. By and by, they shift from reactance to the first threat stage, and later on to the second threat stage as well.

In this case, the experimental demands and failure feedbacks do take much effect because they are perceived by a personality who is handicapped by his or her weak resources and high vulnerability, respectively. However, the experimental situation has its constraints in so far as it is not powerful enough to make subjects turn to stage four in the process model, that is, to elicit predominant loss-of-control evaluations and overwhelming feelings of helplessness. However, for ethical reasons one should not complain about this specific result. Concerning the theoretical model, the predicted slope of threat appraisals that could not be fitted exactly in this investigation might be particularly sensitive to the stakes given. Regarding the above-mentioned field study (Schwarzer et al., 1984), long-term low grades endanger the academic career of the respective students. Since this concerns an important real-life stake almost everyone strives for, the low graders have enough reason to feel helpless.
and depressed in the long run. Within an experimental situation one has to undertake and then is able to leave again, it is more likely that real-life stakes are not so deeply involved, i.e., central values and commitments might be less emphasized. In order to feel severely helpless, individuals most likely have to suffer from failures in more stress-relevant real-life situations than only from negative achievement feedback in a laboratory setting where ethical limits are given in this respect. Appraisal processes also turned out to be sensitive to variations in task material or problem structure at hand. Movements of challenge and threat contrary to the trend appeared when a shift from anagrams to intelligence problems occurred.

One explanation would be that by this shift several demand characteristics are changing, too, for example situational ambiguity, familiarity with the tasks at hand, or their perceived validity for assessing intellectual ability. The distinctiveness of task material may cause new hope to be better able to meet the requirements of the upcoming problems. However, this renewed confidence disappears again as soon as further failures are faced. It is interesting to note that predominantly low self-efficacious individuals show strong reactions to task shifts in this way, whereas high self-efficacious subjects seem to be less sensitive to differing task
materials. For the latter, their

generalized beliefs obviously provide a shelter from all kinds of failure feedback,
at least from those experienced in the experimental session. Maybe they are so

confident in their abilities so as not to attach any importance to the artificial prob
lems given by the experimenter because they do not believe in the tasks' validity

for intelligence measurement and/or the ecological validity of the experimental

condition. In contrast, low self-efficacious individuals do not possess such a

strong shelter from external feedback because they are much less secure with

respect to their actual abilities. Due to their lack of self-confidence they are

guided to a large extent by situational cues which have a strong impact on stress

appraisals, be it failure, task material change, or other conditions. General self-efficacy as a

resource/vulnerability factor towards feeling distressed when confronted with achievement demands serves as a moderator for

the impact of these demands on actual stress experience as represented by

cognitive appraisals. High self-efficacy subjects rather select positive cues, such

as stable and favorable self-evaluations, than negative signals, such as situational

failures, in appraising the stressing person-environment relationship. Low self

efficacy subjects see themselves confronted with negative achievement cues and
negative self-evaluations. Thus, both information sources are combined and attached to high importance, leading to distressful experiences which turn from


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Wiedenfeld, S. A., O'Leary, A., Bandura, A., Brown, S., Levine, S., & Raska, K.
SELF-EFFICACY AND ATTITUDES IN HEALTH EDUCATION

Gerjo Kok, Dirk-Jan Den Boer, Hein De Vries, Frans Gerards, Harm J. Hbos, and Aart N. Mudde

Self-efficacy is defined as the estimation of the person about his/her ability to perform a specific behavior. The
important role of self-efficacy in health education is argued, illustrated with Dutch research, which shows that self-efficacy is an important determinant of health behavior, of future health behavior, and of health behavior change. It will be discussed how attribution theory is related to self-efficacy theory and how insights from attribution theory can be applied in health behavior interventions. Programs to improve self-efficacy by attributional retraining have been developed successfully, mostly based on relapse prevention theory.

Health education is a form of planned behavior change (see Green & Lewis, 1986; Kok, 1988). Research shows that the effectiveness of health education activities is determined by the quality of this planning process (Jonkers, De Haes, Kok, Liedekerken, & Saan, 1988): analysing the problem, analysing the related behaviors, analysing the determinants of that behavior, developing interventions to change that behavior, organising implementation, and finally evaluating of the effects on the problem or, at least, the behavior. An important step in this planning process is the analysis of the determinants of the target behavior. We will focus on self-efficacy as a determinant of behavior and as a predictor of future behavior and behavioral change, using illustrations from our own research. We will then suggest strategies to improve self-efficacy, based on attribution theory and relapse prevention theory. DETERMINANTS OF BEHAVIOR Social psychological theory and research, fundamental as well as applied, has traditionally provided an important contribution to the understanding of the deter
minants of behavior. Fishbein and Ajzen (1975) integrated a series of models from attitude theory and social influence theory in their model of reasoned behavior. They stimulated a whole field of fundamental and especially applied research (Ajzen & Fishbein, 1980; De Vries & Kok, 1986). Gradually it became clear that the Fishbein and Ajzen model was very useful, but limited. The model could not sufficiently account for the important role of behavioral costs and barriers in performing the behavior. In theory, costs and barriers should appear as beliefs about performing the behavior, but in practice researchers found better prediction of behavior when costs and barriers were measured independently of the attitude. In addition to the model of reasoned behavior, researchers focused on Bandura's concept of self-efficacy (Bandura, 1986; Strecher, DeVellis, Becker, & Rosenstock, 1986) as a determinant of behavior. Self-efficacy is the estimation of the person about his/her ability to perform a specific behavior in a specific situation. Self-efficacy expectations are based on own experience with the behavior (and especially the attributions that people make about success and failure), observations of others, persuasion by others, and physiological information (e.g., nervousness). Self-efficacy has to be
distinguished from outcome expectancy, the latter being an estimation of the effectiveness of the behavior to reach a desired goal. For a smoker, outcome expectancy is the estimation of the improvement in health and life by stopping smoking, while self-efficacy is the estimation of own ability to really give up smoking. Several researchers reported an improvement in the prediction of behavior by combining attitudes, social norms, and self-efficacy (Ajzen, 1987; De Vries, Dijkstra & Kuhlman, 1988).

This "Determinants of Behavior Model" is represented in Figure I. Figure 1 Determinants of behavior model. Attitudes, social norms and self-efficacy predict the intention, which in turn predicts the behavior. External variables (outside the model), like demographic ones, are supposed to influence behavior via the three determinants and the intention. Between intention and behavior there can be barriers or lack of skills. Attitudes, social norms and self-efficacy can be measured in advance, while barriers and skills play a role when the behavior is actually performed. The intention predicts the behavior, but the model also indicates that self-efficacy is an estimation of the skills that are needed in the actual situation and the possibilities to overcome barriers. For that reason an influence from self-efficacy via skills on
behavior is proposed. The actual performance of the behavior leads to a feedback process that influences in turn the three determinants. Attitudes, social norms, and self-efficacy are not completely independent from each other. Mostly the correlations between the three are substantial. All three determinants can be characterised as beliefs. But empirical data indicate that a separate measurement of each determinant improves the prediction of behavior significantly. There is as yet no tradition in the measurement of self-efficacy. Bandura (1986) has argued that self-efficacy expectations vary along dimensions of magnitude, generality, and strength. This implies that self-efficacy estimates must be viewed as situation dependent. The perception of subjects' ability to perform a certain behavior is determined, and varies, by the perceived task difficulty and the situation. Measurement of perceived difficulty does not necessarily imply an estimation of ability. A person can see a behavior in a certain situation as very difficult, but also as something that can be done. Measuring ability in relation to situational aspects, however, is likely to include perceived difficulty levels of both situation and behavior. A person asked to rate his
confidence of being able
to perform a certain behavior in a certain situation, will probably weigh ability
against task difficulty and situation difficulty. This leads to the conclusion that
instruments to measure perceived ability ("Do you think you are able to ... ")
assess both the dimensions strength and magnitude. Including a sample of rele
vant situations provides an assessment of the dimension generality. In the following we will present some of our studies about the role of self
efficacy as a determinant of behavior and behavioral change (for a review of the
international literature, see Strecher et al., 1986). Most of these studies are cross
sectional, measuring the determinants and the behavior at the same time. In addi
tion we will present two of our studies that are longitudinal, predicting future
behavior from former measures of determinants. This makes it possible to infer
causal relationships. Dutch Research on Self-Efficacy as a Determinant of Behavior De Vries (1989) analyzed the determinants of the onset of smoking in youth.
Eighty-five third grade Dutch pupils of various secondary schools participated in
his study, 40% male and 60% female, with age varying between 14 and 17 years.
Sixteen questions assessed the attitude by focussing on both shortand long-term
consequences, and personal, social and health consequences. Social norms were
assessed by nine questions about the norms of parents,
siblings, peers and adults.

The nine questions on self-efficacy comprised: finding it difficult/easy not to
smoke when friends smoke, explaining to other people that "do not want to
smoke," being able to refuse a cigarette when offered, when offered by parents,
when offered by friends, in spite of being called a coward, being able to stop
smoking when wanting to, knowing a reason to refuse a cigarette, succeeding in
becoming/staying a non-smoker. One item measured the
intention and one item
measured the behavior. The nine self-efficacy questions
formed a reliable scale,

with Cronbach's alpha .80. Figure 2 shows the correlations
and multiple correla
tions of the determinants with intention and behavior.
Attitude .66 1.47 R-.79 .74 R-.80I Social norms
Intention Behavior .71 I Sel f-efficacy I .66

Figure 2 Correlations and multiple correlations of the
three determinants with intention and smoking behavior (N
= 85, all correlations are significant p < .01). A
hierarchical regression analysis showed that self-efficacy
had a unique
contribution in the prediction of the intention, when
added after attitude and
social norm. Self-efficacy explained another 15% of the
variance in the inten
tion. Moreover, self-efficacy had a unique contribution in
the prediction of the
behavior, when added after the intention, explaining
another 9%. So in line with
our expectations, De Vries found an influence from
self-efficacy on the intention
independent of attitude and social norm, and an influence on behavior independent of the intention. The latter is probably the result of the relation between self-efficacy estimations and the actual skills in performing the behavior and overcoming barriers. On seven of the nine self-efficacy items there was a significant difference between the smokers and the non-smokers (see De Vries, 1989). We have presented a study that shows a relation between attitudes, social norms and self-efficacy on the one hand, and intention and behavior on the other. A number of other studies have found the same result. These were cross-sectional studies that cannot show any causal relationship. We know that attitudes cause behavior, but behavior in turn causes attitudes. The same applies to social norms. With respect to self-efficacy, the first assumption is that self-efficacy is the result of behavior. In our model, however, we have assumed that self-efficacy can also cause behavior. In the following we will present two studies that are longitudinal and that show that self-efficacy is a determinant of future behavior. The reported study by De Vries (1989) was part of a research program about the prevention of smoking in youth, with a series of measures over time. The attitude, social norm and self-efficacy scores of the control group at the first
measurement (Time I), have been used to predict intention and behavior at a following measurement, one year later (Time 2). The correlations of the determinants at Time I with intention and behavior at Time 2 are depicted in Figure 3.

Figure 3 Correlations and multiple correlations of the three determinants at Time 1 with (I) the intention at Time 2, and (2) with smoking behavior at Time 2 (N = 600; all correlations are significant P < .01). The results of a regression analysis showed that self-efficacy at Time 1 was the best predictor of smoking intention at Time 2 one year later, explaining 24% of the variance. Self-efficacy at Time 1 also had a unique contribution in the prediction of behavior at Time 2, when added after the intention Time 1. This study showed that self-efficacy, measured at a certain time, can predict future intentions and behavior. The study of Mudde, Kok, and Strecher (1989) focussed on self-efficacy as a predictor of success in the cessation of smoking. Subjects were 123 participants in a three-week "Stop Smoking" program. The most important principles of the program were: (a) quitting at the first meeting, (b) concentrating on one’s own potential to fight addiction through willpower, and (c) preparation for the physiological consequences of quitting. Enhancing self-efficacy was not the focus of this program. Although certain components of the program are likely to enhance self-efficacy, no specific atten
tion was paid to skills training or obtaining adequate coping responses. The pos
sibility of relapse and how to handle it when it occurs received minimal attention.

The program consisted of seven meetings, spread over three weeks. Both before
and after treatment and after follow-up periods of six weeks and one year, self
efficacy and smoking behavior were measured by questionnaire. Two measures
related to self-efficacy were used in this study: 1. A one-item perceived ability measure. Subjects were asked to rate their perceived ability in resisting the urge to smoke in every possible situation. 2. The "Smoking Self-Efficacy Questionnaire" (SSEQ), developed by Coletti, Supnick and Payne (1985). Subjects were asked to rate their perceived ability in resisting the urge to smoke in seventeen different situations.

.44 Attitude T1 .37 R-.54 Social norm T1 Intention T2 .49 Self-efficacy T1 .50 Intention T1 .64 R-.65 Behavior T2 At the pre-treatment self-efficacy measure, respondents were told to imagine that they were quitting without professional assistance, to minimize the effect of program-efficacy expectations. Assessment of smoking behavior was realised by self-report. The cutting point between smokers and quitters was set at one cigarette or more during the last seven days before measurement. Once a participant was missing at a follow-up, that person was treated as a smoker in the following analyses. Success rates of the program were 54% after treatment, 44% after six-weeks
follow-up, and 27% after one-year follow-up. Schwartz (1987) reports median success rates for group interventions of 24% to 36% after one-year follow-up, so the result of this treatment is comparable. There are no differences between the groups of quitters and smokers after one year, with respect to any measure on the pretest. We will focus on the role of self-efficacy after treatment in predicting smoking behavior after one year. Mudde et al. (1989) divided the participants that were successful after the treatment in three success/failure groups: A: post-treatment success, post-six-weeks success, post-one-year success; B: post-treatment success, post-six-weeks success, post-one-year failure; C: post-treatment success, post-six-weeks failure, post-one-year failure. Mudde et al. predicted the membership of Groups A, Band C after one year, from the self-efficacy scores at the post-treatment measure, and the increase in self-efficacy during treatment (see Table 1) (post-treatment failures were left out because their post-treatment self-efficacy scores will artificially be lower than those of the other groups). The post-treatment level of self-efficacy and the increase of self-efficacy during treatment, as measured by the one-item perceived ability measure, were predictors for success and failure after one year. In the SSEQ measures there is a slight trend. Again we find that self-efficacy at a certain time can predict behavior change in the future, in this case the long-term
effects of a smoking cessation program.

Table I

<table>
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<th>One Year (N = 66) Post-Treatment Score Increase During Treatment One-Item SSEQ One-Item SSEQ</th>
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<tr>
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<tr>
<td></td>
<td>Group B 3.4 4.1 1.6 1.9</td>
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<td>Group 3 3.2 4.4 1.2 1.7</td>
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p < .05 .14 .01 .17 Improving Self-Efficacy by Health Education

We have presented research that shows the contribution of self-efficacy in
the determination of behavior. We have also presented research showing that
self-efficacy is predictive for future success and failure in behavioral change.

However, the program in the study by Mudde et al. (1989) was not specifically
meant to improve self-efficacy. An important question for health education is:

Can we improve self-efficacy and thus stimulate the desired behavior change?

This question cannot fully be answered positively at this moment, but we do have
promising evidence. During the last decade there has been an increase in tech
iques based on attribution theory that can be used to induce people to change
their behavior and based on attributional retraining and self-efficacy improve
ment (Weary, Stanley, & Harvey, 1989). We will now discuss attribution theory
and show how this theory is related to self-efficacy theory. We will also show how attributional insights can be applied in health behavior change programs. Figure 4 is a schematic depicting Weiner's attributional model (1985, 1986).

The model indicates that when outcomes are negative, unexpected, or important a causal search is started, resulting in causal ascriptions that try to explain the outcomes. For example, a person who attempts to quit smoking but fails might attribute this outcome to a variety of reasons, e.g., low effort, the difficulty of the task, or nicotine dependency. According to attribution theory, perceived causal reasons have an underlying dimensional structure (Heider, 1958; Kelley, 1967). Theoretically, three attributional dimensions have been distinguished. The first dimension, locus of causality, reflects the extent to which previous outcomes are attributed to causes either internal or external to the person. The second dimension, stability, reflects the extent to which previous outcomes are attributed to stable or unstable causes. Stable causes refer to perceptions that a failure or success was due to immutable, unalterable causes. Unstable causes refer to perceptions that a failure or a success was due to causes that were mutable. The third dimension, controllability, reflects the extent to which previous outcomes are attributed to controllable or uncontrollable causes.
Empirical support is strongest for the dimensions locus of causality and stability, the support for the dimension controllability is weakest (Hewstone & Antaki, 1988; Weiner, 1986).

Attribution theory contends that causal ascriptions influence cognitions and emotions related to success and failure. We will first describe the cognitive component and then turn to the affective component of attribution theory. Cognitive Component of Attribution Theory Weiner’s model suggests that expectancy of success is determined by the perceived stability of the causes for success or failure. A person attributing a success to a stable cause (e.g., ability) will have a higher expectancy of success when having to perform the same task again, compared to somebody who attributes a success on the same task to an unstable cause (e.g., luck). After failure this effect is reversed. The rationale behind this assumption is that when there is no reason to expect the cause of failure to change, the second time the task will be performed the cause responsible for failure will still be present. If the cause for failure was unstable, there is no reason to expect the cause to be present the next time one performs the task.

Figure 4 Schematic overview of Weiner’s attribution theory. Furthermore, it is assumed that a lowered expectancy of success leads to less adaptive task behavior. Because of the lowered expectation
of success, persons will invest less energy in the task at hand, because they perceive a lower likelihood of succeeding. It is this lack of energy invested in the task which causes the low performance. This line of reasoning very closely parallels Bandura's ideas about self-efficacy. He assumes that a low self-efficacy leads to aversion of the task at hand. Self-efficacy estimates resemble expectancies of success in the respect that both concepts are related to the estimate people make about the likelihood that a certain outcome or goal will be attained. Furthermore, both estimates are based on a cognitive appraisal of past experiences (Bandura, 1986, p. 349; Weiner, 1986, p. 181). Several studies on attributional processes have used self-efficacy ratings as a measure of expectancy of success, and some authors claim that self-efficacy and expectancy of success are identical concepts (e.g., Kirsch, 1985, 1986). Outcome emotion information attribution stability locus controlability expectation of success emotions behavioral consequences outcome Support for the cognitive component of this theory can be found, among others, in a study by Eiser and Van der Pligt (1986) on smoking behavior, and a study by Hospers, Kok, and Strecher (1990) on weight reduction. Hospers et al. tested the cognitive component of the attributional model on 158 subjects who
participated in a weight reduction program. They measured the number of previous attempts to lose weight, stability of attributions for previous failure, expectancy of success and goal attainment. Results of this study are shown in Figure 5.

Figure 5 Path analysis with goal attainment as outcome variable; bold arrows indicate significant β-weights (p < .01). As hypothesized, goal attainment is positively associated with success expectancy which, in turn, is negatively associated with stability. Furthermore, stability was positively related to the number of former trials. Also as hypothesized, there was no significant association between the number of previous attempts and goal attainment, or stability and goal attainment. These results suggest that it is not the number of failures people experience that is important, but the way people interpret these failures. The more stable the causes attributed to failure, the lower the expectancy of success for the next attempt, and hence lower goal attainment. As the results of the above-mentioned studies are all correlational, one should be careful in interpreting these results. These studies do not show that because subjects attribute their previous failures at losing weight (or quitting smoking [Eiser & Van der Pligt, 1986]) to stable causes they do not achieve their goals.

Correlational studies can only show that a relationship between variables exists,
they can never show that a change in one variable is the cause of the change in another variable. Only some studies have shown a causal relationship between attributional change and behavioral change (Den Boer, Meertens, Kok, & Van Knippenberg, 1990).

Affective Component of Attribution Theory

The relation between stability of attributions, expectation of success and behavior can be referred to as the cognitive component of Weiner’s theory. The theory also consists of an affective component: the relation between perceptions of failures in number of failures, stability of attributions, expectancy of success, and goal attainment.

<table>
<thead>
<tr>
<th>Perceptions</th>
<th>Number of Failures</th>
<th>Stability</th>
<th>Expectancy of Success</th>
<th>Goal Attainment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>-.33</td>
<td>.37</td>
<td>-.02</td>
</tr>
</tbody>
</table>

The relation between locus and controllability on the one hand and emotions and behavior on the other. It is assumed that different attributions lead to different emotions. An attribution of effort for failure (internal/controllable) will lead to guilt, while an attribution of ability (internal/uncontrollable) for failure will lead to shame. It is assumed that there are two kinds of emotions: motivating and debilitating. Motivating emotions (guilt for instance) will lead to a better task performance while debilitating emotions (shame) will lead to a worse task performance. Attribution theory states that after failure guilt (as a result of an attribution to, for instance, effort) will lead to better task performance than shame (as a result of an attribution to, for instance, ability). This statement makes the results found by Clifford (1986) interesting. She presented subjects with a
scenario in which

students failed an exam because of lack of ability, choice of a wrong strategy or

lack of effort. She found that subjects predicted the highest rate of success for

those students who failed because of the choice of a wrong strategy, no differ

ences where found between ability or effort attribution condition. She explains

these results by stating that an extremely high or an extremely low level of guilt

(associated with effort or ability respectively) will lead to a worse performance

than a moderate level of guilt (associated with an attribution to strategy). It seems that the relationship between emotions and task behavior is less

clear than it is assumed to be in attribution theory. At this point it is safe to

assume that a relationship between attributions and outcome expectancies exists

that is related to task behavior. Different kinds of research paradigms have

shown this to be true (Den Boer et al., 1990; Hospers et al., 1990). However,

there remains doubt about the affective component of this theory. Especially the

question of which emotions could be termed debilitating and which motivating,

remains to be answered. Applying Attributional Theories

Earlier we stated that attributional techniques can be, and are already, applied

to many different situations and problem areas. Examples of attributional expla

nations can be found in problem areas as diverse as
loneliness (Anderson, Horowitz, & French, 1983), alcoholism (McHugh, Beckman, & Frieze, 1979), smoking (Eiser & Van der Pligt, 1986), losing weight (Hospers et al., 1990), coping with critical life events like accidents, rape and illness (Janoff-Bulman, 1979). While the above-mentioned studies are all descriptive, there have also been attempts at changing people's behavior by changing their attributions (see Forsterling, 1988, for a review). There have been attempts to improve reading skills of children (Fowler & Peterson, 1981), improve arithmetic skills of children (Schunk, 1984), improve the score of subjects on anagram tasks (Andrews & Debus, 1978), lower drop-out rates at high-school, and improve academic success (Wilson & Linville, 1982). All these studies are based on the following assumption: If different attributions lead to different behavioral consequences, it should be possible to change the behavior of people by changing the attributions they make. As most research within this paradigm is focused on attributions after failure, it is assumed that after failure an attribution to effort leads to 'better' task behavior than an attribution to, for instance, ability. One could also say that an internal, stable and uncontrollable attribution for failure should be
substituted by an internal, unstable and controllable attribution (Figures 6 and 7).

Because of the change from stable to instable there is no need for the subjects to expect a renewed failure. Because of the controllability of the cause they can actively try to change it: They can invest more energy in the task, hoping that it will improve their performance. This implies that, because of the change in attribution, they will have a higher expectation of success, which in turn will increase their task performance. Helping people lose weight is a good example of how this theory can be applied. Research shows that the cause people perceive for their failure is predominantly internal, stable and uncontrollable (Hospers et al., 1990).

People often think that they are incapable of losing weight because they perceive no relation between the amount of food they eat and their weight. They think that they will get fat anyway, even if they eat small amounts of low-calorie food. This is a typical case of dysfunctional attribution. Changing this stable, internal and uncontrollable attribution to unstable, internal and controllable will result in a higher possibility of a successful attempt at losing weight the next time. Another possibility is that they do perceive the relation between amount of food eaten and their weight, but do not think that they can control their behavior because they
feel they do not have the willpower to change this behavior. Again an example of a dysfunctional attribution.

Figure 6 Undesirable attributational sequence. failure sad information ability stable internal uncontrollable expectation of failure shame avoidance of task/less effort Investment failure Applications of attributional insights are plentiful (Den Boer, Meertens, Kok, & Van Knippenberg, 1989; Forsterling, 1988; Schunk, 1984; Wilson & Linville, 1982). There remains, however, a significant amount of doubt about the causes of the positive effects found in these reattribution techniques. The fact that there has been hardly any research in which different attributions are compared with each other makes it difficult to state which attributions are "the best" to attribute failure or success to. The fact that providing subjects with a simple attributional questionnaire leads to increases in performances, sheds some doubt on the necessity of complex reattribution techniques as well. Despite these problems we will discuss an approach to maintenance of behavioral change that incorporates many of the above-mentioned insights: relapse prevention theory. RELAPSE PREVENTION

A theory that uses both the concepts of attribution and self-efficacy is relapse prevention theory. Relapse prevention theory explains why people who try to quit a certain addictive behavior (e.g., smoking or drinking) often fail. Marlatt and
Gordon (1985) have elaborated a relapse prevention theory that can be explained in attributional and self-efficacy concepts. An overview of the theory is presented in Figure 8.

Figure 7 Desired attributional sequence: failure sad information effort unstable internal controllable no expectation of failure guilt/anger higher persistence success

Figure 8 The relapse-prevention model (adapted from Marlatt & Gordon, 1985, p. 106). An important concept in this theory is the so-called 'high-risk situation.' A high-risk situation is a situation in which a person is tempted to return to his or her old habit. For a smoker who tries to quit smoking, a meeting with friends who smoke or a day of hard work might be a high-risk situation. In order to cope with such a situation the person needs a coping response. This means that the person needs to anticipate the situation and know what to do when that situation arises. According to the theory, the absence of a coping response will lead to decreased self-efficacy and initial use of the substance, resulting in a relapse. If there is a relapse, it is important to consider what caused this lapse, and what can be done to avoid such lapses in the future. The use of the word "caused" in the previous sentence already suggests the importance of attribution theory. There are causes that a person should not attribute to (for instance stable causes like...
ability or willpower) in this situation because that would result in an even lower self-efficacy. Attributing to stable, internal causes will also lead to shame and perceived loss of control. The smoker who has decided to quit and finds himself high risk situation presence of a coping response absence of a coping response positive outcome expectancies increased self efficacy decreased self efficacy decreased probability of relapse use of substance resolution not to use substance sense of failure self attribution guilt/ shame perceived loss of control increased probability of relapse unable to cope with a high-risk situation resulting in the use of cigarettes, experiences a conflict between his commitment to stop smoking and his actions. This conflict could result in dissonance, attributions to self, and debilitating emotions. As we have seen attributions to stable, internal causes results in emotions like guilt which have a negative impact on further task behavior. In this situation that will mean an increased probability of further relapses. The absence of a coping response does not necessarily lead to a lapse, it "only" increases the probability of a lapse. The basis for this assumption lies in the relationship between the presence or absence of the
response and the increase
or decrease of the perception of one’s own self-efficacy in coping with the situa
tion. This implies that the better ingrained and more automated the response is,
the higher one's self-efficacy and the lower the probability of a relapse will be.

Take for instance the quitting smoker who needs to think every time when he or
she is offered a cigarette whether or not he/she will accept the cigarette compared
with the quitting smoker who automatically says: "No thank you, I don't smoke
anymore." The pressures on the latter person will be much smaller than on the
one who has to make up his/her mind anytime he or she is offered the temptation
of a cigarette. One can conclude from the above-mentioned theories that it is not enough to
motivate people to adopt healthier behaviors; one has to equip them with the
necessary coping-skills to avoid the undesired behavior. This will decrease the
probability of a relapse because it increases their self-efficacy. If a lapse occurs
it is important to make sure that it is attributed to the "right" cause. This means
that it should not be attributed to internal, stable causes like willpower or ability,
as these attributions result in a lowered self-efficacy and a lower expectation of
success which will result in a higher probability of a relapse. In the last part of
In this contribution we will discuss some examples of interventions to avoid the pitfalls mentioned. One important source of self-efficacy information is one's own experience (Bandura, 1986). This implies that self-efficacy can be raised by letting people experience success. Marlatt and Gordon (1985) devised a procedure, consisting of four different stages, to influence the self-efficacy of their clients. These stages are: (a) influencing the frame of reference of the client, (b) searching for high-risk situations and the learning of coping-skills, (c) actual practice of these coping-skills, and (d) learning how to handle relapses. The first stage consists of teaching the client that to achieve the desired behavior one has to learn certain skills. To quit smoking, for instance, is not a question of abilities or willpower but a question of skills. This replaces ideas like "I am a weakling who cannot quit smoking by himself" by the idea that one is going to learn the skills to quit smoking. As self-efficacy is related to experiences of success, it is important to state realistic subgoals. One such subgoal could be to stop smoking during the day. The second stage consists of looking at all the possible high-risk situations, by means of keeping a diary, self-monitoring or exploring the reasons why previous quitting attempts failed. For each high-risk situation a coping response should be devised. Thirdly, it
is important to practice these responses. A possibility to practice lies in actively seeking the risk situations and discussing the experiences afterwards. If a lapse occurs, it is important to learn from this lapse by examining what caused it and how this can be avoided in the future. Reattribution studies showed that not all the causes are as good:

Attributing to ability has different results from attributing to the situation.

Relapse prevention theory states that attributing to the self is not a good attribution because it will lead to negative emotions and a lowered self-efficacy. One has to attribute to external, unstable and controllable aspects of the situation.

This recommendation is at odds with that of reattribution research in which it is recommended to attribute to internal, unstable and controllable causes (specifically effort) after failure. One could say that the attribution recommended in relapse prevention consist of finding a (better) coping response for the situation in which one failed. The cause of the lapse is external, but one is responsible for finding a way to handle that specific Cause and that is something one has to do by oneself. Relapse prevention and attribution theory do agree, however, on the subject of which attributions are not helpful after a lapse; stable or uncon
trollable. Causes whether they are internal or external will result in a lowered self-efficacy or expectation of success and thus in a higher probability of a total relapse. Hall, Rugg, Turnstall, and Jones (1984) have shown that such a coping-skills treatment can be successful. They recruited 135 smokers who followed an aversive-smoking program. For half of them this was followed by training in coping skills. The other half participated in a discussion group. Skills training was more effective in avoiding relapse than the discussion group. Analyses showed that this training was especially effective with subjects who smoked less than 20 cigarettes a day. Killen, McCoby, and Taylor (1984) also showed the effectiveness of skills-training. Fifty-four subjects were divided across three conditions; nicotine chewing gum, skills-training, and a combination of both. Follow-up measures after 10 months showed abstinence of smoking of respectively 23%, 30% and 50%. A combination of interventions was clearly the most effective, but skills-training alone was more effective than nicotine chewing gum. CONCLUSIONS Self-efficacy has been shown to be an important determinant of behavior and of behavior change. Self-efficacy expectations predict future success or failure in behavior change programs, like quitting smoking. Health education should focus on the improvement of self-efficacy in addition to
motivating people to behave in a healthier way. Convincing people about the utility of the expected behavior is necessary but not sufficient. Especially people who have experienced multiple failures and interpret these failures as caused by stable, internal and uncontrolable causes should undergo some kind of reorientation period in which they are taught that they are indeed able to change their behavior. Furthermore we may say that the relapse prevention model can be described in attributional and self efficacy concepts. This model states that it is not only important to convince people to adopt healthier habits and change their attributions but they have to be taught how to cope with difficult situations, that will surely arise, as well. Some of these difficulties will be caused by barriers which can be overcome by the person concerned. These difficulties can be dealt with within the theoretical-self efficacy and attributional-framework, and the resulting relapse prevention interventions. Other difficulties will be caused by real barriers (Bandura, 1986). The difference between these two kinds of barriers is not unequivocally determined:

Perhaps it is best to state that this difference lies in the perceived controllability of the barriers. Real barriers are beyond the person's control; others might be
controllable. Next to skills training, health educators should focus on health promotion strategies in which barriers beyond the individual's control, but controlled by government or community, are removed as well (De Leeuw, 1989; see also Bandura, 1986, p. 449, about collective efficacy and social action). Most of the studies that were presented focussed on smoking, but the basic ideas can be generalized to other areas in health education, for instance AIDS preventive behavior.


physiological activation and health

promoting behavior. In I. Madden (Ed.), Neurobiology of learning, emotion and affect (pp. 229-270). New York: Raven Press.


THE INFLUENCE OF EXPECTANCIES AND PROBLEM-SOLVING STRATEGIES ON SMOKING INTENTIONS

Martin V. Covington and Carol L. Omelich

Educational researchers have proposed that children’s health risk-taking behavior depends in part on how youngsters resolve social/interpersonal problems and on the personal expectations that arise in the course of their daily lives. The present research attempted to establish the usefulness of such a problem-solving/social-cognitive approach to anti-smoking interventions by (a) investigating the nature and causes of problem-solving deficiencies among students at high risk for cigarette smoking, and (b) by determining if various self-efficacy problem-solving elements influence smoking decisions so as
to alter the level of temptation experienced in social situations. Some 4,000 sixth, eighth, and tenth graders (i.e., 15-year-olds) reacted to hypothetical smoking scenarios by rating temptation level, intentions to smoke, and the likelihood of applying ten problem-solving strategies thought to mediate smoking intentions. Between-group analysis indicated consistent differences in problem-solving approaches among individuals with various smoking histories (e.g., nonsmokers, regular smokers), regardless of grade, sex, ethnicity or ability level. Moreover, path analysis showed that self-efficacy strategies and outcome expectations acted as mediators of the temptation-intention relationship regardless of smoking history. Implications of these results for a social problem-solving approach to adolescent health education are considered.

Effective problem solving has long been a valued teaching goal in schools. In more recent years, social problem resolution has also come to occupy a central role in thinking about how to achieve the larger objectives of health education including long-term risk reduction and health maintenance, especially in the area of cigarette use (Botvin & Eng, 1980, 1982; Botvin, Eng, & Williams, 1982; Cohen et al., 1988; Gilchrist, Schinke, & Blythe, 1979; Kim, 1982; Schinke, Gilchrist, Snow, & Schilling, 1985; Williams & Arnold, 1980). Usually the working definition of a problem and its solution involves the resolution of an interpersonal conflict between family members or among peers in which health issues are not necessarily the paramount concern of the participants, but rather get resolved in the course of solving certain other issues involving children's
needs for autonomy, recognition and affiliation. According to this view, anti-smoking education should provide a range of problem-solving skills for coping with larger issues of personal/social significance, yet in a manner that also reduces the likelihood of problem resolution in favor of smoking. It is in this sense that smoking behavior should not be the sole, or even the primary, concern of anti-smoking interventions. If basic needs such as those for autonomy and affiliation underlie adolescent smoking decisions, educational interventions must work within the context of these naturally occurring motivations and not against them for short-term prevention of smoking.

This growing concern with the problem-solving dynamics involved in health-risk reduction is further reflected in the concept of informed decision making. The operative notion here is that students should be taught the judgmental skills necessary to reach their own conclusions regarding personal, moral and social issues, thereby shifting the burden of defining the content of personally relevant education from the school and teacher to the student (Botvin, 1983; Botvin et al., 1980; Jones, Piper, & Matthews, 1970; Piper, Jones, & Matthews, 1974). However, despite the widespread recognition of the potential health relevance of various problem-solving models, few health intervention programs are
based primarily on social decision making (for a review, see D'Onofrio, 1983b).

One of the reasons for this dearth, at least in the area of cigarette smoking, is the general absence of information on the problem-solving characteristics of smokers and nonsmokers. Missing is systematic evidence on the question of whether or not smokers differ from nonsmokers in how they approach a smoking decision; and how such differences, if they exist, enter into smoking decisions. Yet the inherent value of a problem-solving model to the goals of health education depends fundamentally on the presumption of such skill differences, and on their causal role as mediators of a smoking decision. For example, it may be that smokers arrive at different smoking decisions than do nonsmokers, not because they see the issues differently or choose different strategies to resolve interpersonal dilemmas, but simply because their peer culture encourages smoking or because their parents condone it. If this is true, a problem-solving approach offers little leverage for an increased understanding of smoking behavior for its interdiction. In this instance, educators would be better advised to direct their attention to other aspects of the process of smoking uptake and resistance, perhaps by focusing on parent education or by supporting more restrictive legislation on the use and
availability of cigarettes among adolescents. Obviously, then, an important initial step in establishing the usefulness of a problem-solving focus in health education is to investigate the nature and causes of problem-solving deficiencies among adolescents at risk for smoking. Such an investigation was the main purpose of the present study. Several potential sources of problem-solving differences can be anticipated, each of which may lead to a decision to smoke or not, and each implying some what different intervention strategies. First, it may be that individual differences in the perception of smoking issues and in the availability of prosocial strategies are conditioned in part by variations in basic ability. Although many smokers are bright, well-informed individuals, there are enough scattered reports indicating that children who smoke tend to score lower on standard achievement tests and to have poorer scholastic records to make this hypothesis of basic cognitive differences between smokers and nonsmokers more than idle speculation (for a review, see Evans, Henderson, Hill, & Raines, 1979). Intervention strategies would likely differ markedly depending on the acceptance or rejection of this possibility. A second and likely more important source of differences involves the individual’s personal smoking history. Smokers and nonsmokers face fundamentally
different decisions when confronted with the possibility of smoking. Non

smokers feel considerable pressure to yield arising from personal curiosity and

from peer pressure (Covington & Omelich, 1986), yet by definition are highly

resistant to such temptation. Such resistance likely depends in part on a well

developed repertoire of problem-solving strategies which acts to diffuse situa

tions in favor of not smoking. By comparison, the experienced smoker tends to

yield more easily to temptation, irrespective of peer pressure and immediate cir

cumstances, and sees little violation of his or her self-image by smoking. As a

result, young smokers are likely to be less concerned with the issues surrounding

smoking and with the probable consequences of their behavior, and to possess

less well-formulated strategies to avoid smoking. Such concerns may simply be

less salient to smokers, not only because the physical addictive process may have

advanced to a point so as to render the decision to smoke automatic (Leventhal &

Cleary, 1980), but also because young smokers possess well-entrenched rationa

lizations that minimize and distort the risks of having "just one more cigarette."

Thus, unlike the calculated response of the nonsmoker to peer pressure, what is

likely to dominate the decision for smokers is their
perception of the value of cigarettes to achieve certain desired goals, the force of habit, and the whim and moods of the moment. This line of reasoning suggests that we should be quite surprised if investigators failed to find differences in the characteristic ways smokers and nonsmokers typically approach a smoking decision. However, if it is so obvious as to why such differences should arise, then perhaps their existence is merely trivial from the perspective of intervention. In effect, we must also address a further question: Do such problem-solving differences actually exert a causal impact on important target behaviors such as one's intentions to begin smoking or to continue to smoke in the future? As we have argued, problem-solving differences may simply be an artifact of the individual's smoking experiences-more the result of smoking or of coping in a smoking milieu than a cause of smoking. These causal questions are considered from a social-cognitive perspective which emphasizes the role of expectations as leading causes of behavioral intentions (Bandura, 1977, 1989). According to social-cognitive theory at least two kinds of expectations can be discerned: First, outcome expectancies which refer to the perceived consequences of one's actions and their importance to the individual; and second, self-efficacy expectations, namely, perceiving that one is cap
able of performing a specific action. Self-efficacy has proven an especially robust predictor of intentions to smoke or to abstain, even after other factors such as attitudes toward smoking have been taken into account (Ajzen & Madden, 1986; De Vries, Dijkstra & Kuhlman, 1988). Moreover, individuals report greater feelings of efficacy after episodes in which they resisted smoking than when they succumbed to the temptation to smoke (Garcia, Schmitz, & Doerfler, 1990).

For purposes of this research we have focused on two aspects of outcome expectancies. First, there are the outcomes themselves, that is, the anticipated consequences of, say, one’s parents finding out that a child has been smoking.

Then, second, there is the importance the individual attaches to various outcomes, or what we refer to as issues: To extend our example, how important the anticipated parental reactions are to the child. Issues and consequences often interact in their influence on intentions. For example, the expectation of a swift reprisal from parents may have little to do with the child’s decision to smoke or not if he or she does not care what the parents think or do. Additionally, we have represented the self-efficacy portion of Bandura’s model as the perceived availability of strategies for effective action such as
diffusing conflict and negotiating

a positive, nonsmoker resolution which might include communicating one's
values to others and redirecting attention from smoking to
other more constructive activities. These three components-perceived
issues, consequences, and strategies

comprised the focus of this investigation. In order to evaluate the saliency of
these three components to a smoking decision, we focused on the pervasive

smoking temptation/intention linkage. It has been well established that the temptation value of a cigarette exerts a dominant, if not preemptive, influence on

intentions to smoke among young adolescents (Best & Hakstian, 1978; Covington & Omelich, 1988), in effect, as temptation (desire) increases, so do intentions
(desired action). For the child without a well-developed set of internalized controls, desire typically translates directly into action). Research on the development of moral and social reasoning suggests that such impetuosity only slowly comes under the control of evolving cognitive processes and self-interested reflection. Unfortunately, such self-regulating cognitions are not sufficiently established until most youngsters are well past junior high school (13-15 years old), which appears to be the most vulnerable periods to smoking temptation
(Covington & Omelich, 1986). If we accept temptation level as a pivotal causal factor in smoking uptake, then a reasonable measure of the value of a problem solving approach to moderating health risks would be reflected to the extent to which cognitive factors act to offset the dependency of intentions on temptation so that intentions to smoke will remain low, irrespective of the temptation of a given circumstance. This reasoning implies a causal model of the kind portrayed in Figure 1. The unidirectional arrows indicate the paths of influence that were examined in the present study. Put in causal terms, we asked whether or not present problem-solving skills will reduce the dependency of intentions on temptation: (a) by serving as an inhibitor of temptation (Le., high temptation \( \rightarrow \) problem-solving strategies \( \rightarrow \) low intentions); and/or (b) by providing a direct, countervailing presence in their own right (problem-solving strategies \( \rightarrow \) low intentions)?

Smoking Temptation Health Issues \( R^2 = .047 \) Decision-Making Strategies \( R^2 = .033 \) Interpersonal Strategies \( R^2 = .086 \) Self-Peer Strategies \( R^2 = .038 \) Affective Consequences \( R^2 = .104 \) Needs Consequences \( R^2 = .053 \) Intention to Smoke \( R^2 = .406 \)

Figure 1 Path diagram of the hypothesized effect of problem solving in moderating the temptation/intention relationship in smoking decisions.
voluminous (for a review, see Covington, 1986; Hermstein, Nickerson, Sanchez, & Swets, 1986; Nickerson, Perkins, & Smith, 1985). Surely, some approaches will prove more useful to the goals of health education than will others, but which ones? While issue, consequence and strategy components may all contribute to a decision to smoke or to resist, their impact is unlikely to be of equal weight across all individuals. Thus in order to provide a firm empirical basis for problem-oriented interventions, we must also know which of these components are most influential in controlling the smoking intentions and behavior of youngsters of differing ages, sex, intellectual ability and ethnic group membership. Most important, key problem-resolution components may also differ depending on the youngster's personal smoking history. In effect, the cognitive considerations that influence the confirmed smoker's decision to smoke another cigarette may be quite different from the factors that enter into the nonsmoker's decision about whether or not to begin smoking at all. Likewise, the dynamics of both of these groups are likely to differ in turn from those of youngsters who have experimented previously with cigarettes, but who have yet to continue the practice. Given the above considerations, the specific purpose of the present study was
twofold: (a) to determine if different expectancies and problem-solving approaches that children characteristically bring to a smoking decision vary as a function of the individual's smoking history, age, sex, intellectual ability, and ethnic group membership; and (b) to determine if any variations in these problem-solving elements influence smoking intentions in such a way as to alter the temptation value of cigarettes, and whether or not these causal dynamics differ depending on smoking-group membership. METHODS Subjects and Procedures The data reported in the present study were gathered in connection with the research and development of a school-based intervention program by the Risk and Youth: Smoking Project (RAY:S) at the University of California at Berkeley (Covington, D’Onofrio, Thier, Schnur, & Omelich, 1983; D’Onofrio, Thier, Schnur, Buchanan, & Omelich, 1982). The project consisted of three interlocking phases: (a) a program of basic research and theory building; (b) the practical implication of these research findings in the development of educational intervention techniques; and (c) the field testing and formal evaluation of these instructional products both in schools and informal community settings. As part of the research program, a smoking risk profile questionnaire was administered to 6,494 students in 51 schools in 12 cities in the great San
Francisco Bay Area. Of these students, 49.2% (3,198) were sixth-graders (11-12 years old); 31.2% (2,025) were eighth-graders (13-14 years); and 19.6% (1,271) were in the tenth grade (15-16 years). The total sample comprised 8.7% Asians, 32.0% Blacks, 8.6% Hispanics, 48.6% Whites, and 2.1% who classified themselves as "Other." This ethnic distribution roughly approximated the population of the San Francisco Bay Area. The 179-item questionnaire was designed to identify the prevalence of smoking and the causes of cigarette uptake, resistance and cessation. The predictor variables included distal antecedents (e.g., family characteristics), proximal antecedents (e.g., peer-group characteristics), beliefs regarding the instrumental value of cigarette use, and the quality of prosocial decision-making skills. One section of the questionnaire presented several brief, life-like scenarios in which youngsters might be tempted to smoke. Each situation depicted temptation in a group setting varied along several dimensions including composition of the group (e.g., best friends versus casual acquaintances) and whether or not others in the group were already smoking. Because the reactions of subjects differ in degree of previous experience with cigarettes have been shown to be little influenced by these variations in circumstances (Covington & Omelich,
1988), all situational variables of interest were combined across scenarios for the present analysis. Criterion Measures All subjects responded to a series of Likert-type rating questions as follows: Temptation. "In this situation, how much would you actually want to smoke?" (1 = not at all; 5 = very much) Intentions. "Do you think you would actually smoke in this situation?" (1 = definitely no; 5 = definitely yes). Problem-solving. Ten theoretically derived scales incorporating 28 items represented the basic problem-solving components thought to mediate smoking intentions (Covington, 1981; Fishbein, 1977; Sutton, 1989). As a group, these ten scales measured: (1) the extent to which youngsters were likely to consider various issues as important in making a smoking choice (3 scales); (2) the degree to which they were likely to entertain various prosocial strategies facilitative of a nonsmoking decision (4 scales); and (3) the extent to which children anticipated various consequences following a decision to smoke (3 scales). Preliminary principal components analyses of the total sample provided empirical validation of the conceptual structure of the 28 items selected to measure these ten problem solving scales. The factor solutions accounted for 55.9% of the variance in the item set concerned with issues, 47.5% for strategies, and 43.0% for consequences. The actual items making up the various scales are available upon
request from the authors. Issues. Three Likert-type scales measured the perceived importance of
affective issues, needs issues and health issues, respectively (item responses: 1 =
not important; 4 = very important). The affective issues scale (range: 3-12)
measured the importance of anticipated affective reactions of one's parents and
peers, and self-reactions to a decision to smoke (M = 9.15, SD = 2.03, a. = .48).
The needs issues scale (range: 4-16) assessed the extent to which the subject
considered needs for affiliation, for appearing mature, and for a sense of inde
pendence as important issues in making a decision about smoking) (M = 9.36,
SD = 2.50, a. = .51). The health issues scale (range: 2-8)
measured whether or
not concerns for potential health risk and addiction were important issues in a
smoking decision (M = 6.93, SD = 1.51, a. = .69).
Strategies. Four Likert-type sales appraised whether or not subjects would
utilize a variety of prosocial, problem-solving skills (item responses: 1 =
definitely no; 5 = definitely yes). A decision-making strategy scale (range: 2-10)
measured whether or not subjects were inclined to reflect on a smoking decision
rather than to act impulsively without deliberating (M = 7.08, SD = 2.61, a. =
.76). An interpersonal strategy scale (range: 5-25)
appraised the subject's
potential repertoire of interpersonal skills for defusing
pressures to smoke (M = 16.99, SD = 4.86, a. = .76). A parent strategy scale (range: 2-10) assessed the degree to which subjects would be likely to seek out and consider parental opinion (M = 6.73, SD = 2.29, a. = .61). A self/peer strategy scale (range: 2-10) reflected a preoccupation with satisfying one's own wishes or those of one's peers in reaching a decision (M = 4.77, SD = 1.92, a. = .21). Consequences. Three Likert-type scales appraised the extent to which subjects anticipated various consequences should they decide to smoke (item responses: 1 = not at all; 5 = very much). The affective consequences scale (range: 3-15) measured the expected degree of parental, peer, and self displeasure should the subject smoke (M = 10.82, SD = 3.06, a. = .61). The needs consequences (scale range: 3-15) indicated whether or not smoking would promote a sense of autonomy, maturity, and belonging for the subject (M = 7.18, SD = 2.78, a. = .37). The health consequences scale (range: 2-10) assessed the degree to which subjects anticipated health problems as a result of smoking (M = 7.37, SD = 2.29, a. = .38). Individual Difference Measures Smoking status. Current smoking status was measured by a single, self report item as follows: "Check the one sentence below that best tells about you": 

"I have never smoked a cigarette (not even a few puffs)";
"I tried one or two cigarettes and never smoked again"; "I smoked for a while, but do not smoke any more"; "I smoke cigarettes regularly." The incidence of cigarette use in the final sample of 3,994 students having a complete data file closely paralleled that found in national self-report surveys of adolescents in the United States (National Institute of Education, 1979). Some 1,804 subjects had never smoked (NS) (N = 1,127, N = 460, and N = 217 at grades 6, 8, and 10, respectively). Among the remaining subjects, three additional groups were differentiated. That group which had smoked only one or two cigarettes (Experimental Smokers; ES); that which had smoked for a while and then quit (Ex-Smokers; XS); and that which smoked regularly at the time of assessment (Regular Smokers; RS). There were 1,256 ES subjects (N = 518, N = 424, N = 314, at grades 6, 8 and 10, respectively); 433 XS subjects (N = 125, N = 180, and N = 128, respectively); and 510 RS subjects (N = 89, N = 235, and N = 177, respectively). While the validity of adolescent self-reports of smoking has been questioned repeatedly, a study by Williams, Eng, Botvin, HiIJ, and Wynder (1979) demonstrated that when assured of anonymity (as was the case in the present research), adolescents do give accurate self-reports of smoking behavior. Additionally, by
applying a bogus-pipeline procedure (Evans, Hansen, & Mittlemark, 1977) to a subsample (N = 193) of our sixth-grade and eighth-grade subjects, we also confirmed the validity of self-report measures. A comparison of this subsample with the main sample without bogus pipeline revealed no significant differences in reported smoking status, p < .05. The reported smoking levels for the main sample and the bogus pipeline subsample were comparable: NS (50.7% versus 54.0%), ES (29.5% versus 27.0%), XS (9.5% versus 9.0%), RS (10.3% versus 10.0%). Sex and grade. Sampling was disproportionately heavier at the lower grades (11-14 years old) to allow for adequate numbers of youngsters with smoking experience (N6 = 1,859, Ng = 1,299, NI0 = 836). Boys (N = 1,949) and girls (N = 2,045) were represented in roughly equal proportions across the three grade levels. Ability. Academic ability was measured by an abbreviated IO-item form of the Comprehensive Test of Basic Skills (CTBS/McGraw Hill, 1973). Three forms, one appropriate to each grade level, were used so that items of increasing difficulty insured maximum discrimination across age. Ethnicity. Subjects were also classified as to ethnic background based on their response to a single, six-category questionnaire item: Asian, Black, Hispanic, Latino, White, and Other. Since the Latino category was used by less
than 1% of the sample, it was combined with the Hispanic category. Also, due to
the undifferentiated nature of the "Other" category, these subjects (2.1%) were
dropped from those analyses involving ethnicity as a factor. Statistical Analysis Between-group differences in
smoking temptation level, smoking intentions, and all problem-solving variables were assessed by separate
3 (Grade) x 2 (Sex) x 2 (Ability) x 4 (Ethnicity) analyses of variance. Preliminary analysis indicated
that the inclusion of Smoking Status in a five-way factorial design produced too
many depleted cells and resulted in no significant interactions with the other indi
vidual difference factors. Accordingly, analysis of smoking-status group differ
ences were investigated through separate one-way analyses of variance. Deter
mination of the specific source of any significant group differences involved the
use of Dunn's multiple-comparison procedures (Kirk, 1968) which permit testing
a specific number of a priori contrasts at a predetermined level of significance
(a = .05). The postulated causal role of the various problem-solving elements
and temptation in determining smoking intentionality were evaluated by a path
analytic interpretation of multiple regression. Path analysis (Pedhazur, 1982)
allows for all determining factors as specified by a causal model to be incorpor
entered into an overall predictive analysis, thereby permitting an estimation of the relative contribution (both direct and indirect) of each determinant to variations in dependent variables of interest. Hypotheses regarding the similarity of these causal relationships for subjects with varying smoking histories were assessed by comparing the differences in magnitude of regression slopes for the relevant groups.

RESULTS AND DISCUSSION Between-Group Differences

Table 1 displays the mean values and standard deviations for smoking intentions and for the ten issue, strategy, and consequence variables by smoking status and grade. A 2 (Sex) x 3 (Grade) x 2 (Ability) x 4 (Ethnicity) analysis of variance was performed on each of the variables shown in Table 1. With the exception of grade level, the impact of these individual difference variables—although significant due to the large sample involved—was marginal in terms of magnitude of explained variance ($R^2$). For this reason, these mean values are not tabled, nor are those for temptation level since these latter results are essentially identical to those found for intentions ($r = .57, P < .05$). Ability. Brighter youngsters found each of the smoking issues, strategies, and consequences, with the exception of the self/peer strategy variables (NS), to be more salient to their thinking about a smoking decision than did less bright
youngsters, all Fs (1,3946) > 3.84, p < .05. However, the
amount of explained
variance $(\hat{\eta}^2)$ accounted for by ability in each dependent
factor was negligible,
accounting on average for less than 1 % of the variance.
The sole exception was
the health consequences variable, for which ability level
explained some 4% of
the variance, $F(1,3946) = 122.79, (\hat{\eta}^2 = .044$. It appears
that brighter youngsters
weigh the health consequences of their actions more
heavily ($N = 7.87$) than do
less bright individuals ($M = 6.93$). Otherwise, however, we
conclude that
problem-solving dispositions are not particularly dependent
on differences in
basic cognitive ability. Nor did variations in ability
influence smoking tempta
tion level $(\hat{\eta}^2 = .00)$ or intentions to smoke $(\hat{\eta}^2 =
.004)$, although the ability
factor proved significant for temptation and intentions,$F(1,3946) = 5.55, 24.24,$
respectively, $p < .05$, owing to the large sample size. One
caution should be
noted, however. The recognition mode of assessment used in
this study may
underrepresent the role of ability in real-life dilemma
resolutions. For example,
had our subjects been assessed under a free-response
format, then ideational flu
ency factors, verbal skills, and analytic reasoning would
have likely become
more salient, thereby increasing the dependency of
responses on ability level.
Table 1
Mean Values and Standard Deviations on Intentions to Smoke and Problem-Solving Skills by Current Smoking Status and Grade

Dependent Smoking Status Grade

<table>
<thead>
<tr>
<th>Variable</th>
<th>NS (1804)</th>
<th>ES (1256)</th>
<th>XS (493)</th>
<th>RS (501)</th>
<th>6 (1059)</th>
<th>8 (1299)</th>
<th>10 (836)</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>1.32</td>
<td>1.72</td>
<td>2.10</td>
<td>3.26</td>
<td>1.63</td>
<td>1.98</td>
<td>1.80</td>
</tr>
<tr>
<td>SD</td>
<td>0.69</td>
<td>1.01</td>
<td>1.31</td>
<td>1.02</td>
<td>1.23</td>
<td>1.18</td>
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Issues

<table>
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<tr>
<th>Variable</th>
<th>NS (1804)</th>
<th>ES (1256)</th>
<th>XS (493)</th>
<th>RS (501)</th>
<th>6 (1059)</th>
<th>8 (1299)</th>
<th>10 (836)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Affective</td>
<td>9.55</td>
<td>9.06</td>
<td>8.67</td>
<td>7.97</td>
<td>9.35</td>
<td>8.99</td>
<td>8.66</td>
</tr>
<tr>
<td>SD</td>
<td>1.95</td>
<td>2.02</td>
<td>1.92</td>
<td>1.99</td>
<td>2.05</td>
<td>2.10</td>
<td></td>
</tr>
</tbody>
</table>

| SD    | 2.01       | 1.96      | 2.02     | 1.92     | 1.99     | 2.05    | 2.15    |

Health | 7.14       | 6.97      | 6.66     | 7.12     | 6.72     | 6.63    | a       |
| SD    | 2.70       | 2.71      | 2.79     | 2.23     | 2.15     | 2.15    |         |

Strategies!

<table>
<thead>
<tr>
<th>Variable</th>
<th>NS (1804)</th>
<th>ES (1256)</th>
<th>XS (493)</th>
<th>RS (501)</th>
<th>6 (1059)</th>
<th>8 (1299)</th>
<th>10 (836)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decision Making</td>
<td>7.40</td>
<td>7.00</td>
<td>6.60</td>
<td>5.88</td>
<td>7.21</td>
<td>6.91</td>
<td>a</td>
</tr>
<tr>
<td>SD</td>
<td>2.71</td>
<td>2.55</td>
<td>2.41</td>
<td>2.32</td>
<td>2.67</td>
<td>2.54</td>
<td>2.64</td>
</tr>
</tbody>
</table>

| Interpersonal | 18.24      | 17.04     | 15.38    | 13.54    | 18.02    | 16.19   | 15.64   |
| SD          | 4.62       | 4.56      | 4.61     | 4.45     | 4.71     | 4.68    | 4.88    |

| Parent | 7.27       | 6.71      | 6.05     | 5.64     | 7.26     | 6.36    | a       |
| SD     | 2.23       | 2.18      | 2.28     | 2.25     | 2.25     | 2.25    | 2.24    |

| Self/peer | 4.39       | 4.89 b    | 5.13 b   | 5.44 a   | 4.47      | 5.00    | a       |
| SD        | 1.87       | 1.91 1.79 | 1.78 1.95 | 1.87 1.86 |         |         |         |

Consequences

<table>
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<tr>
<th>Variable</th>
<th>NS (1804)</th>
<th>ES (1256)</th>
<th>XS (493)</th>
<th>RS (501)</th>
<th>6 (1059)</th>
<th>8 (1299)</th>
<th>10 (836)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Affective</td>
<td>11.02</td>
<td>10.65</td>
<td>9.91</td>
<td>8.17</td>
<td>11.42</td>
<td>10.41</td>
<td>9.90</td>
</tr>
<tr>
<td>SD</td>
<td>2.74</td>
<td>2.01</td>
<td>2.80</td>
<td>2.97</td>
<td>2.06</td>
<td>2.98</td>
<td>3.28</td>
</tr>
</tbody>
</table>

| Needs | 6.92       | 7.23 a    | 7.33 a   | 7.93    | 7.23 7.34 | 6.89    | a       |
| SD    |            |           |          |         | a        |         |         |
Note. Similarly superscripted values (e.g., a, b) are not significantly different (p < .05). NS = Nonsmokers; ES = Experimental Smokers; XS = Ex-Smokers; RS = Regular Smokers. Sex and ethnicity. Like ability, both the sex and ethnic effects were significant, all Fs < 3.84, .05 P < .05, but accounted for only negligible portions of the problem-solving issues, strategies, and consequence factors. Typical $\eta^2$ values were less than .005, especially for the sex effect. One exception was the self/peer strategy category for which ethnic-group membership accounted for approximately 3% of the variance. Several other exceptions occurred for ethnicity, which explained some 2-3% of the variance in problem-solving behavior. For example, it appears that Asians and, to a lesser degree, Whites, were more likely than Blacks to reflect upon the issues involved in a smoking decision (decision making strategy). Moreover, the issues of greater importance to Asians and Whites were the negative reactions of others (affective issues) and the potential health hazards of smoking (health consequences). On the other hand, Hispanics and Blacks were less likely than Asians and Whites to be guided by peer group suggestions for resolving dilemmas (self/peer strategy). Finally, planned pair
wise contrasts performed after the ethnicity effect proved significant for tempta-

tion level and intentions, $F(3,3946) = 14.65, 18.93,$ respectively, indicated that

Asians were less tempted to smoke and consequently had lower intentions to do

so when compared to the other three ethnic categories, $p < .05$. By contrast,

Whites, Blacks, and Hispanics did not differ among themselves with regard to

degree of temptation and intentions to smoke, $p < .05$. In summary, with only the occasional exceptions noted above, variations in

ethnic group membership, ability, and sex proved to be only marginal contrib-

utors to characteristic approaches to smoking dilemmas. Nor were there any sig-

nificant interactions among these group differences that accounted for more than

negligible proportions of variance, all $00 2 < .005$. Thus, regarding the relative

degree of problem-solving responsiveness, we conclude that it makes little differ-

ence if a youngster is male or female, Hispanic or Asian, or bright or less bright. Grade level. Grade level proved to be a consistent, although modest, contrib-

utor to variations in the problem-solving components, as well as variations in

temptation level and intentions, all $F$s$(2,3946) < 3.00, p < .05$. The significance

of all pairwise contrasts is indicated by superscripts in Table 1. Similarly, super-

scripted values were not significantly different from one another ($p < .05$). The
results of pairwise contrasts generally revealed that the younger the child, the more salient were issues concerning affective reactions ($\chi^2 = .020$) and health ($\chi^2 = .026$), and the more likely he or she was to recognize the value of interpersonal strategies for problem resolution ($\chi^2 = .044$) and to seek parental advice (parent strategy: $\chi^2 = .044$) while rejecting peer suggestions and the paths of personal rebelliousness (self/peer strategy: $\chi^2 = .020$). Without such constraints, older students were more likely to be tempted by cigarettes ($\chi^2 = .017$) and to harbor stronger smoking intentions ($\chi^2 = .023$). These age trends were especially pronounced among eighth-grade students who experienced greater temptation and intentionality than either sixth or tenth-graders. Smoking status. The single overwhelming source of individual differences in the saliency of problem-solving components was the current smoking status of the individual (Table 1). Smoking status accounted for some 30% of the variation in intentions to smoke ($F_{3,39461} = 704.73, p < .05; \chi^2 = .299$). A series of pairwise contrasts was performed between all smoking-status groups for each problem-solving factor separately and for both smoking intentions and temptation as well. Not unexpectedly, the four smoking-status groups were all significantly differentiated as to intentions (as seen by the
absence of superscripts), with current smokers reporting greatest degree of intentionality and nonsmokers reporting the lowest (RS > ES > NS, p < .05). Feelings of temptation also depended largely on one’s smoking history, $F(3,3946) = 426.96$, $P < .05$; $\eta^2 = .219$, with the same significant rank ordering by smoking-status category for temptation as was found for intentions. Also, as expected, with the exception of the needs issues category (NS, as indicated by the "A" superscript in Table 1), the smoking status main effect for all problem-solving issues, strategies, and consequences factors proved significant, all $Fs(3,3946) > 2.60$, $P < .05$, $.016 < \eta^2 < .156$.

A series of pairwise contrasts revealed a consistent profile among individuals with different smoking histories. To summarize the data reported in Table 1: With regard to issues, nonsmokers considered health matters and the opinions of others (affective issues) to be of greater relevance in decision making than did all other smoking groups, with health and affective concerns being least salient among regular smokers. Likewise, regarding perceived consequences, nonsmokers were more likely than were all other groups to view cigarette use as a violation of both their self-interest and their expectations of the reactions of others (affective conse
quences), thereby anticipating greater emotional upset if they smoked. Additionally, nonsmokers perceived the use of cigarettes as less likely to result in feelings of maturity and autonomy (needs consequences) and to create greater health hazards than did all other groups (health consequences).

Finally, regarding strategies, nonsmokers were more likely to adopt a thoughtful decision-making mode than were any other groups, with such reflectivity being least in evidence among regular smokers. Moreover, interpersonal strategies involved in the processes of negotiation were more salient among nonsmokers, as well as a willingness to discuss such tactics with their parents (parent strategy). Conversely, regular smokers displayed a greater tendency to follow the advice of their friends and/or respond to their own desires (self/peer strategy). One of the most striking aspects of this overall data pattern was the fact that these reliable differences in social problem solving emerge after only the briefest, casual exposure to cigarettes (NS versus ES groups). Apparently the act of smoking per se, irrespective of amount, duration or frequency of cigarette use, is associated with a subtle yet discernible shift in self and situational perceptions.

This finding corroborates other research that documents the rapid onset of labeling of one's self as a smoker once cigarette use
begins (D'Onofrio, 1983a).

Equally interesting was the fact that self-designated ex-smokers were also reliably differentiated from continuing smokers on several dimensions. It appears that the initiation of smoking as well as its cessation is related to a powerful restructuring of one's perceptions, expectations and actions in tempting situations. The only apparent exceptions to this consistent rank-ordered differentiation (e.g., NS > ES > XS > RS) were: (1) the uniform importance assigned by all groups to the perceived instrumental value of cigarettes for enhancing feelings of autonomy, maturity and affiliation (needs issues); and (2) the fact that the ES, XS, and RS groups, all of whom had been involved to some degree with cigarettes, were largely undifferentiated in their tendency to yield to their friends' wishes (peer strategy) even when (especially for the ES and XS groups) this meant rejecting parental advice. Causal Dynamics Given the above evidence for consistent differences in problem-solving approaches among the various smoking status groups, we can now consider the potential causal role of these various factors in the dynamics of smoking uptake and resistance. As will be recalled, this inquiry was pursued in the context of the causal model presented in Figure 1. In essence, we asked: How substantial is the
causal dependency of smoking intentions on problem-solving factors, and is this

source of variance sufficiently robust to reduce the initially dominant influence of
temptation on intentions? In order to determine the most discriminating set of problem-solving factors,

all ten variables listed in Table I were entered into a preliminary multiple regression analysis using stepwise inclusion criteria with intentions to smoke as the criterion variable. Six significant factors emerged. In descending order of importance these were: affecting consequences ($\beta = -0.272, R^2 = 0.166$); needs consequences ($\beta = 0.136, R^2 = 0.031$); interpersonal strategies ($\beta = -0.118, R^2 = 0.020$); self/peer strategies ($\beta = 0.143, R^2 = 0.019$); health issues ($\beta = -0.109, R^2 = 0.011$) and decision-making strategies ($\beta = -0.050, R^2 = 0.002$).

As a group, these factors accounted for some 24.92% of the variance in intentions to smoke, with the remaining four factors together contributing nothing additional to the prediction equation, $F(4,3816) = 0.559 (p < .05)$. Next, these six problem-solving variables were entered as a block in a hierarchical regression analysis following temptation in the temporally ordered sequence portrayed in Figure I.

By employing a path analytic interpretation, we can assess the direct effects of both the temptation.Salient Issues Anticipated

Consequences Prosocial Strategies
Figure 2 Path diagram of the moderating effects of problem-solving skills on the relationship between temptation and intentions to smoke. All pathways significant, \( p < .05 \). Smoking Temptation Intention to Smoke

intention and the problem-solving-retention linkages, as well as the moderating role of problem-solving elements in altering the temptation-intention relationship (e.g., temptation strategies intentions). The magnitude and direction of the path coefficients associated with each of the presumed causal linkages are presented in Figure 2. All pathways were significant at the \( a = .05 \) level. Inspection of the first column of Table 2 indicates a significant zero-order correlation between temptation and intentions to smoke of .569 (\( p < .05 \)) that decomposes into a direct effect from temptation (\( p = .440, p < .05 \)), and into a total indirect influence moderated through the problem-solving elements of .129.

Among all the mediating problem-solving variables, affective consequences was the most substantial transmitter of temptation, accounting for approximately half (.058) of the total indirect influence on intentions.

Table 2

<table>
<thead>
<tr>
<th>Effect</th>
<th>% Effect</th>
<th>Zero-order correlation (r)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct</td>
<td>.440*</td>
<td>.569*</td>
</tr>
</tbody>
</table>
| Health issues | .019 3.3% Indirect via: Health issues \(.019 3.3%
| Decision-making strategies | .008 1.4% Interpersonal strategies .014 2.5% Self/peer strategies \(.019 3.3%
| Affective consequences | .050 10.2% Needs consequences .011 1.9% Total indirect .129 22.75 Total

Table 2

Decomposition of the Zero-Order Correlation of Temptation Level With the Intention to Smoke Effect \% Effect Zero-order correlation (r) .569* Direct (p)a .440* 77.3% Indirect via: Health issues .019 3.3% Decision-making strategies .008 1.4% Interpersonal strategies .014 2.5% Self/peer strategies .019 3.3% Affective consequences .050 10.2% Needs consequences .011 1.9% Total indirect .129 22.75 Total
Next, consider the direct influence of problem-solving elements on intentions to smoke. Figure 2 indicates that all six components made significant contributions to variations in intentions, irrespective of temptation level, $p < .05$. Thus, for instance, to the extent that health issues were salient to an individual, intentions to smoke were correspondingly reduced ($p = -.089$, $p < .05$). The same inhibiting influence was seen in the presence of decision-making strategies ($p = -.046$), in the possession of interpersonal strategies ($p = -.049$), and to the degree that smoking represents a violation of affiliative bonds (affective consequences) ($p = .180$), $p < .05$. Contrariwise, intentions to smoke increased to the extent smoking was perceived as leading to need-fulfillment regarding autonomy and maturity ($p = .048$) and to the degree that subjects were likely to defy authority and comply with perceived peer group wishes ($p = .096$), $p < .05$. The results of incremental $F$-tests (not tabled) provided an overall summary of this path analysis. As the first predictor variable entered, temptation accounted for some 79.8% ($R^2 = .324$) of the total explained variation in intentions ($R^2 = .406$) through all paths of influence, both direct and indirect, $F(1,4090) = 2230.91$, $P < .01$. The six combined problem-solving sources...
added the

remaining 22.2% of the explained variance (R² = .082),
F(6,4084) = 93.96, P < .01. These results establish not only the importance of the
aggregated problem

solving variables as direct sources of influence on
intentions to smoke in the face

of temptation, but also indicates something of their
indirect role in mediating

temptation. This latter causal source amounted to
approximately one-fifth (R² =

.059) of the explained variance attributable to temptation
(R² = .324). Finally, consider the evidence on whether
or not the elements of problem

solving under investigation contribute equally to smoking
intentions regardless of

the age and smoking history of the individual. As to age
level, pairwise compari

sons of the seven direct effect regression slopes across
the three age levels

revealed essentially identical findings, all t(00) <
1.96, P < .05. Thus, for exam

ple, while the affective consequences of a smoking
decision may be more salient
to younger children (see Table 1), the causal mechanisms
by which such varia
tions in expected parental, peer and self-upset translate
into intentions are no

more evident among 11 to 12-year-olds among older
youngsters. Nor are the

above findings subject to qualification depending on the
individual's smoking

history. Pairwise contrasts between the regression slopes
of all four smoking
status categories for each direct linkage portrayed in Figure 1 revealed no differences in the causal role of any of the problem-solving components in determining smoking intentions, all $t(\infty) < 1.96, p < .05$. For instance, while RS individuals may have less well-developed interpersonal skills to deflect smoking temptation and express greater intentions to smoke (Table I), we conclude from these insignificant comparisons of regression slope that such deficiencies in problem solving approaches exert no greater causal impact on smoking intentions among smokers than among adolescents with little or no smoking experience. Several educational implications emerge from these data. First, according to the empirically confirmed linkages portrayed in Figure 1, any interventions that act to increase the saliency of health issues and the availability of skills in interpersonal, prosocial coping strategies can be expected to decrease smoking intentionality, regardless of the temptation value of a given circumstance. Likewise, any instruction that decreases the tendency toward defiance of authority and the uncritical acceptance of cigarettes as evidence of maturity will also dampen intentions. Moreover, it is possible—although no empirical demonstration is yet available—that interventions might simultaneously act to
alter the magnitude of
causal relationships between the various problem-solving
elements and intention. Thus, for example, in theory, instruction might act to increase the causal importance of various problem-solving elements (e.g., interpersonal skills) for reducing the likelihood of smoking, as well as to raise the absolute level of skill proficiency. In such an instance, instruction would be doubly effective in controlling intentions to smoke. Second, the indirect linkages by which problem-solving components mediate the influence of temptation on intentions (temptation --> problem solving --> intentions) is another prime source for educational interdiction. In effect, by enhancing problem-solving skills, the instructional planner can control a proportion of the variability in intentions that would otherwise be subject totally to the whims of temptation. However, in order to maximize this potential source of control, the inhibitory effects of temptation on the various problem-solving components must be offset, as reflected in Figure 2 (temptation --> problem solving).

For instance, consider the all-too-common human tendency to discount rational, self-interested concerns in the face of temptation and pressure, a tendency which often takes the form of denying and minimizing health risks (Covington &
These dynamics are well illustrated by the behavior of the subjects regarding the health issue variable. In effect, health issues became less salient to the decision-making process as self-perceived temptation increased ($p = -.218, p < .05$). These data underscore the need to teach more than health facts alone since such information is subject to avoidance, minimization and distortion, a process thought to be caused by strong emotional needs including the denial of illness and death (DeLong, 1970). The same distorting influence of temptation can also be seen at work in the suspension of otherwise inhibitory decision making propensities ($p = -.182$), interpersonal strategies ($p = .332$, $p < .05$). Educationally speaking, one reasonable intervention strategy is to enhance the saliency of problem-solving considerations as a direct, inhibitory influence on intentions to smoke, and simultaneously to reduce the distorting effects of temptation on rational, problem-solving considerations. At the same time, those mechanisms associated with temptation that lead to increased perceptions of the utility of smoking (need fulfillment; $p = .229$, $p < .05$) and to a greater willingness to abide by perceived peer wishes (peer orientation; $p = .195$, $P < .05$) must also be made targets of special corrective treatment.

GENERAL DISCUSSION

The overall results of this study offer support for the view that a social
problem-solving orientation represents a potentially viable approach to anti-smoking intervention. First, not only did various problem-solving elements such as perceived issues, prosocial strategies and expected consequences influence intentions to smoke in their own right, but they also acted to offset the considerable impact of temptation as a primary cause of smoking uptake. Second, this problem-solving dynamic appeared to operate in essentially the same fashion for smokers and nonsmokers alike, a parallelism that suggests the broad applicability of such an approach whether the educational goal is that of smoking prevention or cessation. A further implication to be drawn from these data is that to be most effective, strategies for intervention must not focus solely on health issues, but must also address the need of young people to satisfy naturally occurring motives of personal/social significance. If instruction remains solely at the level of health facts, then educators will be forced to rely heavily on the child's will-power and sometimes on poorly developed cognitive controls to motivate a nonsmoking decision. Although the health issues factor in this study made a distinct impact on smoking intentions, and while smokers appeared disproportionately disposed to reject health facts, health issues nonetheless were a relatively minor causal factor.
source when compared to other factors such as anticipated affective consequences. This is not to suggest that health facts are unimportant or irrelevant, but only that they must be placed in proper perspective as only one of several promising foci for intervention. How, then, can the role of problem solving be best conceptualized without underemphasizing the role of health facts and in ways that are suggestible of specific types of intervention activities? An overall organizing principle is strongly suggested by the present data: informed self-interest. Concern for the social and personal consequences of smoking emerged as a major predictor of intentionality for both smokers and nonsmokers. Inspection of the items that make up the affective consequences factor in the principal components analysis used to derive the scales in this study indicates that concern for one's self-image has the highest factor loading (.765), followed by concern for parental reactions (.643) and peer reactions (.597) to one's smoking. In this context, self-interest involves the potential violation of self-integrity by actions that are inconsistent with one's ideal self as well as the need to maintain family harmony and yet to maximize peer acceptance. These are the problem elements that must be balanced if the child is to avoid smoking. For nonsmokers these elements
are compatible with
the child's self-expectations, as well as with those of
his or her family and peers.

By comparison, most smokers suffer a sense of misalignment
regarding smoking
values. Their parents' advice is often at odds with
prevailing peer values and with
their own emerging perceptions of self. This conflict may
range in emotional tone
from feeling mildly frustrated to an expression of outright
antagonism toward
parents, if we are to judge from the data. The behavior of
the peer strategy factor
underscores this point. Not only do many smokers discount
parental values, but
for some this amounts to an outright rejection in favor of
anarchistic freedom
(e.g., "I'll do what I like, after all it's my life").
Such a conflict makes it all the
more difficult to disentangle health issues from their
emotional overlay. When
intrafamily stress is combined with a greater acceptance
of smoking among one's
peers, and with compelling, if false, beliefs about the
instrumentality of smoking,
then the scales are tipped decidedly in favor of a decision
to smoke. This analysis suggests that successful
anti-smoking intervention should
involve at least three kinds of problem-solving training.
First, it is important to
enhance the capacity of youngsters to identify the
essential issues of self-interest
that arise in any smoking-related decision including: (a)
self-consistency and
valued self-image; (b) the desirability of harmonious relations with parents;

(c) the need to maintain positive peer relationships; and (d) the necessity of continued health maintenance. A second intervention focus strongly implied by the significant interpersonal strategies factor in this study is to provide youngsters with repeated practice in generating resolutions to tempting situations that balance each of these self-interest elements. Or, as young students best understand the task, "What can I do to keep my friends, feel good about myself, get along with my parents—all with out smoking?" The item content of the interpersonal strategy factor suggests some of the specific skills that such dilemma resolutions might embody: "Do something so that others do not feel they have to smoke"; "Talk about my decision so that everyone will still be friends no matter what the others do"; and "Try to talk the others out of smoking." In this connection one fruitful direction for effective decision-resolution training might involve practice in establishing a cost/benefits hierarchy; in effect, helping children determine which resolutions are better or worse given all the likely consequences of each. A third problem-solving focus implied by the present study is to dismantle health rationalizations that tend to discount the risk of smoking especially when
temptation is great. Some evidence (Covington, 1981) suggests that youngsters often smoke without explicit intentions to do so and without any particular thought given to it (i.e., simply because the cigarettes are available). In cases like this, when there is no intention to smoke it seems unreasonable from the adolescent point of view that they should suffer negative health consequences. The responsibility for smoking behavior is either attributed to others (e.g., “the group made me do it”) or is compartmentalized away from intentions (Covington & Omelich, in press). Needless to say, dealing with this form of denial is a complex challenge, especially among children whose sense of future is typically compressed and may be dominated by prelogical thought patterns that stress magical, unrealistic thinking. In this connection, one promising instructional approach is the use of probability games designed to simulate those real-life factors that affect the youngsters’ (players’) acceptance or rejection of smoking risks. Such simulations might involve a sequential series of life transitions in which the decision to smoke in an early round of play (in order to gain peer-group acceptance in the teenage years) puts the player at a handicap in future rounds (as an adult) when the objective is now to establish financial independence, a task made un
certain by increased health risks, ineligibility for certain jobs, and unexpected medical expenses. Here delayed cause-and-effect dynamics can be discovered and the implications understood by the early adolescent, all without preaching.


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V. Self-Efficacy, Physical Symptoms, and Rehabilitation of Chronic Disease


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PERCEIVED SELF-EFFICACY IN SELF-MANAGEMENT OF CHRONIC DISEASE Halsted Holman and Kate Lorig

Chronic disease, now the most prevalent form of disease in the United States, differs from acute disease in many ways. One of the most important is the potential for self-management by patients. Appropriate self-management is based upon a partnership between the patient and health professionals in which each takes responsibility for portions of the management. For patients, this requires learning new skills and assuming new responsibilities. Growing evidence indicates that perceived self-efficacy to cope with the consequences of chronic disease is an essential contributor to developing self-management capabilities, and that perceived self-efficacy can be rapidly enhanced by appropriate learning experiences. Thus perceived self-efficacy is an important personal attribute in the maintenance of health. Enhancing perceived self-efficacy should be an important ingredient of the provision of health care.

The central thesis of this chapter holds that, in the presence of a chronic disease,

many types of self-management practices are both feasible and beneficial, and

that perceived self-efficacy to execute those practices and to manage the consequences of the disease improves the outcomes greatly. In order to explain and substantiate the thesis, we must make clear each of the component concepts.

Therefore this chapter is organized into sections which define and discuss (1) the nature of chronic disease and its management (2) characteristics of self-management and (3) the interactions among self-efficacy, self-management and that the reader can explore the subject more fully.

However, this chapter is not a comprehensive review. It presents conceptual approaches, citing supporting
Chronic disease has become the most prevalent form of disease in the United States (Rice & Feldman, 1983; Verbrugge, 1984). It is the principal source of disability and a major cause of escalating health care expenditures (Colvez & Blanchet, 1981). Because the prevalence of chronic disease increases with age, the aging of the population has contributed to increases in prevalence. However, in recent years, the prevalence of chronic disease has increased for virtually every age group in the population (Rice & LaPlante, 1988). While chronic disease typically arises spontaneously, it can also be created by contemporary treatment of acute illness. For example, modern treatment of an acute heart attack which previously would be fatal can now result in an individual with chronic heart disease. Usually, chronic disease cannot be cured. It must be managed over time. Treatment may correct certain biological abnormalities, can ameliorate some consequences of chronic disease, and may prevent overall deterioration, but it does not terminate the disease. Commonly it is not possible to predict accurately what effect a particular treatment or management technique will have.

The effect may be beneficial, neutral or even harmful; usually only a trial of
Treatment will reveal the effects. The intensity of a chronic disease typically fluctuates of its own accord. That is, the disease process is not relentless but rather has periods of greater and lesser severity. Treatment influences the fluctuations, usually for the better. However, if a treatment has an adverse effect, an additional medical problem is actually created by the management effort. The chronicity of a disease creates problems beyond the specific consequences of the particular biological abnormality (e.g., the symptoms such as thirst and urination due to high blood sugar in diabetes or pain and reduced exercise tolerance due to reduced blood supply from hardening of the arteries in arteriosclerosis). The additional consequences are also a result of the disease and its treatment, and fall in many categories: fatigue, depression, unfavorable employment and financial circumstances, reduced social activities, family conflict. At times, these additional consequences react back on the disease process to make matters worse. Examples would be the emotional refusal of a diabetic to secure an appropriate diet with resultant worsening of the diabetes, or the financial inability of a physically handicapped person to obtain appropriate physical rehabilitation with resultant worsening of the handicap. It is common to refer to the biological
abnormalities of a disease as the disease process and the composite of that disease process and all of its consequences as an illness. Thus a chronic illness has many components and these components can interact with one another to worsen or lessen the total illness effect. Many illness attributes are common across chronic diseases. That is, while the underlying biological abnormalities of chronic diseases may be quite distinct, the illness components such as those mentioned above, and their potential interactions, have many similarities. Therefore, it is appropriate to examine chronic diseases as a group, seeking common themes in both their manifestations and their management. A useful first step in understanding chronic diseases is recognition that they are different from acute diseases. Table 1 enumerates some of the distinctions.

For example, acute diseases usually result from identifiable, abrupt and potentially reversible specific events (e.g., infection, injury, blood vessel rupture or occlusion). By contrast, initiating events for most chronic diseases are obscure. The disease processes appear to emerge over time from protracted interaction among environmental, genetic and behavioral risk factors. Once established, chronic disease may be further altered by interactions among the disease process and its consequences (see above).
Table I
Disease Characteristics

Onset
Duration
Cause
Diagnosis and prognosis
Technological intervention
Outcome
Uncertainty

Knowledge Acute Disease Abrupt Limited Usually single cause Commonly accurate Usually effective (laboratory testing, imaging, medication, surgery) Cure likely with return to normal health Minimal Profession knowledgeable; laity inexperienced Chronic Disease/ Illness Commonly gradual Lengthy; indefinite Multivariate causation of both disease and illness, changing over time Diagnosis often uncertain; prognosis obscure Commonly indecisive; adverse effects frequent No cure; management over time necessary Pervasive Profession and laity partially and reciprocally knowledgeable For purposes of this chapter, the most relevant difference between acute and chronic disease lies in the role of the patient and family, particularly in relation to management. For acute diseases, the patients are usually inexperienced and are dependent upon health professionals for knowledge, decisions and therapy. With chronic illness, however, the patient commonly becomes the most knowledgeable person concerning both consequences of disease and effects
of therapy. At times, the physician is dependent upon the patient even for decisions in changing the medical management. For instance, patients are often best equipped to sense the effect of changes in medication dose, to perceive the relevance of a particular management maneuver to the state of the illness, and to decide to persevere in the face of sub-optimal treatment outcomes. Appropriate management of chronic disease requires development of a partnership between the patient and the physician. Patients, families and physicians come to the relationship created by chronic disease with widely different backgrounds, levels and types of understanding, and suppositions. Patients initially have almost no experience with chronic disease, are beset by fears, and conceptualize the illness through a variety of cultural and metaphorical understandings. Within these understandings, symptoms may have different individual and symbolic meanings. For example, pain may be viewed as a routine manifestation of disease, or as a symbol of worsening and reason for pessimism, or even as a punishment. Understandings of the symbo
isms create explanatory models for the patient about his or her circumstances and fate. Thus patients with the same diseases may have strikingly different ill
ness patterns and explanatory models (Lewis & Daltroy, 1990). Further, patients commonly seek certainty in explanation, prognoses and treatment. Physicians, on the other hand, generally share a biologically-based explanatory model and related treatment methods. While familiar with wide variation in illness patterns and responses to therapy, and hence with uncertainty, they tend to disregard that which is outside their explanatory model. The views of the patient and the physician affect the mood of each, the willingness of each to act, and the types of actions taken. Effective management of chronic disease requires building a partnership based on merged understandings and actions, a process which requires inquiry, interpretation, learning and negotiation. Gradually, as experience with the chronic disease grows, patients' understanding of their particular circumstances grows. This growth of understanding includes not only the physical effects of the disease and treatment but also the consequences in all of the affected aspects of living. Further, the patient and family learn what can be done to ameliorate undesirable consequences through such steps as modification of life styles and living routines, use of rehabilitation and assistive devices, and drawing upon community resources. Characteristics of Self-Management Historically, in the health field, there have been two general lineages from
which contemporary self-management arose: medical therapy and public health practices. Long before the days of medical professionalism, individuals and families engaged in various forms of treatment and/or management of their health problems (Starr, 1982). Similarly, there is a long tradition of community action to protect public health such as improving water and food supplies, providing appropriate housing, and specifying behavior such as quarantine and immunization to prevent spread of disease. In the present era of predominant chronic disease, these traditions tend to modify and meld, creating new roles for both patients and health professionals. The new roles are exemplified by the goal of partnership. In our view, the patient's role is to engage in the maximum feasible self-management; the health professional's role is to develop and facilitate that self-management, teaching and providing expert knowledge. Self-management means having, or being able to obtain, the skills and resources necessary to best accommodate to the chronic disease and its consequences (Holroyd & Creer, 1986). The skills and resources are both general across chronic diseases and specific to particular diseases. Because chronic diseases and illnesses are unpredictable and may fluctuate even on a day-to-day basis, they often must be "managed" on a daily basis.
Appropriate management arises in the collaborative partnership of patients with health professionals, and collaboration distinguishes self-management from self-help and twelve-step programs which are fundamentally conducted by patients without the participation of health professionals. Understanding self-management of chronic diseases requires knowledge of the chronic disease, the relevant self-management practices and the relationship between self-management and professional medical management. The scope of this knowledge has been only partially sketched by the foregoing discussion. It is useful to look more closely at characteristics of chronic diseases in order to specify the role of self-management.

Identifying the Illness Course and Management Effects
Chronic diseases and their resulting chronic illnesses typically fluctuate in intensity over time, both spontaneously and in response to therapies. Because there is no cure, these fluctuations continue indefinitely. Appropriate management requires appropriate responses to these fluctuations: increased disease intensity usually requires increased treatment intensity while the opposite is true when the disease becomes less active. Figure 1 depicts this hypothetical course of fluctuating disease intensity. Points A, B, and C represent the
same disease intensity. However, Point A reflects a time when the disease trend is worsening and the appropriate response would usually be to intensify or change therapy. Point B represents an improving trend in the disease with a likely lesser need for therapy. Point C represents a disease activity plateau in which the minimum therapy necessary to maintain the stable situation would probably be appropriate. The central requirement in interpreting such situations is accurate identification of the disease trend as reflected by the arrows. But knowing the trend alone is not sufficient. The tempo or speed along the trend is also essential. Is the disease worsening rapidly or slowly? How quickly must one react? How rapidly must the treatment take effect? In Figure 1, the tempo is depicted by the slope or steepness of the curve. In both medical emergencies and chronic disease, trend and tempo are essential in assessing a patient’s state; in emergencies they are compressed into minutes or hours while in chronic disease they play out over days, weeks and months. However, the situation is not as simple as depicted in Figure 1. Because the disease process and the various components of the resulting illness all fluctuate over time, Figure 2 is a truer representation of the clinical setting in which signs and symptoms oscillate appreciably around the true course of the disease and/or
illness. Sometimes, those oscillations may be so extreme as to suggest a trend.

Figure 1 Severity Tim.

Figure 2

opposite to the true one. Also, the trends of the disease and the illness may not move in parallel; that is, a disease may be improving or stable but a particular illness component may worsen. An example could be pain in chronic arthritis. The intensity of pain, a major consequence of arthritis, can vary with a person's emotional state; pain can worsen with emotional distress and lessen when a person is emotionally tranquil. Thus, though the arthritis may be stable, external emotional circumstances can aggravate a primary symptom of arthritis. If the proper cause of the increased pain is not identified and addressed, treatment could be wrong.

The result could be lack of benefit and adverse treatment effects. Thus it is not only essential that trends in disease and illness be identified but that oscillations around the true trend be accurately interpreted. This usually requires, in addition to diagnostic perceptiveness, observation over time in order to understand the meaning of trends in sign and symptoms. Sometimes the interpretation is assisted by diagnostic tests but commonly with chronic diseases and illness, appropriate use of time is all that is necessary to interpret.
physical signs and symptoms

and thus to identify the trend and tempo. Indeed, when used wisely, time can be

the most accurate, most available and least expensive tool for the management of

current disease. A B C Time The discussion of Figures 1 and 2 reveals two of the most crucial attributes of good management of chronic disease and illness, namely, the identification of trends and tempo, and the wise use of time to accomplish that identification.

These two attributes of sound management provide the conceptual base for self management of chronic disease. While the physician and other health professionals are most knowledgeable about the biology of the disease and the principal treatment methods, the patient and the family are usually in the best position to identify the impact of the disease and treatment on the individual, and to interpret changes in the impact. Particularly if the patient develops understanding of (1) the nature of the disease, (2) the ways to interpret signs and symptoms, (3) the types of treatments and management procedures which are available, and also learns (4) to execute those aspects of management which can be done personally, a true partnership can emerge.

Basic Self-Management Skills In addition to learning about the nature of chronic disease and illness, and about medical management, there are seven basic areas of
skill which are central
to those aspects of management which can be done personally. These are

(1) minimizing or overcoming physical debility, (2) establishing realistic expec
tations and emotional responses to the vicissitudes of the illness, (3) interpreting

and managing symptoms (4) learning how to judge the effects of medications and

manage their use (5) becoming adept at ways to solve problems as they arise,

(6) communicating with health professionals and (7) using community resources
to advantage. Each will be discussed in sequence. 1. In the presence of chronic disease, physical deconditioning can result from

many causes: the disease itself (as when muscles or joints are affected), reduced

activity (as when bedridden, handicapped or short of breath), treatment (as when

using drugs which affect muscle strength like cortisone), and poor nutrition.

Furthermore, the deconditioning creates its own symptoms in that, when used,
deconditioned muscles, joints and tendons can cause pain and accentuate fatigue.

The latter consequences are similar to those experienced by a deconditioned

athlete who resumes training. Maintaining the maximum possible physical fitness

is therefore a cardinal goal in management of any chronic disease. Most people

with chronic diseases are benefitted by exercise and most can establish exercise
programs that are within their tolerance and which lead to maintaining or improv

ing physical capability. Such programs are often aided by simple pain reducing

mechanisms such as the use of heat, mild analgesics like aspirin and cognitive

pain control methods. Physical activity and stamina are also aided by assuring

appropriate nutrition and sleep, both of which can be achieved by various physi

cal, cognitive and medical strategies. 2. Achieving appropriate expectations and new emotional adjustments can be

the most important changes to be made by a patient with chronic disease.

Patients with chronic illness often find themselves unable to relieve persistent

symptoms and unable to participate in desired activities. Simultaneously they are

often faced with uncertainty in diagnosis and prognosis. For many, this uncer

tainty extends, through the fluctuations in illness intensity, to their lives from day
to day. Planning becomes difficult; loss of work, of social activities and of social

support systems may occur. In such a setting, patients may develop a sense of

helplessness and depression. Health professionals can help in various ways but much of an appropriate

response lies within the realm of self-management. It is particularly helpful for

patients to learn what is known and is not known about both the disease and its
therapy. This allows the patient to place himself/herself in the context of prevailing knowledge. Understanding that context aids in accommodating to uncertainty in a variety of ways: knowing that appropriate steps are being taken; identifying other patients with similar problems whose experiences can be helpful; learning particular activities which prevent or compensate for consequences of the disease; learning how to confront most effectively a new problem from the illness or its therapy. Activities in each of these categories can be very specific, for example, minimizing pain by cognitive techniques, maximizing mobility by use of appropriate assist devices, reducing fatigue by both exercise and rectifying sleep disturbances, building new friendships with persons with similar difficulties. Such approaches can be generally summarized under the headings of learning to function effectively and pleasurefully within the limits imposed by the disease while simultaneously taking actions to expand those limits. As a patient's repertoire of skills grows the distress of uncertainty declines because of a rising capacity to confront the variations which the disease creates. 3. The most obvious effect of a chronic disease is a symptom: pain, fatigue, breathlessness, nausea. The disease may directly cause the symptom, or the symptom may be caused by a behavior such as exertion or by
an emotional upset,
or the symptom might arise from an error in medication dose
or from an adverse
effect of a drug. With chronic disease, patients often
become quite adept at inter
preting their symptoms. This skill is essential to
identifying appropriate action
and avoiding useless or harmful treatment changes. Often,
when there is uncer
tainty about symptom interpretation, a brief observation
period or a slight treat
ment change followed by observation will provide the
answer. 4. Most management of chronic disease includes the
use of medications. The
medications are not intended as a cure but rather as a
means of diminishing the
intensity of the disease or alleviating some of its
consequences. It is almost
always the responsibility of the patient or the family to
administer the treatment
on a day to day basis. Skills involved in medication
self-management include
those which assist in complying with the regimen and in
interpreting the effects
of the medication, in particular recognizing adverse
effects. When a new or
unanticipated event arises, the patient must be prepared to
describe and interpret
the event, to seek medical advice, and potentially to
alter the treatment program.

Patients can readily develop these skills but, to do so,
they must learn about
medications and their effects, and monitor their own
experiences carefully. 5. Problem solving is a major
self-management skill. One cannot predict in advance the problems which an individual patient will face. These can range from the discomforts and disabilities of the illness to inability to pay for health care, to the need to change a residence, or to difficulties in a marriage. Success in dealing with new adverse situations greatly influences how a patient accommodates to and manages an illness. Problem solving with chronic disease is similar to that of virtually any other situation. It includes defining the problem, identifying alternative solutions, choosing a solution to be tried, monitoring the results of the trial, and testing alternative solutions if desirable. While it is impossible to teach patients all potential solutions, it is possible to teach them the generic skills for finding those solutions. This involves teaching general problem solving skills rather than solving of specific problems. Though initially inexperienced at resolving medical problems, patients commonly become expert in knowledge of their disease generally. Building this knowledge into an understanding of how medical problems are solved, and providing access to appropriate consultation or supervision, allows the patient’s common sense skills in problem solving to be applied in a new area. 6. Health professionals are the most common consultants used by people with chronic illness. Unfortunately, all too often, care for chronic disease is provided
like care for acute disease: Health professionals solve the problems for a passive patient; patients are neither encouraged nor assisted to solve problems independently. For the partnership necessary for the best possible outcome from chronic disease, patients need at least two essential skills. First, the patient must know when to seek advice, how to describe symptoms and how to identify the trends and tempo of the disease. Second, patients must be able and willing to express concerns and to negotiate with health professionals concerning the next action. Often this means questioning the physician, and accepting or rejecting treatment options. For their part, physicians must encourage development of these skills by the patient and must be willing to enter into a partnership. When both parties develop these skills, a process emerges which is both efficient and satisfying. 7. Identification and use of resources beyond those which are personal or are provided by health professionals is the final general self-management skill. Problems caused by chronic illness are often soluble only outside the health care system. These include, but are not limited to, use of exercise facilities and programs and use of special educational opportunities such as libraries, community colleges and special education programs. Community groups may be invaluable such as...
senior citizen centers and organizations for people with particular diseases. At times, Meals-on-Wheels and Friendly Visitors can be particularly helpful.

Prevention Prevention of disease is commonly perceived in terms of direct prevention such as sanitation, immunization, avoidance of substance abuse and wearing seatbelts. This is called primary prevention. There are two other types of prevention, secondary and tertiary. Secondary prevention involves avoiding a disease once a risk factor is present. Examples include modifying a diet when a blood cholesterol level is high or reducing weight and salt intake when blood pressure is elevated. Tertiary prevention involves preventing loss of independent function once a disease is present. Examples include maintaining general physical strength and stamina in the presence of disease, use of specific breathing patterns to improve oxygenation in lung disease and elimination of household obstacles over which one might fall when physically handicapped. In the presence of chronic disease, secondary and tertiary prevention are particularly important. Some of the appropriate practices can be learned from health professionals while others entail the use of common sense in confronting the issues which arise in daily life. Prevention practices designed to minimize the consequences of chronic disease and maintain independent
living illustrate the convergence of classical medical and public health principles to create the most effective management program for the patient and the family. The afore-mentioned components of self-management-understanding and interpreting disease and illness patterns, using specific self-management practices and applying prevention principles-apply generally across chronic diseases. As well, there are disease specific aspects of self-management which must be inte grated with the general skills. These include particular medications and specific activities such as pursed-lip breathing, controlled coughing and respiratory exer cises for chronic lung disease, diets for heart disease and special exercise for arthritis. Such disease-specific activities are determined together with the physi cian or other health professionals. Once learned, they fit well with general self management skills. The Relevance of Perceived Self-Efficacy to Self-Management and Health Outcomes in Chronic Disease For patients to engage in effective self-management, a number of pre conditions are important. The first is an understanding of the appropriateness and value of the self-management activity. This understanding flows from recog nition of the nature of chronic illness and the complementary roles of patients, families and health professionals in management over time. The second precon
dition is the development of skills and confidence on the part of the patient concerning the specific, useful self-management practices. This is a matter of learning, practicing and evaluating the personal benefits derived from particular self-management practices. The third precondition, highly desirable but often absent, is a health care service which encourages and coordinates with self-management, preferably together with a social network which supports and facilitates self-management behaviors. The desired preconditions generally fall outside of the classical biomedical model of health care in which the relatively passive patient is attended by the all-knowing physician. Instead, the pre-conditions fall far better under the biopsychosocial model of health and health care in which biology, knowledge, treatment, beliefs, emotions and socioeconomic circumstances interact to determine health outcomes (Engel, 1977). For instance, cognitive and motivational factors have long been recognized as influencing the level of functioning of patients with chronic disability; witness, for example, the severely deformed person with rheumatoid arthritis who leads an independent and satisfying life compared to persons with mild forms of the same disease who remain despondent and functionally incapacitated. Of
special relevance to self-management is the impact on health status of people's beliefs in their efficacy to exercise some control over conditions that affect their lives (Bandura, 1986). A growing body of research has identified various processes---cognitive, motivational, affective and physiological---through which self-beliefs of efficacy exert their effects. Perceived self-efficacy influences what people choose to do, their motivation, their perseverance in the face of difficulty, the self-enhancing or self-hindering nature of their thought patterns, and their vulnerability to stress and depression. Indeed, people's beliefs in their personal efficacy have been found to influence outcomes in a number of acute and chronic illnesses, including the level of benefit they receive from therapeutic interventions. Thus perceived self-efficacy provides a linking mechanism between psychosocial factors and functional status. Beliefs in personal efficacy can be strengthened in four principal ways (Bandura, 1986). The most powerful relies on guided mastery experiences that build coping capabilities. In essence, this involves learning and practicing the appropriate behaviors. This is best done by breaking the desired behavior into small, graded tasks which can be accomplished in a relatively short time. Feedback is important so that patients can see progress. Once a
component task is accomplished, another is added until the whole behavior is achieved. Thus, a patient may start a walking program by walking one block four times a week. Gradually blocks are added until the ultimate goal of walking a mile four times weekly is achieved. The second approach to building personal efficacy draws upon the power of social modeling to convey skills and a coping orientation. This is the experience of observing others exercise the skills and gain the benefits. When using models in teaching it is important that the models be as much like patients as possible. If a 60-year-old patient with osteoarthritis is attempting to learn exercise, the model should also be an older person experiencing problems with arthritis. Prominent persons and young models leading exercise programs do not serve as good examples for persons unlike them. There are two general types of models for persons suffering a handicap. Supermodels are those who have reached some great achievement in the face of much adversity. An example is the young cancer patient who walks across the country with an artificial limb. While such models are inspirational, they do little for enhancing efficacy because people don't believe they can come close to a similar achievement. Coping models are people.
who have a problem but cope with it on a day-to-day basis. They have good and bad days, but on the whole, are able to lead full and active lives. These models enhance efficacy because patients are able to relate realistically to them. Social persuasion provides a third type of efficacy enhancing influence; successful efficacy builders do more than convey positive approaches, they also design and explain activities for others in ways that bring success. Effective persuasion usually involves urging learners to do just a little more than they are presently doing. For instance, instead of urging a patient to lose 40 pounds, it is better to urge them to lose a pound this week. The goal is realistic and can be seen by the patient as reasonable. In building self-efficacy, success leads to success. The final mode of influence is aimed at reducing aversive physiological reactions or interpreting them in less pathological ways. An example of the former for a person with chronic lung disease would be learning how to accomplish a desired physical activity without undesirable shortness of breath, perhaps through use of assisting devices; an example of the latter for a person with arthritis or heart disease would be recognizing that the appearance of pain does not commonly mean worsening disease. Perceived self-efficacy is specific to particular activities. That is, one can feel efficacious for walking on a level surface but not for mounting many stairs.
Therefore, just as the appropriate self-management activities result from the particular consequences of the chronic illness for a given individual, so the development of perceived self-efficacy must relate to those particular self-management activities. With this background, it is pertinent to review some recent evidence which supports a mediating role for perceived self-efficacy in the response to, and treatment of, chronic diseases. Historically, one of the first applications of self-efficacy concepts occurred in the treatment of phobias (Bandura, 1986). An example is snake phobias which prevent individuals from walking in fields or other places where they fear snakes might lurk. Rapid and successful ways of curing established phobias were devised using different combinations of the four principal ways mentioned above to modify the patient's perceived self-efficacy. Since then, measures to enhance perceived self-efficacy have been applied with very salutary effects in a number of disease settings, some which are discussed elsewhere in this book. These settings include recovery from heart attacks, improvement of lung function in chronic pulmonary disease, pain reduction in a variety of settings such as headaches and child birth, changing eating and exercise patterns (Bandura, 1991). In all these settings, patients and their
families have learned new practices and behaviors which minimize or eliminate dysfunction and discomfort. We shall illustrate the application of self-efficacy principles and practices to chronic disease through a brief recounting of their use in patients with chronic arthritis. Chronic arthritis limits the mobility of joints and ultimately the strength of muscles and tendons which move those joints. One of the principles of good medical management is exercise to retain or improve mobility and strength. Such exercise is frequently painful and it is common for patients to imagine that exercise will make the joint disease worse. Good management therefore involves not only illustrating the appropriate exercises but also aiding the patient to understand that, despite the pain, exercise is beneficial and that as strength improves pain will decline. Some years ago, we decided that a health education program about exercise and other aspects of management for chronic arthritis would be beneficial to groups of patients. A program called the Arthritis Self-Management Program (ASMP) was designed to cover, in six two-hour sessions, such subjects as: current understanding of the nature of arthritis, present therapies and how they are used, interpretation of symptoms, communication with physicians and other health professionals, self-management skills such as exercise and cognitive
pain control, and marshalling of community resources. The program was tested in randomized, prospective studies, the results of which showed that, compared to control persons, participants in the ASMP experienced significant reductions in pain, less depression, increased social and physical activities and decreased use of physician services (Lorig, Lubeck, Kraines, Seleznick & Holman, 1985). The pain reductions were 15 to 20% from baseline levels which is similar to that achieved by the milder medications used for arthritis. In order to understand the true effects of the ASMP, it was important to know whether the people who improved were those who learned the most and practiced what was taught most frequently. Because of large numbers of participants, it was possible to correlate health outcomes with knowledge gained and reported use of the self-management practices which were taught. Surprisingly, the results showed very little correlation: the best was 0.14 between exercise and pain reduction (Lorig, Seleznick, Lubeck, Ung, Chastain, & Holman, 1989). In order to understand this unexpected turn, structured and open-ended interviews were conducted with ASMP participants. The results revealed a fairly consistent pattern: Persons who did well in ASMP generally did not believe that their chronic ar
Arthritis had irretrievably damaged their lives and believed that they could do things to improve matters; persons who did not do well had opposite views (Lenker, Lorig, & Gallagher, 1984). These findings suggested that patients' perceived self-efficacy to cope with the consequences of arthritis was mediating the outcomes of ASMP. An instrument (see Appendix) was therefore designed to measure such perceived self-efficacy. In four months following start of the ASMP, perceived self-efficacy grew 10% to 15%. Further, whereas the highest correlation between health outcomes and either knowledge gain or practice of taught behaviors had been 0.14, as seen in Table 2, the correlations of perceived self-efficacy with health outcome scores were much higher (Lorig, Chastain, Ung, Shoor & Holman, 1989). As a consequence, the content of ASMP was modified to emphasize efficacy enhancing activities. Subsequent outcomes of the new ASMP were improved over those of the initial version (Table 3). Recently, it has been possible to study two groups of persons four years after taking ASMP who had not experienced any organized educational intervention in the interim. Again surprisingly, as seen in Table 4, the beneficial effects had either persisted or increased. Pain remained reduced by approximately 20% and visits to physicians were reduced by approximately 40%.
Both of the latter results occurred despite a modest increase in physical disability. During the four years, perceived self-efficacy to cope with the consequences of arthritis as measured by the final version of the instrument had grown by an average of 29% (Holman, Mazonson, & Lorig, 1989).

Table 2

Associations Between Self-Efficacy and Health Status at Four Months After Start of the Arthritis Self-Management Program (ASMP) Pain Depression

<table>
<thead>
<tr>
<th>Self-efficacy for pain</th>
<th>Self-efficacy for other symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>-0.39 <strong>a</strong></td>
<td>-0.45</td>
</tr>
<tr>
<td>-0.47</td>
<td>-0.59</td>
</tr>
</tbody>
</table>

Note. **a** Pearson correlations for combined data from 144 persons (49 from control group and 95 from ASMP). All correlations significantly different from zero (p < 0.01). Because of the persistent decline in use of physician services over the four years, it was possible to estimate cost savings which accrued from the lesser dependence on medical care. Taking into account the costs of providing the course and discounting the dollar value at 6% annually, it was calculated that the net four-year savings per participant with osteoarthritis were approximately $190.00 and the net savings per patient with rheumatoid arthritis were almost $650.00. Multiplying these savings by 1% of individuals suffering those two diseases identifies potential savings approximating $32,000,000 in four years if only that small portion of patients participated in the
ASMP (or similar program)

and achieved the same results as have been found in the initial studies. The health benefits for patients with chronic arthritis described thus far have been in the subjective (pain, depression) and behavioral (activity, visits to physicians) realms. In one controlled study of persons with moderately severe inflammatory rheumatoid arthritis participating in the ASMP, pain declined, self-efficacy grew and joint inflammation diminished over seven weeks (O'Leary, Shoor, Lorig, & Holman 1988). The latter suggested a biological effect of the ASMP on inflammation. However, measured immunological parameters did not change and the benefits were not sustained at four months. Therefore, at this time, there is no substantial evidence of a biological benefit of the ASMP. The results of ASMP and its evaluations indicate that health education for self-management, operating significantly through the vehicle of perceived self-efficacy to cope with the consequences of arthritis, results in reductions in pain, depression and dependence on medical care while improving participants' physical and social activities. These personal, social and financial benefits strongly imply that enhanced perceived self-efficacy is a vehicle through which major advantage for patients and for the health care system can be achieved simultaneously.
Table 3

Comparison of Changes Achieved by the Original and Revised Arthritis Self Management Programs (ASMP)

<table>
<thead>
<tr>
<th>Pain</th>
<th>0-to Scale</th>
<th>Disability</th>
<th>0-3 Scale</th>
<th>Depression</th>
<th>0-60 Scale</th>
</tr>
</thead>
</table>

Note: *p < .15; **p < .05.

Table 4 Original ASMP (N = 500) Baseline Four Month Mean Change 4.8 -12% .7 -1% 12.7 -8% Revised ASMP (N = 97) Baseline Four Month Mean Change 5.7 -8%* .91 -10%** 15.2 -16%

Summary of Changes in Outcome Attributes in Two Groups of Participants at Four Months and Four Years After Start of the Arthritis Self-Management Course Group I Group II (N = 224) (N = 177)

<table>
<thead>
<tr>
<th>Outcome Attribute</th>
<th>Four Months</th>
<th>Four Years</th>
<th>Four Months</th>
<th>Four Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain a</td>
<td>-12%</td>
<td>-19%</td>
<td>-17%</td>
<td>-22%</td>
</tr>
<tr>
<td>Disability b</td>
<td>-3%</td>
<td>+9%</td>
<td>-4%</td>
<td>+0%</td>
</tr>
<tr>
<td>Depression c</td>
<td>-11%</td>
<td>-2%</td>
<td>-18%</td>
<td>-3%</td>
</tr>
<tr>
<td>Visits to physicians</td>
<td>-21%</td>
<td>-43%</td>
<td>-24%</td>
<td>-44%</td>
</tr>
<tr>
<td>Original self-efficacy</td>
<td>+7%</td>
<td>+17%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Final self-efficacy</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

Final self-efficacy
The precise mechanism whereby perceived self-efficacy exerts its effects on patients with arthritis or other chronic diseases is not known. The involved patients have been heterogenous with diverse disease and illness manifestations. Hence it is not possible to infer that a specific consequence of enhanced self-efficacy, such as handling snakes in the case of phobia, mediated the overall benefit. More likely, given the diversity of patients and manifestations, individual patients developed understandings and adopted practices which were pertinent to their particular situation. Such a general conclusion is consistent with what is known about self-efficacy from many different studies and settings. Perceived self-efficacy affects people's willingness to initiate change, the magnitude of the change achieved, and their persistence in the change. Because self-efficacy is also specific to beliefs and activities, it is reasonable that patients identify areas of self-management pertinent to them and...
develop a repertoire of relevant attitudes and skills. In this regard, it is very interesting that, in the ASMP studies, self-efficacy grew, pain remained improved and use of physician services remained reduced over four years while physical disability actually increased. A reasonable interpretation would hold that the successful use of self-management skills reinforced and enhanced perceived self-efficacy and sustained the benefits despite a worsening physical situation.

Summary Chronic disease has replaced acute disease as the predominant form of disease in this country, and is the primary cause of disability. Because chronic disease can rarely be cured, its consequences extend out over time. Sound management of chronic disease and its consequences requires participation of patients and their families at most levels of health care from understanding the disease to applying management practices. Such participation, called self-management, requires a functioning partnership between the patient and the physician. To engage in effective self-management requires that the patient achieve new knowledge and master new skills. In turn, the new learning and skill development appears to be dependent upon a person’s perceived self-efficacy in those realms. Perceived self-efficacy can be developed and enhanced through a variety of
learning experiences. High and increasing levels of perceived self-efficacy to cope with the consequences of chronic disease are associated with improvement in symptoms, physical and emotional well-being and social activities. Thus perceived self-efficacy is an essential precondition for the appropriate management of chronic disease. The present health care system was developed in an era when acute disease predominated, with concepts and structures adhering to the attributes of acute disease (Table 1). It can readily be argued that significant responsibility for the ineffectiveness and inefficiency in present health services arises from the discordance between a health care system designed to treat acute disease and the dominating prevalence of chronic disease. Designing health services which are more appropriate for chronic disease would be an essential element in resolving the health care crisis. The scope of such a design is beyond the limits of this chapter but, we argue, fostering and supporting self-management practices and developing the skills for them, would be an essential ingredient of any successful approach.


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between changes in health behavior and improved health status: An exploratory


Self-Efficacy Pain Subscale

In the following questions, we'd like to know how your arthritis pain affects you. For each of the following questions, please circle the number which corresponds to your certainty that you can now perform the following tasks.

1. How certain are you that you can decrease your pain quite a bit?

2. How certain are you that you can continue most of your daily activities?

3. How certain are you that you can keep arthritis pain from interfering with your sleep?

4. How certain are you that you can make a small-to-moderate reduction in your arthritis pain by using methods other that taking extra medication?

5. How certain are you that you can make a large reduction in your arthritis pain by using methods other than taking extra medication?
Self-Efficacy Function Subscale

We would like to know how confident you are in performing certain daily activities.

For each of the following questions, please circle the number which corresponds to your certainty that you can perform the tasks as of now, without assistive devices or help from another person. Please consider what you routinely can do, not what would require a single extraordinary effort.

AS OF NOW, HOW CERTAIN ARE YOU THAT YOU CAN:

1. Walk 100 feet on flat ground in 20 seconds?
2. Walk 10 steps downstairs in 7 seconds?
3. Get out of an armless chair quickly, without using your hands for support?
4. Button and unbutton 3 medium-size buttons in a row in 12 seconds?
5. Cut 2 bite-size pieces of meat with a knife and fork in 8 seconds?
6. Turn an outdoor faucet all the way on and all the way off?
7. Scratch your upper back with both your right and left hands?
8. Get in and out of the passenger side of a car without assistance from another person and without physical aids?
9. Put on a long-sleeve front-opening shirt or blouse (without buttoning) in 8 seconds?

Self-Efficacy Other Symptoms Subscale

In the following questions, we’d like to know how you feel about your ability to control
your arthritis. For each of the following questions, please circle the number which corresponds to the certainty that you can now perform the following activities or tasks.

1. How certain are you that you can control your fatigue?

2. How certain are you that you can regulate your activity so as to be active without aggravating your arthritis?

3. How certain are you that you can do something to help yourself feel better if you are feeling blue?

4. As compared with other people with arthritis like yours, how certain are you that you can manage arthritis pain during your daily activities?

5. How certain are you that you can manage your arthritis symptoms so that you can do the things you enjoy doing?

6. How certain are you that you can deal with the frustration of arthritis?

Each question is followed by the scale: 10 20 very uncertain 30 40 50 60 moderately uncertain 70 80 90 100 very certain

Each subscale is scored separately, by taking the mean of the subscale items. The pain and other symptoms scales can be scored separately or together. The function scale should not be combined with anything else. If one-fourth or less of the data are missing, the score is a mean of the completed data. If more than one-fourth of the data are missing, no score is calculated. (The authors invite others to use the scale and
The role of self-efficacy in the rehabilitation of adult patients with chronic obstructive pulmonary disease (COPD) was examined. One hundred and nineteen COPD patients were randomly assigned to either a comprehensive rehabilitation program or to an education control group. Each program lasted two months. Patients were evaluated on pulmonary function, exercise, treadmill endurance, and psychosocial measures. These tests were administered prior to the intervention, immediately following the intervention, and one year after the start of the program. The treadmill endurance walk and the psychosocial measures were also administered six months after the start of the program. Self-efficacy was measured using a questionnaire that evaluated expectancies to engage in specific activities that reflect the functional disabilities often associated with COPD.

Validity of the self-efficacy construct was demonstrated through systematic correlations with both pulmonary function and exercise variables. Although rehabilitation patients demonstrated significant improvements in treadmill performance, a trend toward improved self-efficacy for walking was non-significant. Further, the modest improvement in self-efficacy for walking did not generalize to similar behaviors. Patients with high initial self-efficacy scores for walking demonstrated the greatest endurance on the treadmill. However self-efficacy expectancies did not predict other health status outcomes. We conclude that physiological feedback is a strong source of self-efficacy expectation. These expectancies might be modified by performance accomplishment. However, continuing physiologic feedback provides a significant obstacle for modifying self-efficacy in chronically ill patients.

Recent advances in health psychology research have demonstrated the importance of cognitive variables in explaining and predicting health behaviors. Social learning theory and value-expectancy theory form the basis for several cognitive constructs that have been useful in explaining diverse forms of health behavior.
such as smoking cessation, pain management, and exercise (see review O'Leary, 1985). Bandura's (1977) self-efficacy theory, in particular, has received substantial empirical support for its explanatory role in the therapeutic change process and maintenance of treatment gains in smoking cessation (Baer, Holt, & Lichtenstein, 1986; Devins & Edwards, 1988) the behavioral treatment of pain (Dolce, 1987; Reese, 1982); exercise following uncomplicated myocardial infarction (Ewart, Taylor, Reese, & DeBusk, 1983); and exercise training for patients with chronic lung diseases (Kaplan, Atkins, & Reinsch, 1984). Self-appraisal of capabilities can be altered in a number of ways, including mastery experiences, observing models, accepting social persuasion, and alteration of physiological state (Bandura, 1977). The most effective way of influencing self-efficacy expectancies is through mastery experiences (Bandura, 1977).

However, self-efficacy expectancies may develop through the other channels without direct experiences of a particular behavior. In this chapter, we consider the importance of physiological feedback on self-efficacy expectancies and subsequent task performance in patients with chronic obstructive pulmonary disease (COPD). Before proceeding, a brief overview of COPD and the role of rehabilitation in the management of patients with this disease will
be presented. CHRONIC OBSTRUCTIVE PULMONARY DISEASE AND PULMONARY REHABILITATION RESEARCH Chronic obstructive pulmonary disease (COPD) is a disorder characterized by persistent expiratory airflow obstruction (American Thoracic Society, 1987).

The diseases most often categorized as COPD include emphysema, chronic bronchitis, and irreversible asthma. Many patients exhibit features of more than one specific disease process. Although the etiology and severity of these diseases vary, the common clinical problem is impaired airflow which results in the symptom of shortness of breath. COPD is a major health problem in the United States today; current estimates reveal that 13.5 million Americans have COPD (Higgins, 1989). This condition is the fifth leading cause of death in the U.S. and accounts for approximately 71,000 deaths per year (National Center for Health Statistics, 1988). In addition, the death rate is increasing rapidly at a rate of 1.4% per year, second only to AIDS as the most rapidly increasing common cause of death in the United States (Lenfant, 1988). Since respiratory diseases are generally considered to be of greater importance as causes of morbidity and disability than mortality, the economic consequences of COPD are great. COPD has been linked to an estimated 4.7 million hospital days per year and 32.7 million physician office visits per year, approximately 5% of total physician visits (Feinleib
et al., 1989). Direct
and indirect costs for COPD were estimated to be $4.5
dillion in 1972, $19 bil
ion in 1979, and $27 billion in 1982 (Lenfant, 1982). Recent reports suggest that
1.14 million years of potential life are lost to COPD each
year (Kaplan, Atkins, & Ries, 1985). The total mortality rate and years of
potential life lost rate are
higher for men than for women and higher for whites than
for other races. These
findings most likely reflect previous differences in
smoking patterns among these
groups (Morbidity and Mortality Weekly Report, 1986). COPD
has a profound impact upon the daily lives of afflicted
patients.
Dyspnea, the clinical symptom of shortness of breath,
interferes with daily activ
ities, often restricting patients to their homes. One of
the largest and most detail
ed studies on the quality of life of COPD patients was
reported by McSweeney
and colleagues (McSweeney, Grant, Heaton, Adams, & Timms,
1982). They
studied 203 patients suffering from COPD, and concluded
that these people were
significantly more impaired than a matched control group in
ambulation, self
care, social interaction, and recreational activities.
Depression and dissatisfaction
with life were also significantly more common in the COPD
patient. The progressive course of COPD is often
expressed in terms of functional
loss, impairment of gas exchange, and structural changes
in the lungs. For example, deterioration in forced expiratory volume in one second (FEV1) for healthy persons is estimated to be 20 to 30 mL/year. Deterioration in FEV1 for COPD patients approximates 40 to 80 mL/year (Morbidity and Mortality Weekly Report, 1986). Lung dysfunction often causes symptoms that result in a sedentary lifestyle which further erodes the patient's functional capacity. Thus, the pulmonary patient often falls victim to a cyclical downward pattern of increasing disability and dyspnea. The patient who experiences exertional dyspnea may stop or restrict activities that produce the uncomfortable and frightening symptom of dyspnea. Prolonged restriction of activities can lead to the deconditioning of diaphragmatic muscles and inefficient oxygen utilization and ventilation. In order to interrupt this cyclical increase in dyspnea and the resulting decrease in functional ability, pulmonary rehabilitation has been promoted as an intervention strategy (Bass, Whitcomb, & Forman, 1970; Mertens, Shephard, & Kavanagh, 1978). A major component of pulmonary rehabilitation is a structured exercise program. In these programs, patients exercise on a treadmill under close medical supervision. Maximum exercise levels for COPD patients can be predicted from
just a few variables (Carlson, Ries, & Kaplan, t 991) and some patients can exercise at levels close to their maximum (Punzal, Ries, Kaplan, & Prewitt, t 991).

However, since exercise causes shortness of breath, many patients avoid physical activity. Rehabilitation programs encourage regular, safe exercise programs that are generalized to home settings. Rehabilitation programs for the management of COPD have expanded substantially in recent years and continue to gain momentum. The primary goal of most programs is to restore the patient to the highest possible level of functioning. Results from previous studies suggest that participation in a pulmonary rehabilitation program offers numerous positive outcomes for COPD patients (Dudley, Glaser, Jorgenson, & Logan, 1980; Moser, Bokinsky, Savage, Archibald, & Hansen, 1980). These benefits include improved work tolerance and work efficiency, improvement in activities of daily living, reduced ventilatory demand, decreased by dyspnea, and a reduction in hospital days without any appreciable change in pulmonary function. These outcomes have been documented using various research designs and training programs. SELF-EFFICACY IN COPD REHABILITATION Rehabilitation programs for COPD patients emphasize a systematic increase in activity levels through a structured exercise program. A major component to
many exercise programs is treadmill walking in combination with free walking.

The treadmill exercise experiences in rehabilitation programs may affect self efficacy expectancies through multiple sources of information. Many COPD patients may have low self-efficacy because of their preconceptions of pulmonary deficiencies and limitations. Years of experience with a chronic illness can result in negative symptoms such as shortness of breath, fatigue, and pain. These symptoms become more apparent when the patient attempts activities such as walking. The more prolonged or strenuous the activity, the greater the increase in distressing symptoms. A strong preconception of limitations and impairment increases the focus on negative physiological reactions to exertion.

Therefore, it is likely that patients who focus on their physical capabilities as they engage in physically demanding tasks will judge their pulmonary functioning as stronger than those patients who selectively focus on the discomforting symptomatology. Providing patients with ongoing feedback about their performance as they encounter more challenging physical demands, can shift the focus away from the negative physiological feedback to the more positive aspects of their capabilities. Therefore, judgments of efficacy will vary depending on how
patients interpret their symptoms during a physically demanding task. Many patients with COPD often experience moderate to severe discomforting symptoms with even minimal exertion. For these patients, their physiological state may have an even greater impact on self-efficacy judgments, particularly for behaviors taxing the respiratory system. Self-efficacy theory assumes that people rely on inferences from their physiological state in judging their capabilities. Thus, for activities involving strength and stamina, patients with COPD may judge or interpret their shortness of breath, fatigue, and pain as signs of physical inefficacy. This chapter considers the validity of the self-efficacy construct as well as its function in promoting and maintaining change in patients with COPD. In addition, the association between sources of self-efficacy information, in particular physiological feedback and activity levels, will be evaluated in a clinical trial of rehabilitation for patients with COPD. A test of the validity of the self-efficacy construct is provided by anchoring self-efficacy expectancies, the hypothesized mediator, to independently measurable variables of pulmonary function such as forced expiratory volume in one second (FEV1)' residual volume/total lung capacity (RV/LT), single breath diffusing capacity (DLCO), exercise tolerance.
as measured by oxygen uptake at maximum exercise (\( V_{O_2} \text{ max} \)), and maximum workload which can be estimated as metabolic equivalents (METS max). Po stu late mediators, in this case self-efficacy expectancies, are not directly observ able. Nevertheless, theoretically self-efficacy expectancies should be associated with several observable indicators, in this case physiological parameters of lung functioning. This chapter considers self-efficacy expectancies at two levels. We suggest that self-efficacy in untreated patients is largely determined by physiological feedback. Thus, without intervention, the primary source of information will be disease severity. However, we also expect performance accomplishment to over ride physiological feedback. Specifically, patients who participate in a rehabilitation program designed to enhance activity should improve in efficacy expectation despite their physiological status. CLINICAL TRIAL OF PULMONARY REHABILITATION Method Subjects Over a one-year period, 350 patients with COPD were screened for study; 129 met entry criteria and were randomized into either a comprehensive pulmonary rehabilitation program or an education control group. Ten patients drop ped out prior to treatment, leaving 119 patients who received the intervention. There were no differences between those patients who dropped out prior to the
intervention and those who remained in the study. The subjects were 32 female

and 87 male patients. This female/male ratio approximates the distribution of

COPD in females and males in the general population. In order to be included,

the patient had to meet the following criteria: 1. Clinical diagnosis of COPD, mild to severe, confirmed by history, physical

examination, spirometry, arterial blood gases, and chest roentgenograms.

Patients with emphysema, chronic bronchitis, or asthmatic bronchitis were ac

cepted. Patients with primarily acute, reversible airway disease (asthma) without

chronic airflow obstruction were not accepted. 2. Patients were required to be stable on an acceptable medical regimen. If

the treatment was considered inappropriate or the patient was unstable, the pri

mary physician was contacted and the treatment regimen adjusted prior to inclu

sion in the study. 3. Patients were excluded if they had other significant disabling lung disease,

serious heart problems, or other medical conditions that would interfere with

their participation. Assessment. Each patient underwent pulmonary function tests, exercise tests,

treadmill endurance walks, and psychosocial measures prior to the intervention

(baseline), immediately following the intervention (two months) and one year

from the start of the program (twelve months). A six-month assessment was also
conducted but involved only the treadmill endurance walk and the administration of the psychosocial measures. Due to the physical demands of the pulmonary function, exercise, and endurance walk tests, patients were scheduled for the tests on several occasions over a five-day period. Typically, patients were given the pulmonary function tests in the hospital laboratory on the first day, the exercise tests in the hospital laboratory on the third day, and the treadmill endurance walk and psychosocial measures in the rehabilitation building on the fifth day. Certified cardiopulmonary respiratory technicians administered the pulmonary function tests and exercise tests in the laboratory. During the exercise test, a pulmonary physician was also present to ensure the safety of the patient.

The endurance walk tests and the psychosocial measures were administered by trained psychology graduate students who had current cardio-pulmonary resuscitation certification. In some instances where the patient required continuous electrocardiogram monitoring during the endurance walk test, a pulmonary physician and registered nurse observed for arrhythmias and/or premature ventricular contractions. The physicians, technicians, and graduate students were blind to the group assignment of the patients.

Physiological Measures Descriptions of selected
physiological and psychosocial variables examined
in this chapter are presented below. Pulmonary junction
tests. Pulmonary function tests included: 1. Spirometry to
determine the following parameters: (a) Vital Capacity
(VC)—the maximum volume of air that can be expelled from
fully inflated lungs; (b) Forced Expiratory Volume in one second (FEV I);
and (c) FEV INC ratio. 2. Plethysmographic measurements: (a) Functional
Residual Capacity (FRC);
(b) Airway Resistance (RAW); (c) Residual Volume (RV); (d) Total Lung
Capacity (TLC); and (e) RV/TLC ratio. 3. Single-breath
diffusing capacity for carbon monoxide (DLCO). 4. Maximal inspiratory and expiratory pressures to assess respiratory muscle
strength. Although pulmonary rehabilitation does not
typically lead to changes in
standard measures of pulmonary function, it was important
to monitor these
parameters in order to follow the progression of the
patient’s disease. Exercise tests. The laboratory exercise
tests included: (a) an incremental,
symptom-limited exercise test to the maximal tolerable
level on a treadmill, and
(b) a treadmill test to define the steady-state walking
level for subsequent training
sessions. In the incremental exercise test, the work load
was increased at one
minute intervals by 0.5 miles per hour up to 3.0 miles per
hour with further work
increments made by increasing elevation by 2% to a maximum,
symptom-limited
level. This multiple-stage test assessed the maximal
exercise tolerance. In the
steady-state exercise test, the work load was maintained at a constant level for a predetermined period of time to allow the subject to reach steady-state for the variables of interest. This test was used to make measurements at defined levels for subsequent exercise training. After the incremental exercise test and an appropriate rest, patients performed the steady-state treadmill test at the highest possible level to determine a level for subsequent endurance walk testing and exercise training. During the tests, patients breathed through a low-resistance breathing valve; expired gases were analyzed continuously for measurements of oxygen uptake ($V_{O2}$), carbon dioxide elimination ($V_{CO2}$), expired minute ventilation ($V_e$) and other related variables. Metabolic equivalent (METS) was estimated at the maximal treadmill speed and grade as a measure of exercise workload. During all exercise tests an electrocardiogram with a single (modified V5) lead was used to measure heart rate and monitor for arrhythmias or ischemia. Blood pressure was measured at regular three-minute intervals. Arterial blood was sampled from an indwelling radial artery catheter for measurement of arterial oxygen pressure ($P_{aO2}$), arterial carbon dioxide pressure ($P_{aCO2}$), pH, and alveolar-arterial oxygen gradient ($P(A-a)O2$). An ear oximeter was used to
monitor continuous arterial oxygen saturation (SaO2). Patients who demonstrated severe resting (PaO2 < 55mmHg) or exercise hypoxemia (PaO2 < 50mmHg or SaO2 < 85%) were given supplemental oxygen and repeated the treadmill exercise test on oxygen to define a safe level for sub-sequent exercise training. Ratings of perceived breathlessness and perceived exertion were assessed after each exercise test using standard scales adapted from Borg (1982). Patients were asked to rate their degree of breathlessness and fatigue on a scale from 0 to 10, with 0 representing nothing at all and 10 representing the maximum ever experienced. Treadmill Endurance Walk Test. Based on the maximal, symptom-limited graded exercise test, each patient was given an exercise prescription which approximates maximal sustained exercise tolerance levels. The target rates for the individualized exercise prescriptions ranged from a treadmill speed of 0.6 mph at 0% grade to 3.0 mph at 16% grade. The endurance walk test was designed to assess the patient’s endurance for walking, the type of exercise used in the rehabilitation program. Prior to endurance walk testing, heart rate, respiratory rate, and blood pressure were recorded with the patient seated. Those patients requiring supplemental oxygen waited for ten minutes with the oxygen.
prior to being tested. All patients walked at 1.0 mph for two minutes (0.6 mph for patients with that target speed). For patients whose prescribed target rate was higher than 1.0 mph, after two minutes the examiner asked the patient if they felt they could walk faster. If the patient replied yes or maybe, the treadmill speed was increased to a level 0.5 mph (or 2 to 4% grade) less than the target speed/grade. If the patient did not feel he or she could walk faster, or if the target rate was less than or equal to 1.0 mph, the initial speed was maintained. After two more minutes, if the target rate had not yet been reached, the patient was once again asked if he or she felt they could walk faster. If the response was positive, the treadmill speed was increased to the target rate. Once the individualized target rate was achieved, all patients were instructed to walk as long as possible. If the patient walked for 20 minutes at the target rate, the treadmill speed was increased another 0.5 mph (or 2 to 4% grade). A maximum endurance walk protocol was achieved if the patient walked 20 minutes at the target rate and to minutes at a higher rate (i.e., 30 minutes maximum test).

During the entire endurance walk, the patient's blood pressure was monitored every three minutes. The test was stopped when a patient stated that he/she was
unable to walk any longer. In addition, the examiner stopped the test for any of
the following conditions: (a) chest pain; (b) dizziness; (c) excessive rise in blood
pressure (≥ 250 mmHg systolic or ≥ 130 mmHg diastolic pressure); or (d)
excessive fall in blood pressure (≤ 20 mmHg in systolic pressure). At the
completion of the test, sitting pulse rate, respiratory rate, and blood pressure were
measured. Symptoms of perceived breathlessness and fatigue were rated after
the first two minutes on the treadmill and at the end of the test, using a to-point
scale (Borg, 1982). The examiner then recorded the reasons for stopping the test
(e.g., dyspnea, chest pain, maximum protocol).

Psychosocial Measures All patients completed a battery of psychosocial measures at baseline, two
months, six months, and twelve months. The battery included the following
measures: Self-Efficacy Questionnaire. The self-efficacy questionnaire used in this
study was constructed and used in a previous study by Kaplan, Atkins, and
Reinsch (1984) to demonstrate that specific rather than generalized expectancies
mediate behavior changes in patients with COPD. The self-efficacy question
naire was adapted from self-efficacy scales used to measure levels of capability
to engage in activities that imposed stress on the heart for patients with uncom
plicated myocardial infarction (Ewart et al., 1983). The self-efficacy question

naire used in this study was modified to more accurately measure the functional
disabilities associated with chronic obstructive pulmonary
disease. The question
naire consists of a list of seven behaviors that require physical and/or emotional
stamina. The seven scales represent activities progressively more dissimilar to
the target behavior of walking. Within each of the seven scales is a series of brief
statements describing progressively more difficult performance requirements.

For example, the scale for walking includes the following statements: walk 1
block (approximately 5 minutes), walk 2 blocks (10 minutes), walk 3 blocks (15
minutes) ... walk 3 miles (90 minutes). The scale for walking has nine items
representing unequal intervals of increasing difficulty. For each item, the patient
rated the degree of confidence or strength of their expectation to perform that
activity on a 100-point probability scale, ranging in to-point intervals from 0
(complete uncertainty) to 100 (complete certainty). The seven scales included in
the measurement of self-efficacy expectancies are listed in the Appendix. The
scale scores on the self-efficacy questionnaire reflect the highest level that the
patient expressed 100% confidence they could perform or
tolerate the behavior. Quality 0/ Well-Being Scale. The Quality of Well-Being (QWB) scale is a comprehensive measure of health-related quality of life that includes several components. First, it obtains observable levels of functioning at a point of time. The levels of functioning are obtained from three separate scales: mobility, physical activity, and social activity. Second, symptomatic complaints and disturbances are noted. Each patient is classified according to the symptom or problem that he or she finds most undesirable. Then, the observed level of function and subjective symptomatic complaint are weighted by preference or the desirability of the state on a scale ranging from 0 (for dead) to 1.0 (for optimum function).

The weights are obtained from independent samples of judges who rate the desirability of the observable health status. This system has been used extensively in a variety of medical and health services research applications (Kaplan & Anderson, 1988). In addition, specific validity and reliability studies using this measure for COPD patients have been published (Kaplan, Atkins, & Timms, 1984). These studies demonstrate that the QWB scale is sensitive to relatively minor changes in health status and that it is correlated with a variety of physical and functional measures of health status. Centers for Epidemiologic Studies Depression Scale (CES-D). Depression
was measured using the CES-D scale. The CES-D scale is a general measure of depressive symptoms that has been used extensively in epidemiologic studies (Weissman, Sholomskas, Pottenger, Prusoff, & Locke, 1977). The scale includes twenty items and taps dimensions of depressed mood, feelings of guilt and worthlessness, appetite loss, sleep disturbance, and energy level. These items are assumed to represent all of the major components of depressive symptomatology.

Sixteen of the symptoms are worded negatively, while the other four are worded positively to avoid the possibility of patterned responses. The patient is asked to report how often they experienced a particular "symptom" during the past week on a four-point scale: 0 (rarely or none of the time-less than 1 day), 1 (some or a little of the time-1 to 2 days), 2 (occasionally or a moderate amount of time 3 to 4 days), 3 (most or all of the time-5 to 7 days). The responses to the four positive items are reverse scored and then the total sum of the responses is derived. Scores on the CES-D scale can range from 0 to 60 with scores greater than 18 suggestive of clinically significant levels of depression. The CES-D scale has been found to have high internal consistency and test-retest reliability (Radloff, 1977). It has also been documented to be highly correlated
to other standardized depression scales (Weissman et al., 1977). Eaton and Kessler (1981) have presented evidence for the reliability and validity of this measure.

Group Comparisons of Baseline Measures As described in the previous section, the patients were randomly assigned to either a rehabilitation or an education control group. Patients in the rehabilitation group participated in an outpatient rehabilitation program consisting of education about their disease, physical and respiratory care instruction, psychosocial support, and supervised exercise training, while patients in the education control group received information about their disease through a series of videotape and lecture presentations. There were no significant differences between patients in the rehabilitation or education control group on baseline measures of self-efficacy ratings, treadmill performance, and other psychosocial measures including Quality of Well-Being score, number of illness symptoms endorsed, depression, and subjective ratings of fatigue and dyspnea during the treadmill endurance walk. These group comparisons are presented in Table I.

Table 1

<table>
<thead>
<tr>
<th>Group Comparisons of Variables at Initial Evaluation</th>
<th>Rehabilitation</th>
<th>Education</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variable Mean SD Mean SD F</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FEV1 1.39 0.66 1.44 0.62 1.12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RVrrLC 60.01 10.80 61.22 10.44 1.07</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OLCO 14.17 7045 14.01 6.03 1.19</td>
<td></td>
<td></td>
</tr>
<tr>
<td>V0 2 max 1.24 0.51 1.24 0.54 1.12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Treadmill</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&amp;end 12.37 8.36 11.79 7.97 1.10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>QMB 0.6656 0.0960 0.6523 0.067 2.08</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CES-0 14.02 0.74 15.34 10.03 1.32</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perceived</td>
<td></td>
<td></td>
</tr>
<tr>
<td>dyspnea 0049 2.19 4.52 2.09 1.10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perceived</td>
<td></td>
<td></td>
</tr>
<tr>
<td>fatigue 4.20 2.23 4.25 2.17 1.06</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SE-Walk 3.70 3.22 4.11 3.32 1.06</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SE-Climb 2.11 1.00 2.08 1.51 1.16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SE-Lift 4.07 2.93 3.85 2.96 1.02</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SE-Exert 2.30 1.16 1.94 1.25 1.16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SE-Push 2.81 1.14 2.55 1.33 1.35</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SE-Stress 2.52 1.80 2.35 1.84 1.04</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SE-Anger7 2.51 1.88 2.08 1.80 1.10</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. SE == self-efficacy. Results Part i: Efficacy and Physiological Feedback in Untreated Patients In order to evaluate the relationship of baseline self-efficacy judgments with baseline physiological and psychosocial parameters, the self-efficacy scores of all patients were partitioned into tertiles, reflecting those patients with the lowest, middle and highest scores. A series of analyses of
variance tests were then conducted. In these analyses, the efficacy tertiles for walking, climbing, lifting, pushing, exertion, stress, and anger served as independent variables. A selected group of pulmonary function, exercise, and psychosocial assessment variables were the dependent variables. The pulmonary function test variables (including FEV1, RV(fLC, and OLCO) and the exercise test variables (including METS max, V02 max, and treadmill endurance) were selected as representative measures of lung disease severity and exercise tolerance, respectively. Quality of Well-Being and depression scores were the psychosocial variables selected. The analyses suggest that self-efficacy expectancies are significantly influenced by physiological state, particularly if the patient has had little or no mastery experiences with the task. The univariate F values for the associations between the pulmonary function test, exercise test, and psychosocial variables and self-efficacy expectancies for each category are shown in Table 2. Figure 1 summarizes the relationship between pulmonary function test variables, FEV1, RV(fLC, and OLCO, and self-efficacy expectancies for patients by lowest, middle, and highest tertiles for each efficacy category. As predicted, the self-efficacy measures reflecting a physical demand or task (e.g., walk, climb, lift,
push, exert) were significantly related to the pulmonary function variables. The only exception was the non-significant relationship between RV(fLC and self-efficacy expectancies for the push category, though the trend was in the expected direction. Similarly, Figure 2 summarizes the relationship between exercise test variables, \( \text{VO}_2 \text{ max} \) and treadmill endurance, and tertiles of self-efficacy expectancies for each efficacy category. As demonstrated with the pulmonary function measures, the exercise variables were also significantly related to the self-efficacy measures reflecting a physical demand or task. Thus, there was a highly significant linear relationship between the physical self-efficacy measures (e.g., walk, climb, lift, exert, push) and the pulmonary function and exercise test variables. The relationship between the pulmonary function and exercise test measures and the self-efficacy judgments for stress and anger, on the other hand, were not systematically related. In contrast to the systematic relationships observed with the pulmonary function and exercise test variables, the relationships between the psychosocial variables, QWB, CES-O, and Treadmill, and tertiles of self-efficacy expectancies for each efficacy category were not as systematic. Figure 3 summarizes the relationship between psychosocial variables and self-efficacy.
tertiles for each efficacy category. The Quality of Well-Being scale much like the psychological and exercise test variables was significantly related to tertiles of self-efficacy involving a physical demand. The CES-D scale, a scale in which higher scores indicate more depression, had significant linear relationships with self-efficacy categories measuring both a physical and emotional demand. It was not significantly related to self-efficacy for lifting, pushing, or tolerating stress. Interestingly, the self-efficacy measures reflecting an emotional demand, in this case, stress and anger, were not systematically related to any of the pulmonary function or exercise test variables, nor to most of the psychosocial variables. 2

Figure 1 Relationship between pulmonary function measures (FEV1, RV, DLCO) and self-efficacy. 65 15 RV / T L C Treadmill by Self Efficacy Category and Tertile 15 Lowest Middle Highest 10 Walk Climb Lift Exert Push Anger Stress ELCO by Self Efficacy Category and Tertile 15 Lowest 10 Middle Highest 5 0 Walk Climb Lift Exert Push Anger Stress M. T. Toshima et al. Lowest Middle Highest Lowest Middle Highest

Figure 2 Relationship between exercise test variables (treadmill endurance & VO2 MAX) with self-efficacy tertiles for each efficacy category. 15 VO2 max (L / min) Treadmill (min) 1.5

Table 2
Analysis of Variance Values for Pulmonary Function Test, Exercise Test, and Psychosocial Variables by Self-Efficacy Tertiles

**Pulmonary Function Test Variables**

<table>
<thead>
<tr>
<th>Efficacy</th>
<th>RV (FLC FEV) DLCO F P F P F P Walk</th>
<th>9.96</th>
<th>0.01</th>
<th>8.13</th>
<th>0.01</th>
<th>9.72</th>
<th>0.01</th>
<th>9.19</th>
<th>0.01</th>
<th>13.20</th>
<th>0.01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lift</td>
<td>3.02</td>
<td>0.05</td>
<td>4.90</td>
<td>0.01</td>
<td>10.73</td>
<td>0.01</td>
<td>Exert</td>
<td>6.55</td>
<td>0.01</td>
<td>3.38</td>
<td>0.04</td>
</tr>
<tr>
<td>Push</td>
<td>2.32</td>
<td>n.s.</td>
<td>1.54</td>
<td>n.s.</td>
<td>2.83</td>
<td>n.s.</td>
<td>1.73</td>
<td>n.s.</td>
<td>1.78</td>
<td>n.s.</td>
<td>Stress</td>
</tr>
</tbody>
</table>

**Exercise Test Variables**

<table>
<thead>
<tr>
<th>Efficacy</th>
<th>VO_{2} max Treadmill F P F P Walk</th>
<th>13.11</th>
<th>0.01</th>
<th>10.11</th>
<th>0.01</th>
<th>10.74</th>
<th>0.01</th>
<th>7.99</th>
<th>0.01</th>
<th>15.99</th>
<th>0.01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lift</td>
<td>3.64</td>
<td>0.03</td>
<td>5.00</td>
<td>0.01</td>
<td>5.25</td>
<td>0.01</td>
<td>4.47</td>
<td>0.01</td>
<td>2.29</td>
<td>n.s.</td>
<td>1.52</td>
</tr>
<tr>
<td>Push</td>
<td>11.78</td>
<td>0.01</td>
<td>15.99</td>
<td>n.s.</td>
<td>0.46</td>
<td>n.s.</td>
<td>7.40</td>
<td>0.01</td>
<td>0.15</td>
<td>n.s.</td>
<td>3.12</td>
</tr>
<tr>
<td>Stress</td>
<td>1.59</td>
<td>n.s.</td>
<td>1.54</td>
<td>n.s.</td>
<td>339</td>
<td>n.s.</td>
<td>1.73</td>
<td>n.s.</td>
<td>1.78</td>
<td>n.s.</td>
<td>0.57</td>
</tr>
</tbody>
</table>

**Psychosocial Variables**

<table>
<thead>
<tr>
<th>Efficacy</th>
<th>QWB CES-D F P P</th>
<th>4.59</th>
<th>0.01</th>
<th>2.67</th>
<th>0.07</th>
<th>7.61</th>
<th>0.01</th>
<th>3.36</th>
<th>0.04</th>
<th>3.14</th>
<th>0.05</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lift</td>
<td>3.14</td>
<td>0.05</td>
<td>1.94</td>
<td>n.s.</td>
<td>Exert</td>
<td>0.29</td>
<td>0.01</td>
<td>4.97</td>
<td>0.01</td>
<td>Push</td>
<td>11.78</td>
</tr>
<tr>
<td>Contact</td>
<td>11.78</td>
<td>0.01</td>
<td>15.99</td>
<td>n.s.</td>
<td>0.46</td>
<td>n.s.</td>
<td>7.40</td>
<td>0.01</td>
<td>0.15</td>
<td>n.s.</td>
<td>3.12</td>
</tr>
<tr>
<td>Stress</td>
<td>1.59</td>
<td>n.s.</td>
<td>1.54</td>
<td>n.s.</td>
<td>339</td>
<td>n.s.</td>
<td>1.73</td>
<td>n.s.</td>
<td>1.78</td>
<td>n.s.</td>
<td>0.57</td>
</tr>
</tbody>
</table>

Figure 3: Relationship between psychosocial variables (QWB, CES-D) and self-efficacy for each efficacy category. Although self-efficacy expectancies are not directly observable, the results suggest that the efficacy expectancies are anchored to physiological variables which, in turn, are associated with observable levels of behavior. Thus, the self-efficacy expectancies have observable correlates other than the behaviors they presumably govern. These data provide evidence for the validity of the self-efficacy construct. Validity inferences are supported by the anchoring of self-efficacy expectancies to independently measurable indicators, in this case, physi...
ological and exercise parameters. The results confirm that external factors are indeed linked to efficacy expectancies which, in turn, may be linked to observable behaviors. The degree and nature of the relationship between self-efficacy expectancies and behavior can be further quantified. Correlations between aggregate self-efficacy scores and pulmonary function test variables, exercise test variables, and psychosocial variables were computed. Results of the correlational analyses revealed that the pulmonary function test, and the exercise test were significantly correlated with most of the aggregate perceived self-efficacy scores. Table 3 displays the relationship between aggregate efficacy expectation scores for each category and pulmonary function test and exercise test, and psychosocial variables respectively. High scores on RV(fLC and CES-D reflect diagnostically poorer status. Thus, negative relationships of these variables and efficacy expectancies were expected.

### Table 3

Correlation Among Mean Pulmonary Function Test, Exercise Test, and Psychosocial Variables and Aggregate Self-Efficacy Scores for Each Efficacy Category

<table>
<thead>
<tr>
<th>Efficacy Category</th>
<th>Walk</th>
<th>Climb</th>
<th>Lift</th>
<th>Exert</th>
<th>Push</th>
<th>Stress</th>
<th>Anger</th>
</tr>
</thead>
<tbody>
<tr>
<td>FEY1</td>
<td>.42**</td>
<td>.35**</td>
<td>.17*</td>
<td>.18*</td>
<td>.11</td>
<td>.04</td>
<td>.04</td>
</tr>
<tr>
<td>RY/fLC</td>
<td>-.44**</td>
<td>-.39**</td>
<td>-.28**</td>
<td>-.17*</td>
<td>-.15*</td>
<td>-.08</td>
<td>-.08</td>
</tr>
</tbody>
</table>
Note. *p < .05; **p < .01. Although the magnitude of many of the associations are significant, of most interest is the nature of the relationships between the variables and the efficacy categories. For all physiological variables, the efficacy category for walking was most highly correlated, closely followed by climbing and/or lifting. Moreover, stress and anger efficacy categories were consistently least correlated with the physiological measures. In contrast, the pattern of associations between the psychosocial variables and efficacy expectancies for the various efficacy categories did not follow the pattern of association found between physiological variables and efficacy expectancies. Self-efficacy for walking, climbing, and lifting were not necessarily the most highly correlated with the psychosocial measures. In addition, self-efficacy ratings for stress and anger were not consistently the least correlated with the psychosocial measures. Part 2: The Effects of Performance Accomplishment Upon Efficacy Expectations. Numerous studies in the health behavior change literature suggest that self
Efficacy expectancies play a crucial role in the initiation and maintenance of behavior change. Uniformly across studies of change in health-related behavior, including smoking cessation, pain management, and exercise compliance, post-treatment self-efficacy judgments have been found to be associated with outcome. In general, enhanced self-efficacy perceptions have been associated with greater behavior change and maintenance of gains over time. Despite the substantial literature base supporting this general finding, only a select few have examined self-efficacy expectancies across groups receiving different health behavior change interventions (Blittner, Goldberg, & Merbaum, 1978; Chambliss & Murray, 1979; Kaplan, Atkins, & Reinsch, 1984; Nicki, Remington, & MacDonald, 1985; Reese, 1982). This investigation not only addresses the role of self-efficacy expectancies on outcome, but addresses changes in self-efficacy judgments as a result of participation in a rehabilitation program. Efficacy expectancies are based on four major sources of information: mastery experiences, observing models, accepting social persuasion, and alteration of physiological state (Bandura, 1977). Successful experiences performing a behavior (performance accomplishment) are the most potent influence on self-efficacy.
expectancies. In this investigation, it was hypothesized that the rehabilitation patients would have successful experiences walking on the treadmill, as well as, free walking on their own; thus, raising their efficacy expectancies for walking.

Once efficacy expectancies for walking are established, it was predicted that enhanced efficacy for walking would generalize to other similar behaviors as demonstrated in a study by Kaplan, Atkins, and Reinsch (1984). Thus, it was predicted that improvements in walking behavior, and subsequent increases in self-efficacy expectancies for walking, transfer to similar behaviors, and, to a lesser degree, to behaviors dissimilar to those on which the intervention was based. The effect of the rehabilitation program on efficacy expectancies was evaluated in several ways. First, it was predicted that for patients in the rehabilitation group, self-efficacy expectancies for walking would significantly improve following participation in the rehabilitation program, while no increases were expected for the education control group. Secondly, for patients in the rehabilitation group, it was proposed that improvements in self-efficacy expectancies for walking would generalize to efficacy expectancies for other behaviors, with tasks most similar to walking expected to have greater increases in self-efficacy expectancies than tasks dissimilar to walking. This gradient
of generalizability was not expected to emerge in the education control group. Self-efficacy expect
ancies were also predicted to be associated with health status outcome measures. For both groups, strict attendance records were kept to ensure that all patients completed their respective programs. All patients were required to make up any sessions they had missed. Table 4 shows the status of patient participation at the various assessment periods. Two months after enrollment, 104 patients had complete follow-ups, 4 patients had partial follow-ups, and 11 patients were unavailable for testing. There was a 91% follow-up rate at two months, 89% at six months, and 79% at twelve months. Attrition rates for the two groups were not significantly different, but by the twelve-month assessment, twice as many education control patients than rehabilitation patients were unavailable for follow-up.

Table 4

<table>
<thead>
<tr>
<th>Status</th>
<th>Baseline</th>
<th>2 Months</th>
<th>6 Months</th>
<th>12 Months</th>
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<tbody>
<tr>
<td>Complete</td>
<td>57</td>
<td>62</td>
<td>48</td>
<td>56</td>
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<tr>
<td>Partial</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Follow-up</td>
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% of patients tested 100 91 89 79

Note. R = rehabilitation, E = education control. At both two-month and six-month post-intervention assessments, patients in the rehabilitation group performed significantly better on the treadmill endurance walk than education control patients as reported by Toshima, Kaplan, and Ries (1990). Furthermore, analysis of twelve-month follow-up data demonstrate continued superior performance on the endurance walk by the rehabilitation patients, though the effect was not significant. These effects are shown graphically in Figure 4. Treadmill performance by group and follow-up period 22 20 18 16 14 12 -1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 Month or follow-up Rehab Education

Figure 4 Comparison of treadmill endurance for rehabilitation and education patients over 12 months. Despite significantly improved treadmill performance by the rehabilitation patients at two-, six-, and twelve-month follow-up visits, self-efficacy rating scores for walking were not statistically significant between the patient groups at any of the three post-intervention assessments. Figure 5
shows self-efficacy rating scores for both groups from baseline through twelve-month assessments.

Although the self-efficacy ratings between groups were not statistically significant, the pattern of scores was in the predicted direction. There were significant differences between groups for subjective ratings of fatigue and dyspnea that were measured during the treadmill endurance walk.

Not only did the patients in the rehabilitation group walk longer and report some what increased self-efficacy in their ability to do so, they also reported less fatigue and dyspnea at the end of the endurance walk test. Repeated measures analysis of variance for ratings of fatigue revealed significant main effects for group [F(1,67) = 5.21, P < .05] and time [F(1,67) = 5.73, p < .01] and a significant group by time interaction [F(3,201) = 3.15, p < .05]. For ratings of dyspnea, repeated measures analysis of variance revealed a significant main effect for time [F(1,67) = 7.05, P < .01] and a significant group by time interaction [F(3,201) = 6.77, p < .01]. These differences in subjective symptom ratings were statistically significant at two-month follow-up for dyspnea [F(1,104) = 10.69, p < .01] and for fatigue [F(1,104) = 10.05, p < .01]. At the six-month follow-up, the differences were still significant for dyspnea [F(1,103) = 7.34, p < .01] and for fatigue.
\[ F(1,103) = 9.61, p < .01 \] J. By the twelve-month assessment, the differences had diminished somewhat, though still present. These results are shown in Figure 6. Self efficacy for walking by group and follow-up period 5.0 4.5 4.0 Rehab Education 3.5 3.0 2.5 2.0 1.0 0 2345678910111213 Month of Follow-up

Figure 5 Comparison of walking efficacy expectations for rehabilitation and education patients over 12 months. Post-treadmill dyspnea and fatigue ratings by group and follow-up period 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.0 0 2 3 4 5 6 7 8 9 10 11 12 13 Month of Follow-up Dyspnea(R) Fatigue(R) Fatigue(E)

Figure 6 Comparison of rating of perceived fatigue and dyspnea for rehabilitation and education patients over 12 months. 5.0 Ratings (min 0, max 10) Self efficacy score for walking 11

Correlations between self-efficacy for walking and treadmill performance for both rehabilitation and education control patients were also assessed. For the rehabilitation patients, correlations between the two variables at each assessment period are as follows: baseline \((r = .42, P < .01)\), two month \((r = .23, \text{n.s.})\), six month \((r = .39, P < .01)\), twelve month \((r = .40, P < .01)\). For the education control patients, correlations between the two variables are as follows: baseline \((r = .43, P < .01)\), two month \((r = .30, P < .05)\), six month \((r = .32, P < .05)\), twelve month \((r = .30, \text{n.s.})\). These findings provide further support that patients in both groups were fairly accurate in judging efficacy expectancies for walking in relation to actual treadmill performance. It had been predicted there would be a systematic gradient for changes
efficacy expectancies for the rehabilitation but not for
the control group. Specifically, the rehabilitation patients were expected to show
the largest change in
expectancies to perform the target behavior, walking, with changes in expectan
cies for other behaviors changing as a function of their similarity to walking.
However, the proposed gradient of generalizability did not emerge and no signif
icant differences between the rehabilitation and education control group were
noted for self-efficacy ratings of climbing, lifting, exertion, pushing, anger
tolerance, or stress tolerance at any follow-up period. To determine whether health status outcomes as measured by
Quality of
Well-Being and CES-D could be predicted from self-efficacy expectancies and
other variables, multiple regression analysis was employed. Both baseline and
post-intervention self-efficacy expectancies did not account for a significant
amount of the variance in predicting Quality of Well-Being or depression scores
at any of the assessment periods. Part 3: Microanalyses of Self-efficacy and Behavior Change In a series of
experiments, Bandura, Reese, and Adams (1982) sought to clar
ify the causal link between self-efficacy and behavior through a method they
called microanalysis. This method examines the relationship between differential
levels of efficacy expectancies and behavioral change. Their first series of analyses demonstrated that performance varies systematically as a function of perceived self-efficacy. Increasing levels of perceived self-efficacy both across experimental groups and within experimental subjects resulted in progressively higher performance accomplishments. Thus, groups whose efficacy expectancies were raised to either low, medium, or high levels had correspondingly low, medium, or high performance attainment. Although there appears to be a correspondence between enhanced self-efficacy expectancies and subsequent performance, efficacy expectancies may exceed, match, or remain below performance attainments, depending on how they are cognitively appraised. The following example illustrates that self-efficacy expectancies are not merely a reflection of past performance. Data from several case study experiments (Bandura et al., 1982) show how similar mastery experiences have variable effects on perceived self-efficacy over the course of treatment. In one comparison, two moderately phobic patients had very similar performance attainment curves. In one case, self-efficacy increased substantially during initial successes but rapidly leveled off, even though progressively more demanding tasks were mastered, while the other patient continued to exhibit a
steady increase in self-efficacy with each successive mastery experience.

Because individuals are influenced more by how they interpret their performance successes than by the successes per se, perceived self-efficacy is often a better predictor of subsequent behavior than is past performance attainments. Several analyses were conducted to evaluate the role of differential levels of initial perceived self-efficacy ratings on future performance attainment. To facilitate the analyses, baseline self-efficacy rating scores for walking were categorized into tertiles with rating scores through one comprising the low efficacy group (n = 41), scores two through five comprising the medium efficacy group (n = 37); scores greater than five comprised the high efficacy group (n = 41). To assess the relationship between differential levels of initial self-efficacy for walking and subsequent treadmill performance, an analysis of variance across groups for tertiles of efficacy for walking was conducted. Rehabilitation and education control patients were grouped together since there were no initial differences between the groups on treadmill performance or self-efficacy for walking prior to the intervention. The results, as displayed in Figure 7, revealed a strong linear relationship between initial perceived self-efficacy expectancies for walking and treadmill performance \[F(1, 119) = 10.11, p < .01\]. Initial treadmill performance by
Initial self-efficacy for walking 16 14 12 10 8 Low Medium High Efficacy for walking (tertile)

Figure 7 Treadmill endurance performance by initial efficacy expectation for both groups combined. A 2 x 3 (Group x Efficacy tertiles) analysis of variance was conducted to examine the role of differential levels of initial self-efficacy expectations on improvements in treadmill performance following the intervention for both the rehabilitation and education control patients. The results, shown in Figure 8, demonstrate significant main effects for group [F(1, 108) = 26.98, P < .001] and self-efficacy for walking [F(2, 106) = 2.86, p < .05], but no significant interactions. The figure shows that for the rehabilitation patients, those initially high in self-efficacy for walking had less improvement in treadmill performance, while those initially low in self-efficacy for walking demonstrated the greatest improvements. For the education control patients, there was little change in treadmill performance regardless of initial self-efficacy expectancies for walking.

Figure 8 Initial efficacy expectations and subsequent improvements in treadmill performance for rehabilitation and education patients. DISCUSSION Patients with COPD experience significant limitation in daily activities. However, evidence from the pulmonary rehabilitation literature suggests that most of these patients can safely increase their levels of
Considering sources of information about self-efficacy, we observed that psychological indicators of disease severity were significantly correlated with efficacy expectations. In other words, disease severity was significantly associated with the expectation that patients could perform various activities. Results from Part I of the study suggest that without intervention, physiological state (min.) appears to dominate self-efficacy beliefs. Thus physiological feedback, in the form of symptoms, helps form expectations about performance. These findings help define the validity of the self-efficacy construct and suggest that it indeed has meaning in the context of understanding function in COPD patients. One of the problems in this line of research is that physiological feedback may not always be accurate. Although patients with COPD may experience discomforting symptoms when active, most evidence suggests that they can perform more exercise without endangering their health. In fact, exercise is typically advocated as part of treatment. The intervention in this investigation demonstrated that, despite these physiological limitations, significant increases in exercise performance were attainable. Self-efficacy theory contends that mastery or performance-based success experiences are the most potent influence on self-efficacy.
was predicted that patients in the rehabilitation program would show increased self-efficacy expectancies for walking as a function of demonstrated improvements in actual treadmill performance. Results from Part 2 of the study showed improvements in exercise performance. There are several possible explanations for these findings. One explanation for the non-significant results is that there was insufficient statistical power to detect a meaningful difference. With low power, true differences might not be detected. This study, however, was designed to have a .80 probability to detect differences of .7 Z units. This might be classified as a moderate effect size.

Thus, although moderate effects should have been detected, small effect sizes could have been missed. Another possible explanation is that performance accomplishment in this group of COPD patients may not be as strong a source of self-efficacy expectancies as might be predicted from self-efficacy theory. It may be important to distinguish between information available to the individual from the environment and the individual's interpretation of the information. The impact of information on efficacy expectancies is dependent on how it is cognitively appraised. Thus, even success experiences do not necessarily create strong generalized expectancies. Thus, it
cies of personal efficacy. Success experiences are more likely to produce posi-
tive changes in efficacy expectancies if performances are perceived as resulting
from within the individual rather than from some external source. The attribution
of increased performance capabilities to external factors such as the efforts of the
staff, rather than to the patients' own capabilities may account for these findings. Numerous investigations of
health behavior change, have demonstrated
increased self-efficacy ratings for individuals who participated in a variety of
intervention programs including smoking reduction and cessation, pain manage-
ment, and exercise maintenance. A majority of the studies, however, made no
comparisons to a control group. In this study, the rehabilitation patients certainly
gained in their ability to walk, but did not show an equally strong increase in self
efficacy expectancies for walking, while the education control patients did poorly
on the treadmill exercise and showed little change in efficacy expectancies. Previous investigations have shown
that self-efficacy expectancies derived
from successful performance with a particular task generalized along dimensions
of task similarity to other behaviors (Kaplan, Atkins, & Reinsch, 1984). In this
investigation, the hypothesized gradient of
generalizability of self-efficacy
expectancies did not emerge. This finding was unexpected because the study
used the same measure and a similar patient group. One possible explanation for the divergent finding is that the previous study used a fairly specific, cognitive behavioral intervention rather than a medical model rehabilitation intervention as employed in this investigation. The critical difference being the cognitive behavioral intervention stressed internal attributions for behavior change. Various studies have also shown self-efficacy ratings to be predictive of successful performance with many responses including phobias (Bandura, Adams, Hardy, & Howells, 1980), physical stamina (Ewart et al., 1983; Kaplan, Atkins, & Reinsch, 1984; Weinberg, Gould, & Jackson, 1979) and self-regulation of addictive behaviors (Coelho, 1984; Conditte & Lichtenstein, 1981; Godding & Glasgow, 1985). The findings from this investigation suggest that self-efficacy expectancies for walking predict actual treadmill performance. However, self-efficacy judgments did not predict other health status outcomes. This supports self-efficacy theory and suggests that self-efficacy expectancies are task specific and do not necessarily reflect more general outcomes. The finding that the rehabilitation patients reported significantly decreased dyspnea and fatigue following the treadmill endurance walk is important.

Dyspnea is recognized in the literature as one of the most disabling symptoms of
COPD. The literature addresses at length the fear/dyspnea cycle. Basically, the fear/dyspnea cycle refers to the downward cyclical process whereby patients are limited in their functional capabilities because of their fear of dyspnea. This fear of dyspnea often produces increased anxiety and leads to greater feelings of shortness of breath, further limiting the patients ability to engage in activities. At the present time, the interaction of environmental stimuli, psychological variables, physical capacity, and physiological mechanisms on the perception of dyspnea is not well understood. Attempts to reduce the symptom of dyspnea through pharmacological and medical interventions have produced mixed and often conflicting results. The finding from this study suggests that rehabilitation may be an effective method to break the cycle by decreasing the fear associated with dyspnea, ultimately leading to greater functioning. The findings from Part 3 of the study suggest that initial beliefs about abilities to perform a certain behavior are important predictors of subsequent performance capabilities. Prior to the intervention, there was a clear and direct relationship between self-efficacy ratings for walking and actual treadmill performance, with patients high in self-efficacy for walking demonstrating the longest duration on the treadmill. Conversely, those patients...
low in self-efficacy had

the poorest performance on the treadmill. These results are consistent with

previous investigations of health behavior change, and indicate that self-efficacy

is a good predictor of performance. Although initial self-efficacy expectancies for walking predicted treadmill

performance before the intervention, following the intervention, initial self

efficacy expectancies had differential effects on improvements in treadmill per

formance. It was predicted that higher efficacy expectancies would predict

higher performance capabilities. An unexpected finding was that patients in the

rehabilitation group with initially low self-efficacy expectancies showed the

greatest gains in treadmill performance, while those patients with initially high

self-efficacy expectancies had the smallest performance gains. One possible

explanation is that patients with initially low self-efficacy had the greatest

improvement, since a performance ceiling may have prevented those highest in

efficacy at baseline from achieving even higher performance accomplishments.

In other words, the patients who started out at initially low levels of efficacy for

walking had the greatest opportunity for making improvements because they

started out at lower levels of performance. Another possible explanation is that
the rehabilitation program may have produced some increases in efficacy expectancies, and again those with initially low levels had the most to gain. It is also possible that self-efficacy expectancies have less value for those who are already performing at a high level.

CONCLUSIONS Contributions to Self-Efficacy Theory Measurement of self-efficacy. According to self-efficacy theory, self-efficacy expectancies are established through both physiological and psychological feedback. The theory suggests that feedback from physiological indicators has a more central role in establishing efficacy expectancies when there has been little or no exposure to the task or behavior. The results from this investigation lend support to this assertion and suggest that, indeed, physiological variables, as measured by pulmonary function and exercise tests, are associated more strongly with self-efficacy judgments than psychosocial variables. These results demonstrate that self-efficacy expectancies are associated with observable correlates other than the behaviors they presumably govern; thus, providing evidence for the validity of the self-efficacy construct. This is one of a handful of experimental investigations that has systematically evaluated the validity of the construct. Self-efficacy enhancement through success experiences. Self-efficacy theory maintains that efficacy expectancies can be influenced by various sources of
incoming information, the most influential being performance attainment. In this investigation, rehabilitation resulted in significant increases in performance attainment without similar significant increases in self-efficacy. In comparison, the control group experienced no improvements in treadmill performance accomplishment or self-efficacy expectancies. Although self-efficacy theory maintains that performance accomplishment is the most influential factor in enhancing self-efficacy expectancies, the data from this study suggest that self appraisals of performance accomplishment may be attenuated by a number of contextual factors. For example, in this patient population, efficacy changes derived from performance accomplishment may be attenuated by strong physiological feedback. For this reason, even success experiences do not necessarily create strong expectancies of self-efficacy. Therefore, although performance accomplishment is an important factor in building efficacy, the information from successful performance can be attenuated, leading to smaller changes in self-efficacy expectancies than might be expected. The present research findings do not provide unanimous support for principles of self-efficacy theory (Bandura, 1977, 1982, 1986). Self-efficacy theory suggests that while specific procedures for achieving
change may differ for
different clinic populations, the general strategy of
assessing and enhancing self
efficacy expectancies by providing performance mastery
experiences has sub
stantial utility. The results from this investigation raise
some questions about the
functional relationship between successful performance
experiences and
enhancement of efficacy expectancies. Although the value of
efficacy expectancies in health promotion and maintenance has been
demonstrated in
numerous studies, the present results provide mixed support
for the usefulness of
the self-efficacy construct in understanding health
behavior change in COPD
patients. Further investigations into self-efficacy
expectancies in more seriously
ill patients is needed in elucidating the role
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Author Notes Supported by Grant R01 HL 34732 from the National Heart, Lung, and Blood Institute. Address requests for reprints to the second author, Robert M. Kaplan. APPENDIX SELF-EFFICACY EXPECTANCIES MEASURE

Instructions: The following measure describes various tasks and activities. Under the column marked Can Do, put a check mark next to the tasks or activities you expect you could do now. For each of the tasks you checked under Can Do, indicate in the column marked Conf., how confident you are that you could do that task now. Rate the degree of your confidence using a number from 0 to 100 on the scale below: 0 10 20 30 40 50 60 70 80 90 100 Uncertain

LIFTING OBJECTS

Lift a 10 lb. object
Lift a 20 lb. object
Lift a 30 lb. object
Lift a 40 lb. object
Lift a 50 lb. object
Lift a 60 lb. object
Lift a 80 lb. object
Lift a 100 lb. object
Lift a 120 lb. object
Lift a 150 lb. object
Lift a 175 lb. object
CLIMBING (without rest)
Walk up several stairs
Walk up I flight of stairs
Walk up 2 flight of stairs
Walk up 3 flight of stairs
Walk up 4 flight of stairs
PUSHING/MOVING OBJECTS
Move a light weight object
(Kitchen chair)
Move a medium weight
object (Coffee table)
Move a fairly heavy object
(Armchair)
Move a heavy object
(Sofa or Bed) Moderately Certain Certain WALKING
Walk 1 block (5 min.) Walk 2 blocks (10 min.) Walk 3 blocks (15 min.) Walk 4 blocks (20 min.) Walk 5 blocks (25 min.) Walk 1 mile (30 min.) Walk 1.5 miles (45 min.) Walk 2 miles (60 min.) Walk 3 miles (90 min.) GENERAL EXERTION Capable of very light exertion Capable of moderate exertion Capable of hard exertion Capable of extremely hard exertion TOLERANCE OF EMOTIONAL TENSION/STRESS Tolerate mild tension/stress
Tolerate some tension/stress Tolerate moderate tension/stress Tolerate substantial tension/stress Tolerate a great deal of tension/stress TOLERANCE OF ANGER AROUSAL Tolerate mild anger arousal Tolerate some anger arousal Tolerate moderate anger arousal Tolerate substantial anger arousal Tolerate a great deal of anger arousal

Can Do Conf. SELF-EFFICACY MECHANISM IN PSYCHOBIOLOGIC FUNCTIONING Albert Bandura Perceived self-efficacy operates as an important psychological mechanism linking psychosocial influences to health functioning. Perceived self-efficacy affects a wide range of biological processes that mediate human health and disease. Many of these biological effects arise in the context of coping with acute and chronic stressors. Exposure to stressors with a sense of efficacy to control them has no adverse effects. But exposure to the same stressors with perceived inefficacy to control them activates autonomic, catecholamine, and opioid systems and impairs the functioning of the immune system. Depending on their nature, lifestyle habits enhance or impair health status. This enables people to exercise some control over their vitality, quality of health, and rate of aging. Self-efficacy beliefs affect every phase of personal change—whether people even consider changing their health habits; whether they can enlist the motivation and perseverance needed to succeed should they choose to do so; and how well they maintain the changes they have achieved. Health outcomes are related to predictive factors in complex, multidetermined and probabilistic ways. Prognostic judgments, therefore, involve some degree of uncertainty. Because prognostications can alter self-efficacy beliefs, such judgments have a self-validating potential by influencing the course of health outcomes.

The recent years have witnessed a major change in the conception of human health and illness. The traditional approaches relied on a biomedical model which places heavy emphasis on infectious agents, ameliorative medications, and repair of physical impairments. The newer conceptions adopt a broader bio psychosocial model (Engel, 1977). Viewed from this perspective, health and di sease are products of interactions among psychosocial and...
biological factors.

Health is not merely the absence of physical impairment and disease. The bio

psychosocial perspective emphasizes health enhancement as well as disease pre

vention. It is just as meaningful to speak of degrees of wellness as of degrees of

impairment. Thus, for example, there are degrees of immunocompetence, cardio

vascular robustness, physical strength and stamina, movement flexibility and

cognitive functioning. Health enhancement seeks to raise the level of

psychobiological competencies. It is now widely acknowledged that people's health rests partly in their own

hands. In analyzing mortality rates within and between countries, Fuchs (1974)

has shown that expenditures for medical care have only a small impact on life

expectancy. The quality of health of a nation is largely determined by lifestyle

habits, and environmental conditions. People often suffer physical impairments,

and die prematurely of preventable health-impairing habits. Industrial and agri

cultural practices are injecting carcinogens and harmful pollutants into the air we

breathe, the food we eat, and the water we drink, all of which take a heavy toll on

the body. Changing health habits, and environmental practices yields the large

health benefits. Psychosocial determinants of health status operate largely through the exer
cise of personal agency. Among the mechanisms of personal agency, none is more central or pervasive than people's beliefs in their capability to exercise control over their own motivation and behavior and over environmental demands.

Evidence from diverse lines of research shows that perceived efficacy operates as an important psychological mechanism linking psychosocial influences to health functioning. One can distinguish two levels of research on the psychosocial determinants of health functioning in which perceived self-efficacy plays an influential role. The more basic level examines how perceived coping self-efficacy affects biological systems that mediate health and disease. The second level is concerned with the exercise of direct control over the modifiable aspects of health and the rate of aging.

**BIOLOGICAL EFFECTS OF PERCEIVED SELF-EFFICACY**

Perceived self-efficacy can activate a wide range of biological processes that mediate human health and disease. Many of these biological effects arise in the context of coping with acute or chronic stressors in the many transactions of everyday life. Stress has been implicated as an important contributing factor to many physical dysfunctions (Goldberger & Breznitz, 1982; Krantz, Grunberg, & Baum, 1985). Recent investigations with animals have identified controllability
as a key organizing principle regarding the nature of stress effects. Exposure to
stressors with a concomitant ability to control them has no adverse effects. However, exposure to the same stressors without the ability to control them activates neuroendocrine, catecholamine, and opioid systems and impairs the functioning of the immune system (Bandura, 1991; Coe & Levine, 1991; Maier, Laudenslager, & Ryan, 1985; Shavit & Martin, 1987).

Biochemical Effects of Self-Efficacy in Coping With Stressors Social cognitive theory views stress reactions in terms of perceived self-efficacy to exercise control over aversive threats and taxing environmental demands. If people believe they can deal effectively with potential environmental stressors they are not perturbed by them. But if they believe they cannot control aversive events they distress themselves and impair their level of functioning.

Our understanding of the biological effects of uncontrollable stressors is based mainly on experimentation with animals involving uncontrollable physical stressors. Stressors take diverse forms and can produce different patterns of physiological activation. This places certain limitations on extrapolation of conclusions across different species, stressors, and patterns of controllability. Uncontrollable physical stressors are not only stressful but also inflict some physical trauma that
can activate a variety of complicating physiological processes. Most of the im
portant stressors with which humans have to cope involve psychological threats
(Lazarus & Folkman, 1984). Moreover, stress reactions are
governed largely by
perception of coping self-efficacy rather than being triggered directly by the ob
jective properties of threats and environmental demands (Bandura, 1988a). It is
the perception of environmental threats as exceeding one's coping capabilities
that becomes the stressful reality. Efforts to verify the effects of controlling efficacy on biological stress
reactions in humans have relied extensively on correlational or quasi-experi
mental studies in which occurrences of life stressors are related to indices of
biological functioning or infectious illnesses. Such studies leave some ambiguity
about the direction of causality and even whether the biological effects are due to
the stressor or other unsuspected factors operating at the time. To overcome
these problems, we devised a research paradigm combining strong phobic stres
sors with mastery efficacy induction procedures that enables us to examine causal
relationships under laboratory conditions with a high degree of experimental
control over confounding sources of influence. Participants cope with a uniform
stressor that can be varied in intensity. Because a high
sense of controlling efficacy can be quickly instilled through guided mastery experiences, we can create conditions combining exposure to chronic stressors with, and without, perceived controlling self-efficacy. By the end of each study, the phobia is eradicated in all participants so they all gain lasting relief from chronic phobic stressors while contributing to knowledge. Autonomic Activation In studies of autonomic activation, elevation in blood pressure and cardiac acceleration were measured in phobics during anticipation and performance of intimidating tasks corresponding to strong, medium, and weak strength of perceived self-efficacy. Following the test for autonomic reactions, subjects received guided mastery experiences until they perceived themselves to be maximally self-efficacious on all of the previous coping activities. Then their autonomic reactions were again measured. Figure 1 shows the mean change from the baseline level of heart rate and blood pressure as a function of differential strength of perceived self-efficacy. Subjects were viscerally unperturbed by coping tasks they regarded with utmost
ood pressure during anticipatory and performance periods as a function of differential strength of perceived self-efficacy. Refer to base line level, and S, M, and W signify strong, medium, and weak strengths of perceived self-efficacy, respectively. For each physiological measurement, the figure on the left in each pane shows the autonomic reactions related to self-efficacy beliefs of differing strengths (performance arousal at perceived weak self-efficacy is based on only a few subjects who were able to execute only partial performances). The figure on the right of the same pane shows the autonomic reactions after self-beliefs of efficacy were strengthened to the maximal level (Bandura, Reese, & Adams, 1982). Mean change in heart rate mean change in blood pressure

self-efficacy. However, on tasks about which they had moderate doubts about

their coping efficacy, their heart rate accelerated and their blood pressure rose

during anticipation and performance of the activities. When presented with tasks

in their weak self-efficacy range, most subjects promptly rejected them as too far

beyond their coping capabilities to even attempt. Indeed, only a few subjects

were able to do any of them. Although lack of coping action precluded a mean

ingful analysis of performance arousal, data from the anticipatory phase shed

light on how autonomic reactions change when people withdraw from transac
tions with threats they judge will overwhelm their coping
capabilities. Cardiac reactivity promptly declined but blood pressure continued to climb. After perceived self-efficacy was strengthened to the maximal level, everyone performed these previously intimidating tasks without any autonomic activation. Heart rate is affected more quickly than blood pressure by personal restructuring of intimidating task demands, which may explain the different pattern of autonomic reactivity at the extreme level of perceived self-inefficacy. Catecholamines, which govern autonomic activity, are released in different temporal patterns during encounters with external stressors (Mefford et al., 1981). Heart rate is especially sensitive to momentary changes in catecholamine patterns, with epinephrine, which is rapidly released, having a more pronounced effect on cardiac activity than on arterial pressure. Catecholamine Activation Investigation of the biochemical effects of perceived coping efficacy was further extended by linking strength of perceived self-efficacy to plasma catecholamine secretion (Bandura, Taylor, Williams, Mefford, & Barchas, 1985).

The range of perceived coping efficacy in severe phobics was broadened by modeling which conveyed predictive information about the phobic threat and demonstrated effective ways of exercising control over it. They were then pre-sented with coping tasks they had previously judged to be...
in their low, medium, and high self-efficacy range, during which continuous blood samples were obtained through a catheter. Figure 2 presents graphically the microrelations between self-efficacy beliefs and plasma catecholamine secretion. Levels of epinephrine, norepinephrine, and dopac, a dopamine metabolite, were low when phobics coped with tasks in their strong efficacy range. Self-doubts in coping efficacy produced substantial increases in these catecholamines. When presented with tasks that exceeded their perceived coping capabilities the phobics instantly rejected them. Catecholamines dropped sharply. The dopac response differs markedly from the other catecholamines. Where epinephrine and norepinephrine dropped upon rejection of the threatening task, dopac rose to its highest level, even though the phobics had no intention of coping with the task. Dopac seems to be triggered by the mere apperception of environmental demands overwhelming one's perceived coping capabilities. These microrelations between weak, medium, and strong self-percepts of coping efficacy and level of plasma catecholamines secretion. The coping task corresponding to the weak sense of efficacy was rejected (Bandura, Taylor, Williams, Mefford, & Barchas, 1985).
data suggest that under some conditions plasma dopac could reflect activity of

brain dopamine neurons. Such a central contribution would be consistent with the

enhanced dopac concentrations observed with perceived inefficacy to cope with a

task, as shown in Figure 2. After perceived coping efficacy was strengthened to the maximal level by

guided mastery, performance of the previously intimidating tasks no longer elic

ited differential catecholamine reactivity. Thus, the

elevated catecholamine se

cretions observed in the initial test resulted from a perceived mismatch between

coping capabilities and task demands, rather than from properties inherent in the

tasks themselves. The evidence across a variety of biological indices is consis

tent in showing that biological stress reactions to coping activities differ when

perceived self-efficacy differs, but biological reactions are the same when

perceived self-efficacy is raised to the maximal level. The crucial role of controllability in biological

activation is further shown in

microanalysis of changes in catecholamine secretion as phobics gain mastery

over phobic threats through guided mastery treatment (Bandura et al., 1985). In

this approach, phobics quickly gain mastery over threats through aided guided

mastery. As treatment progresses, the mastery aids are discontinued to verify
that coping attainments stem from the exercise of personal
efficacy rather than

from mastery aids. Self-directed mastery experiences are
then arranged to

strengthen and generalize the sense of coping efficacy.

Figure 3 presents the

plasma catecholamine levels at five demarcated stages in
treatment. During the

initial phases of treatment, when phobics lacked a sense of
coping efficacy, even

the mere sight or minimal contact with phobic threat
activated catecholamine re

sponses. After participants gained controlling efficacy,
their catecholamine level
dropped and remained relatively low during the most
intimidating interactions

with the phobic threat. When they were asked to relinquish
all control, which left

them completely vulnerable, catecholamine reactivity
promptly rose. This pat

tern of results is in accord with a mechanism involving
controllability rather than

simple extinction or adaptation over time. Autonomic
arousal to stressors is reduced by self-knowledge that one
can

wield control over them at any time even though that
controlling capability is un

exercised (Glass, Reim, & Singer, 1971). Choosing not to

exercise control at a

particular time, but being able to do so whenever one
wants to, should be distin

guished from relinquished control in which one is deprived
of all means of con

trol while subjected to stressors. Relinquished control
leaves one completely vulnerable, whereas freely usable control, though unexercised at a particular occasion, leaves one in full command. Opioid Activation Endogenous opioids play a paramount role in the regulation of pain (Fanselow, 1986) and as mediators of the effects of uncontrollable stressors on immunocompetence (Shavit & Martin, 1987). Studies with animals subjected to painful stimulation show that stress can activate endogenous opioids that block pain transmission (Fanselow, 1986). Opioid involvement is indicated by evidence that stress-induced analgesia is reduced by opiate antagonists, is blocked by adrenalectomy, and is reinstated by administering corticosterone to adrenalectomized animals (Grau, Hyson, Maier, Madden, & Barchas, 1981; MacLennan et al., 1982). It is not the physically painful stimulation, per se, but the psychological stress over its uncontrollability that seems to be a key factor in opioid activation (Maier, 1986). Animals who can turn off shock stimulation show no opioid activation, whereas yoked animals who experience the same shock stimulation without being able to control its offset give evidence of stress-activated opioids. Another line of research on biological mediators examined the impact of perceived coping efficacy on endogenous opioid activation (Bandura, Cioffi, Taylor, Brouillard, 1988). Differential levels of perceived
cognitive self-efficacy were induced by having subjects exercise control over the pace of cognitive demands or by having the same demands controlled externally at a pace that strained cognitive capabilities. Strong perceived self-efficacy was accompanied by low stress, whereas subjects who judged themselves ineffectual to cope with the cognitive demands experienced high subjective stress and autonomic arousal. Stress can activate endogenous opioids that block pain transmission (Kelley, 1986). Opioid involvement is indicated by evidence that stress-induced analgesia is reduced by opiate antagonists, such as naloxone, which blocks opiate receptors. To test for opioid activation, subjects were therefore administered either naloxone or an inert saline solution, whereupon their pain tolerance was measured at periodic intervals by cold pressor tests. Efficacious subjects, whose high sense of control kept stress low, gave no evidence of opioid activation in that their pain tolerance was unaffected by naloxone (Figure 3). In contrast, the perceived self-ineffectual subjects, who experienced high stress, gave evidence of opiate-mediated analgesia. They displayed high pain tolerance under saline, but found pain difficult to bear under naloxone opioid blockage. The greater the decline in perceived
cognitive efficacy, the greater was the opioid activation. Opioid and Cognitive Mechanisms in Pain Control Pain is a complex psychobiological phenomenon, influenced by psychosocial factors, rather than simply a sensory experience arising directly from stimulation of pain receptors. The same intensity of pain stimulation can give rise to different levels of conscious pain depending on how attention is deployed, how the experience is cognitively appraised, the coping strategies used to modulate pain, and on modeled reactions to nociceptive stimulation (Cioffi, 1991; Craig, 1986; Turk, Meichenbaum, & Genest, 1983). Pain can be regulated through different mechanisms. We have already examined how pain sensations can be counteracted at the locus of pain receptors by opioid blockage. Pain can also be regulated by central processes involving attentional and other cognitive activities that reduce consciousness of pain sensations.

Figure 3 Percent change in pain tolerance as a function of perceived self-efficacy to exercise control over cognitive demands and whether people received saline or the opiate antagonist, naloxone (Bandura, Cioffi, Taylor, & Brouillard, 1988). There are several ways by which perceived coping efficacy can bring relief from pain by cognitive means. People who believe they can alleviate pain enlist whatever ameliorative skills they have learned and will persevere in their efforts to reduce the level of experienced pain. Those who judge themselves as ineffectual...
cious give up readily in the absence of quick relief. Consciousness has a very
limited capacity (Kahneman, 1973). It is hard to keep more than one thing in
mind at the same time. If pain sensations are supplanted in consciousness, they
are felt less. Dwelling on pain sensations only makes them more noticeable and,
thus, more difficult to bear. Perceived self-efficacy can lessen the extent to
which painful stimulation is experienced as conscious pain by diverting attention
from pain sensations to competing engrossments. Thus, for example, attentional
diversion enables long-distance runners to press on even though their body is
wracked in pain. Were they to focus on their mounting pain sensations they
could not continue for long. During deep engrossment in activities people can be
come oblivious to chronic pain sensations. Finally, people who believe they can
exercise some pain control are likely to interpret unpleasant bodily sensations and
states more benignly than those who believe there is nothing they can do to allevi
viate pain (Cioffi, 1991). Construals that highlight the sensory rather than the
aversive aspects of pain reduce distress and raise pain tolerance (Ahles,
Blanchard, & Leventhal, 1983). Results of several lines of research indicate that perceived self-efficacy can
mediate the analgesic potency of different psychological procedures. Reese
(1983) found that cognitive pain control techniques, self-relaxation, and placebos 40 HIGH SELF-EFFICACY
NALOXONE SALINE 30 20 10 0 -10 -20 0 5 LOW
SELF-EFFICACY NALOXONE SALINE 15 30 0 5 15 30 TIME OF
POST-INJECTION TESTS (min) % CHANGE IN PAIN INTENSITY
E R A N C E ( s e c )

all increase perceived self-efficacy to cope with and ameliorate pain. The more

self-efficacious the people judged themselves to be, the less pain they experienced in later cold pressor tests, and the higher was their pain threshold and pain tolerance.

Arbitrary persuasory influences, in the form of bogus feedback that one's pain tolerance is high or low compared to that of others, similarly alters people's beliefs in their efficacy to manage pain which, in turn, raises and lowers their actual pain tolerance, respectively (Litt, 1988). Change in self-efficacy belief is a better predictor of pain tolerance than is past level of pain tolerance. Arbitrarily instilled perceived inefficacy restricts pain coping behavior even when the opportunity to exercise personal control exists, whereas heightened perceived self-efficacy largely overrides ostensible external constraints on personal control of pain. Biofeedback is widely used as a muscle relaxation procedure to ameliorate pain. Holroyd and his colleagues have shown that the benefits of biofeedback training stem more from boosts in perceived coping efficacy than from the
muscular exercises themselves (Holroyd et al., 1984). Perceived self-efficacy, created by false feedback that one is a skilled relaxer for controlling pain, predicted reduction in tension headaches, whereas the actual amount of change in muscle activity achieved in treatment was unrelated to the incidence of subsequent headaches. Studies of alternative cognitive mechanisms of pain tolerance reveal that perceived self-efficacy to manage pain predicts pain tolerance, whereas outcome expectations of the amount of pain anticipated for engaging in aversive activities do not independently affect how much pain people endure when variations in perceived self-efficacy were controlled (Williams, Kinney, & Falbo, 1989). That perceived self-efficacy makes pain easier to manage is further corroborated by studies of acute and chronic clinical pain (Council, Ahern, Follick & Kline, 1988; Dolce, 1987; Lorig, Chastain, Ung, Shoor, & Holman, 1989; Manning & Wright, 1983; O’Leary, Shoor, Lorig, & Holman, 1988). At first sight, helplessness theory and self-efficacy theory appear to be at odds on how controlling efficacy relates to pain tolerance and the mechanisms mediating it. Endurance of pain is associated with deficient control over stressors in helplessness theory, but with controlling efficacy in self-efficacy theory. There are several possible explanations for this seeming
contradiction. It might be reasoned, from research on stress-induced analgesia, that coping efficacy may enhance pain control mainly through nonopioid mechanisms. Because a high sense of coping efficacy renders aversive situations less stressful, it would reduce stress activation of opioids. Although there may be less opioid blockage of pain, exercise of personal efficacy that occupies consciousness with engrossing matters can block awareness of pain sensations by a nonopioid cognitive mechanism. A second plausible explanation for the paradoxical findings is in terms of the markedly different consequences of control in the types of coping situations used.

The exercise of control produces fundamentally different conditions of pain stimulation in the situations commonly used in animal and human studies of pain that would argue for some opioid involvement with high self-efficacy. In the usual animal experimentation, behavioral control promptly terminates pain stimulation. By contrast, in the human situation, efficacious exercise of cognitive control over pain sensations enables people to tolerate high levels of pain stimulation but, in so doing, it promotes even more active engagement in activities that can heighten the level and duration of pain stimulation. A strong sense of coping efficacy often increases engagement in pain-generating activities to the point where it can
create stressful predicaments. Thus, for example, self-efficacious people suffer from arthritis generate pain and discomfort when they first take on more vigorous activities. Activity eventually improves function and reduces pain but in the short term it increases pain and distress. Similarly, people experience mounting pain the longer they keep their hand immersed in icy water in the cold pressor task. Indeed, in the latter situation, continued exercise of controlling efficacy through cognitive means eventually heightens pain to the point where it begins to overwhelm people’s coping capabilities and they begin to experience the intense pain stimulation as unbearable. The stress of failing control with mounting pain in later stages of coping would activate opioid systems. In this conception of the human coping process, both opioid and nonopioid mechanisms operate in the regulation of pain, but their relative contribution varies with degree of controlling efficacy and phases of coping. A nonopioid mechanism would subserve pain tolerance while cognitive control effectively shuts out pain sensations from consciousness or renders them less aversive by benign construal. But an opioid mechanism would come into play in later phases of coping when control techniques become insufficient to attenuate mounting
pain or to block it from consciousness. Thus, opioid activation would remain low during successful phases, but high during the more stressful failing phases of cognitive control. Research in which exercise of personal efficacy lowers stress rather than fosters activities of mounting aversiveness that eventually overwhelms coping capabilities yields findings similar to those from studies of uncontrollable physical stressors (Bandura et al., 1988). Perceived self inefficacy raises pain tolerance through opioid activation. Evidence for pain control through the dual mechanisms is provided by a study in which individuals were either taught cognitive methods of pain control, administered a placebo presented as a medicinal analgesic, or they received no intervention (Bandura, O'Leary, Taylor, Gauthier, & Gossard, 1987). Following the treatment phase, their perceived efficacy to control pain, and to reduce it, and their tolerance of cold pressor pain were measured. Participants in all conditions were then administered either naloxone, an opiate antagonist, or an inert saline solution, and thereafter their pain tolerance was measured at periodic intervals. Training in cognitive control heightened perceived self-efficacy to endure and reduce pain (Figure 4). Placebo medication had a differential impact on perceived efficacy to endure pain and perceived efficacy to reduce its intensity. Peo
people believed they were better able to withstand pain with the aid of a supposedly pain-relieving medication. However, success in reducing experienced pain depends on effective exercise of pain ameliorating skills, which medication alone does not provide. Placebo medication did not persuade people that they became more capable of reducing the intensity of pain. These findings underscore the value of measuring different aspects of perceived self-efficacy in research designed to elucidate the exercise of control over pain. Perceived self-efficacy predicted how well people managed pain. The stronger their ability to withstand pain, the longer they endured mounting pain, regardless of whether their perceived self-efficacy was enhanced by cognitive means or by placebo medication or varied preexistantly without any intervention. A strong sense of efficacy to endure pain predicts tolerance of mounting pain when initial differences in pain tolerance are controlled.

Figure 4 Percent change from pretest level in perceived self-efficacy and pain tolerance achieved by people who were taught cognitive pain control techniques, administered a placebo, or received no intervention (Bandura, O’Leary, Taylor, Gauthier, & Gossard, 1987). The findings provide evidence for both an opioid-mediated component and a nonopioid component for attenuating the impact of pain stimulation by cognitive means. As can be seen in Figure 4, cognitive copers who
were administered saline displayed a sizable increase in pain tolerance. In contrast, when pain reducing opioids are blocked by naloxone, cognitive copers found it more difficult to manage pain. However, cognitive copers were able to increase their pain tolerance even under opioid blockage, which lends support for a nonopioid component as well in the exercise of cognitive control.

For cognitive copers administered saline the combined action of both opioid and cognitive control contributed to their ability to achieve a sizable increase in pain tolerance.
The correlational findings shed some light on how different forms of self-efficacy relate to opioid activation under different modes of coping. Coping with heightened pain under opioid blockage requires active exercise of strategies for alleviating pain rather than mere forbearance. People who judge themselves to be good pain copers would be especially distressed by their eventual ineffectiveness to manage their pain. Thus, the degree of opioid activation is best predicted by perceived capability to reduce pain. The stronger the subjects' perceived self-efficacy to reduce pain, the greater was the opioid activation. The strength of this relationship is further increased when initial ability to tolerate pain is controlled by partial correlation. The findings also provide some evidence that placebo medication may activate some opioid involvement. After the full time had elapsed for naloxone to exert its antagonistic effect, people in the naloxone condition were less able to
tolerate pain than those who had been given saline. These findings are in accord with those of Levine and his associates showing that endogenous opioids can be activated by placebo medication to reduce postoperative dental pain (Levine, Gordon, & Fields, 1978; Levine, Gordon, Jones, & Fields, 1978). A socially administered placebo produces analgesia, whereas unsignaled mechanical infusion of the placebo that goes undetected by patients has no analgesic effect (Levine & Gordon, 1984). Placebo-induced analgesia may involve both a nonopioid cognitive component and a stress analgetic component that is antagonizable by naloxone (Gracely, Dubner, Wolskee & Deeter, 1983). In the study under discussion, placebo medication had its major impact on perceived self-efficacy to withstand pain. Therefore, it was this expression of efficacy that predicted degree of opioid involvement. The strength of the placebo response is predictable from how the placebo affects perceived self-efficacy to endure pain (Bandura et al., 1987). People who judge themselves efficacious to withstand pain given a supposed medicinal aid are good pain endurers, whereas those who continue to distrust their efficacy to manage pain despite receiving the placebo medication are less able to bear pain. For people who lack assurance in their efficacy, the
evident failure to achieve relief from pain, even with the help of a medicinal analgesic, is only further testimony for their coping inefficacy. So far the discussion has focused on self-efficacy regulation of pain through cognitive supplanting or construal of pain sensations and stress-induced opioid activation. There is a third possible mechanism that merits serious consideration as well. Self-efficacy expectations may directly activate the central nervous system to release pain-blocking opioids independently of stress. Animals can learn to activate their endogenous opioid systems anticipatorily in the presence of cues formerly predictive of painful experiences (Watkins & Mayer, 1982). Such findings add some credence to the possibility of direct central activation of opioid systems. Perceived Coping Self-Efficacy and Immunocompetence Several lines of evidence suggest that psychosocial factors modulate the immune system in ways that can influence susceptibility to illness (Coe & Levine, 1991; Kiecolt-Glaser & Glaser, 1987; Locke et al., 1985; O'Leary, 1990). The types of biological reactions that have been shown to accompany perceived coping efficacy, such as autonomic activation, catecholamines, and endogenous opioids, are involved in the regulation of the immune system. There are three major pathways through which perceived self-efficacy can affect immune func
tion. They include mediation through stress, depression and expectancy learning. Stress mediation. The ability to exercise control over potential stressors can have significant impact on the cellular components of the immune system. Exposure to intermittent stressors without the ability to control them causes impairment in various facets of immune function, whereas exposure to the same stress ful events, but with efficacy to control them, has no adverse effects on immune function (Coe & Levine, 1991; Maier et al., 1985). There is evidence that some of the immunosuppressive effects of inefficacy in controlling stressors, such as reduced natural killer cell cytotoxicity, are mediated by release of endogenous opioids (Shavit & Martin, 1987). When opioid mechanisms are blocked by opiate antagonists, the stress of coping inefficacy loses its immunosuppressive power. These findings are based on experimentation with animals involving uncontrollable physical stressors. Human coping involves an important feature that is rarely examined in either animal laboratory paradigms or human field studies. In animal experimentation, controllability is usually studied as a fixed dichotomous property in which animals either exercise complete control over physical stressors or they have no control whatsoever. In contrast, human coping usually entails an ongoing pro
cess of developing one's coping efficacy rather than unalterable self-infficacy in
the face of unremitting bombardment by stressors. Most human stress is activat
ed in the course of learning how to exercise control over environmental demands
and while developing and expanding competencies. Stress activated in the pro
cess of acquiring coping self-efficacy may have very different effects than stress
experienced in aversive situations with no prospect in sight of ever gaining any
self-protective efficacy. There are substantial evolutionary benefits to experienc
ing enhanced immunocompetence during development of coping capabilities
vital for effective adaptation. It would not be evolutionarily advantageous if
acute stressors invariably impaired immune function, because of their prevalence
in everyday life. If this were the case, people would experience high
vulnerability to infective agents that would quickly do them in. Efforts to determine the immunologic effects of psychological stressors in
humans have relied extensively on correlational or quasi-experimental studies in
which occurrences of life stressors are related to the incidence of infectious ill
nesses or to indices of immunologic functioning (Jemmott & Locke, 1984;
O'Leary, 1990; Palmblad, 1981). Exposure to stressors is usually accompanied
by impairment of the immune system. These lines of research
have clarified some aspects of inefficacious control of stressors, but experimental studies are needed to verify the direction of causality. That stress aroused while gaining coping mastery over acute stressors can enhance different components of the immune system is revealed in a study of exposure to a chronic stressor with experimentally varied perceived coping self-efficacy (Wiedenfeld et al., 1990). In this experiment, we measured in severe phobics their strength of perceived coping self-efficacy, autonomic and neuroendocrine activation and different aspects of their immune system at three phases--during a baseline control phase involving no exposure to the phobic stressor; a perceived self-efficacy acquisition phase in which they gained an increasing sense of coping efficacy over the stressor through guided mastery; and

Figure 5 Changes in components of the immune system experienced as percent of baseline values during exposure to the phobic stressor while acquiring perceived coping self-efficacy (Efficacy Growth) and after perceived coping self-efficacy had been developed to the maximal level (Maximal Efficacy). The baseline mean values for the different immune functions were as follows: Total lymphocytes = 1572; T lymphocytes = 1124; Helper T-cells = 721; Suppressor T-cells = 370; Helper/Suppressor ratio = 2.22; HLA-DR = 216 (Wiedenfeld, O'Leary, Bandura, Brown, Levine, & Raska, 1990). 25 % CHANGE FROM BASELINE

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a perceived maximal self-efficacy phase during which they coped with the same
stressor after they had developed a complete sense of coping efficacy. As may be seen in Figure 5, development of strong perceived self-efficacy to
control stressors had an immunoenhancing effect. However, a small subgroup of
individuals exhibited a decrease in immune system status during the efficacy
acquisition phase. The rate of efficacy acquisition is a good predictor of whether
exposure to acute stressors enhances or attenuates the immune system. Rapid
growth of perceived coping efficacy reduces stress with concomitant immunoenhancing effects, whereas slow growth of perceived coping efficacy is associated
with prolonged high stress and immunosuppressing effects. High autonomic and
neuroendocrine activation also attenuate components of the immune system, but
their impact is somewhat weaker. Acquisition of perceived self-efficacy to control stressors produced more than simply transient changes in immunity. The increase in immunologic competence was generally sustained over time as evident in the significantly higher
immune system status in the maximal perceived self-efficacy phase than in the
baseline phase. Rapid growth of perceived self-efficacy also predicted mainte
nance of immunocompetence during the maximal perceived self-efficacy phase.
These findings indicate that vigorous mastery of chronic stressors not only instills a strong sense of self-efficacy but leaves lasting changes that can serve as protective factors against adverse immunologic effects of psychological stressors. The field of health functioning has been heavily preoccupied with the physiologically debilitating effects of stressors. Self-efficacy theory also acknowledges the physiologically strengthening effects of mastery over stressors. A growing number of studies are providing empirical support for physiological toughening by successful coping (Dienstbier, 1989). Any comprehensive theory of psycho-social modulation of health functioning must specify the determinants and mechanisms governing both debilitating and toughening effects of coping with stressors. Depression mediation. Bereavement and depression have been shown to reduce immune function and to heighten susceptibility to disease (Ader & Cohen, 1985; Coe & Levine, 1991). Depressive states are, therefore, often associated with increased incidence of infectious disease, development and spread of malignant neoplasms and accelerated rate of tumor cell growth. These findings suggest that another possible path of influence of coping inefficacy on immunocompetence operates through the mediating effects of depression. A sense of inefficacy to fulfill desired goals that affect evaluation of
self-worth and to secure things that bring satisfaction to one's life creates depression (Bandura, 1988b; Kanfer & Zeiss, 1983). Moreover, a low sense of cognitive efficacy to turn off perturbing ruminations contributes to the depth, duration and recurrence of bouts of depression (Kavanagh & Wilson, 1989). Supportive relationships help to lessen the aversive impact of adverse life events that can give rise to depression. When the self-doubts concern one's social capabilities, they induce depression both directly and indirectly by curtailing social relationships that can provide satisfactions and buffer the effects of chronic daily stressors (Cutrona & Troutman, 1986; Holahan & Holahan, 1987a, 1987b). O'Leary and her associates report findings that are in accord with depression mediation of immunity (O'Leary et al., 1988). A low sense of efficacy to exercise control over one's health functioning was accompanied by high levels of stress and depression, each of which was, in turn, associated with lowered functioning of several facets of the immune system. Central mediation. The central nervous system can exert regulatory influence on immune function. Thus, a third possible path of influence of perceived self-efficacy is through central expectancy modulation of immunologic reactivity.

Ader and Cohen (1981) have shown in animal experimentation...
immune function is influenceable by expectancy learning. In studies with humans, induced expectations have been shown to affect physical reactions to allergens and antigens (Fry, Mason, & Pearson, 1964; Smith & McDaniel, 1983). Experiences involving successful or failed efforts to manage environmental demands produce cognitive changes in beliefs about personal efficacy that have significant physiological consequences when the environmental stressor is no longer present (Bandura et al., 1988). Thereafter, mere thoughts about one's coping efficacy lower autonomic activation in those whose perceived self-efficacy had been enhanced, but heighten autonomic reactions in those whose sense of coping efficacy was diminished. Such findings raise the possibility that situationally aroused self-expectations of coping efficacy may produce anticipatory immunosuppressive or immunoenhancing effects. PERCEIVED SELF-EFFICACY AND ADOPTION OF HEALTH PRACTICES Lifestyle habits can enhance or impair health status. This enables people to exercise some control over their vitality and quality of health. Fries and Crapo (1981) have marshalled a large body of evidence that the upper limit of the human life span is fixed biologically. Figure 6 shows the mortality curves for a society at different periods of time. People are now living longer. Psychosocial
factors partly determine how much of the potential lifespan is realized and the

quality of life that is lived. The ideal outcome can be approximated by exercising

control over modifiable factors that slow the process of aging and forestall the
development of chronic diseases and infirmities. The goal is to enable people to
live their expanded lifespan productively with minimum dysfunction, pain and
dependence. The physical problems of "old age" get compressed into a short
period at the very end of the lifespan. One makes a rapid, dignified exit when a
vital system finally gives out.

Figure 6 National survival curves in the United States for different periods of time. In the ideal survival curve for a society, people exercise control over modifiable aspects of disease and aging so they live their expanded lifespan with minimum dysfunction (Fries, 1989). The impact of efficacy beliefs on the modifiable aspects of health and aging constitutes the second major level of research. Perceived self-efficacy affects every phase of personal change—whether people even consider changing their health habits; whether they can enlist the motivation and perseverance needed to succeed should they choose to do so; and how well they maintain the changes they have achieved. Initiation of Personal Change People's beliefs that they can motivate themselves and regulate their own behavior plays a crucial role in whether they even consider changing detrimental
health habits or pursuing rehabilitative activities (Beck & Lund, 1981; Brod & Hall, 1984). The perceived inefficacy barrier to preventive health is all too familiar in people’s resignation concerning health risks, such as smoking or obesity, over which they can exercise control. They see little point to even trying if they believe they do not have what it takes to succeed. If they make an attempt, they give up easily in the absence of quick results or setbacks. Efforts to get people to adopt health practices that prevent disease rely heavily on persuasive communications in health education campaigns. Meyers and Chaiken (1987) examined four alternative mechanisms through which health communications could alter health habits—by transmission of factual information; fear arousal; change in risk perception; and enhancement of perceived self-efficacy. They found that health communications fostered adoption of preventive health practices primarily by their effects on perceived self-efficacy. Analyses of how community-wide media campaigns change health habits similarly reveal that both the preexisting and induced level of perceived self-efficacy play an influential role in the adoption and social diffusion of health practices (Maibach, Aora, & Nass, 1999; Slater, 1989). The stronger the preexisting per...
ceived self-efficacy, and the more the media campaigns enhance people's self-regulative efficacy, the more they are to adopt the recommended practices (Figure 7). To help people change health-impairing habits clearly requires a shift in emphasis from trying to scare people into health, to empowering them with the tools and self-beliefs of efficacy to exercise control over their health habits.

Figure 7 Path analysis of the influence of perceived self-efficacy on health habits in community-wide programs to reduce risk of cardiovascular disease. The initial numbers on the paths of influence are the significant path coefficients for adoption of healthy eating patterns; the numbers in parentheses are the path coefficients for regular exercise (Maibach, Flora, & Nass, 1991). Achievement of Personal Change Effective self-regulation of health behavior is not achieved through an act of will. It requires development of self-regulative skills. To build people's sense of controlling efficacy, they must develop skills on how to influence their own motivation and behavior. In such programs, they learn how to monitor the behavior they seek to change, how to set short-range attainable subgoals to motivate and direct their efforts, and how to enlist incentives and social supports to sustain the effort needed to succeed (Bandura, 1986). Once empowered with skills and self-belief in their capabilities, people are better able to adopt behaviors that promote health and to eliminate those that impair it. They benefit more from
treatments for physical disabilities and their psychological well-being is less adversely affected by chronic impairments. A growing body of evidence reveals that the impact of different therapeutic interventions on health behavior is partly mediated through their effects on perceived self-efficacy. The stronger the perceived self-efficacy they instill, the more likely are people to enlist the personal resources and sustain the level of effort needed to adopt and maintain health-promoting behavior. This has been shown in studies conducted in such diverse areas of health as enhancement of pre-existing self-efficacy: community health campaign (.35 (.32) .16 (.16) change in self-efficacy adoption of health habits .35 (.32)), pulmonary function in patients suffering from chronic obstructive pulmonary disease (Kaplan, Atkins, & Reinsch, 1984); recovery of cardiovascular function in postcoronary patients and activity level following cardiac surgery (Gortner & Jenkins, 1990; Taylor, Bandura, Ewart, Miller, & DeBusk, 1985); reduction in pain and dysfunction in rheumatoid arthritis (Lorig, Chastain, et al., 1989; O'Leary et al., 1988); amelioration of tension headaches (Holroyd et al., 1984); control of labor and childbirth pain (Manning & Wright, 1983); management of chronic low back, neck and leg pain and impairment (Council et al., 1988); stress reduction (Bandura, Reese, & Adams, 1982; Bandura et al., 1985); adjustment to
abortion (Major et al., 1990); weight reduction (Bernier & Avard, 1986; Glynn & Rudner, 1986; Jeffrey et al., 1984; Stotiand, Zuroff, & Roy, 1991); exercise of control over bulimic behavior (Love, Ollendick, Johnson, & Schlezinger, 1985; Schneider, O'Leary, & Agras, 1987; Wilson, Rossiter, Kleifield, & Lindholm, 1986); reduction of cholesterol through dietary means (McCann, Follette, Driver, Brief, & Knopp, 1980); adherence to prescribed remedial activities (Ewart, Stewart, Gillilan, & Kelemen, 1986; McCaul, Glasgow, & Schafer, 1987); adoption and long-term adherence to a regular program of physical exercise (Desharnais, Bouillon, & Godin, 1986; McAuley, 1991; Sallis et al., 1986; Sallis, Pin ski, Grossman, Patterson, & Nader, 1988); maintenance of diabetic self-care (Crabtree, 1986); effective management of sexual coercions and contraceptive use to avoid unwanted pregnancies (Levinson, 1986); control of sexual practices that pose high risk for transmission of AIDS (Mckusick, Coates, Morin, Pollack, & Hoff, 1990; O'Leary, Goodhart, Jemmott, & Boccher-Lattimore, 1991); and exercise of control over drug use (Gossop, Green, Phillips, & Bradley, 1990), alcohol abuse (Sitharthan & Kavanagh, 1991; Solomon & Annis, 1990), and cigarette smoking (Coletti, Supnick, & Payne, 1985;
DiClemente et al., 1991:

McIntyre, Lichtenstein, & Mermelstein, 1983). Maintenance of Personal Change Habit changes are of little consequence unless they endure. Maintenance of habit change relies heavily on self-regulatory capabilities and the functional value of the behavior. Development of self-regulatory capabilities requires instilling a resilient sense of efficacy as well as imparting skills. Experiences in exercising control over troublesome situations serve as self-efficacy builders. This is an important aspect of self-management because if people are not fully convinced of their personal efficacy they rapidly abandon the skills they have been taught when they fail to get quick results or suffer reverses. Studies of behavior that is amenable to change, but which is difficult to sustain over an extended period, show that perceived self-inefficacy increases vulnerability to relapse (Bandura, 1991). Moreover, perceived efficacy predicts how participants are likely to respond to subsequent relapse, should it occur. Those who have a strong belief in their efficacy tend to regard a slip as a temporary setback and reinstate control. In contrast, those who distrust their self-regulative capabilities display a marked decrease in perceived self-efficacy after a slip and relapse completely. People's beliefs about their efficacy can be altered in four principal ways (Bandura, 1986). The most effective way of instilling a
strong sense of efficacy

is through mastery experiences. Successes build a robust sense of efficacy. Failures undermine it, especially if failures occur early in the course of events. The second method is through modeling. The models in people's lives serve as sources of competencies and motivation. People partly judge their capabilities in comparison with others. Seeing people similar to oneself succeed by perseverant effort, raises observers' beliefs about their own capabilities. The failures of others, instill self-doubts about one's own ability to master similar tasks. Social persuasion is the third mode of influence. Realistic boosts in efficacy can lead people to exert greater effort, which increases their chances of success. People also rely partly on their physiological state in judging their capabilities. They read their anxiety arousal and tension as signs of vulnerability to dysfunction. In activities involving strength and stamina, people interpret their fatigue, aches, and pains as indicants of physical inefficacy. The fourth way of modifying efficacy beliefs is to reduce people's physiological overreactions or change how they interpret their somatic sensations. Each of these modes for enhancing self-efficacy can be put to the service of developing the resilient sense of perceived efficacy needed to override difficul
ties that inevitably arise from time to time. With regard to the enactive mastery mode, a resilient sense of personal efficacy is built through structured demonstration trails in the exercise of control over progressively more challenging tasks. For example, as part of instruction in cognitive control strategies, arthritic patients were given efficacy demonstration trials in which they performed selected pain-producing activities with, and without, cognitive control and rated their pain level (O'Leary et al., 1988). Explicit evidence that they achieved substantial reduction in experienced pain with cognitive control provided the patients with persuasive demonstrations that they could exercise some control over pain by enlisting cognitive strategies. Self-efficacy confirming trials not only serve as efficacy builders, but put to trial the value of the techniques being taught. Modeling influences, in which other patients demonstrate how to cope with difficult situations, reinstate control should a setback occur and show that success usually requires tenacious effort, can further strengthen perceived self-efficacy.

Moreover, modeled perseverant success can alter the diagnosticity of failure experiences as partly reflecting difficult situational predicaments rather than solely inherent personal limitations. Difficulties and setbacks prompt redoubling of efforts rather than provoke self-discouraging doubts.
about one's coping capabilities. Persuasive influences that instill self-beliefs conducive to optimal utilization of skills can also contribute to staying power. As a result, people who are persuaded they have what it takes to succeed and are told that the gains achieved in treatment verify their capability are more successful in sustaining their altered health habits over a long time than those who undergo the same treatment without the efficacy-enhancing component (Blittner, Goldberg, & Merbaum, 1978).

Successful persuasive efficacy enhancers do more than convey positive appraisals. In addition to raising people's beliefs in their capabilities, they structure situations for them in ways that bring success and avoid placing them prematurely in situations where they are likely to fail. By maintaining an efficacious attitude that gains are attainable when clients are beset with self-doubts, they can be helped to sustain their coping efforts in the face of reverses and discouraging obstacles. Self-efficacy in the Causal Structure of Social Cognitive Theory Perceived self-efficacy operates within social cognitive theory as one of many determinants that regulate human motivation, emotional activation and behavior (Bandura, 1986). In addition to the regulative function of self-efficacy beliefs, outcome expectations concerning the effects that may flow from different
forms of behavior contribute to health behavior. These outcome expectations take the form of detrimental or beneficial physical effects, favorable or adverse social consequences, and positive or negative self-reactions. Cognized goals and internal standards rooted in value systems also create self-incentives and guides for health behavior. Cognitive and behavioral strategies aid in the translation of self-beliefs, outcome expectations and personal goals to successful action. Dzewaltowski and his colleagues tested the predictiveness of a subset of sociocognitive determinants that included perceived self-efficacy to adhere to health-promoting behavior, outcome expectations of physical benefits, and self-evaluative reactions to one's behavioral attainments (Dzewaltowski, 1989; Dzewaltowski, Noble, & Shaw, 1990). These three factors accounted for a substantial amount of variance in health-promoting behavior. A number of conceptual models, founded largely on expectancy-value theory, have been devised to predict adoption of preventive health practices (Becker & Maiman, 1983; Rosenstock, Strecher, & Becker, 1988; Schwarzer, 1992). They include such variables as the perceived severity of, and susceptibility to, a health threat, the perceived effectiveness and costs of the protective action, and the anticipated outcomes for different courses of action. Recent
efforts to increase the predictiveness of such models have added the self-efficacy determinant to the usual set of predictors. Self-efficacy beliefs make a significant independent contribution to health behavior within the expanded models (Ajzen & Madden, 1986; De Vries, Dijkstra, & Kuhlman, 1988; McCaul et al., 1987; McCaul, O'Neill, & Glasgow, 1988; O'Leary et al., 1991; Schifter & Ajzen, 1985; Schwarzer, 1992). The development of a comprehensive conceptual model of health behavior should be guided by the principle of parsimony. The extant conceptual models multiply predictive factors in two ways: through redundancy by including essentially the same determinant under different names; and by fractionating a higher order construct into facets and labeling them with dissimilar names as though they represented fundamentally different classes of determinants. These points can be illustrated by comparing the causal structure of social cognitive theory and the Ajzen and Fishbein (1980) theory of reasoned action. According to the theory of reasoned action, the intention to engage in a behavior is governed by attitudes toward the behavior and by subjective norms. Attitude is measured in terms of perceived outcomes and the value placed on those outcomes. Norms are measured by perceived social pressures by significant others and one's motivation to comply with their
expectations. The latter factor corresponds to expectations of social outcomes for a given behavior. In social cognitive theory normative influences regulate actions through two regulatory processes—social sanctions and instated self-sanctions. Norms influence behavior anticipatorily by the social consequences they provide. Behavior that fulfills social norms gains positive social reactions; behavior that violates social norms brings social censure. People do not act like weathervanes, constantly shifting their behavior to conform to whatever others might want. Rather, they adopt certain standards of behavior for themselves and regulate their behavior anticipatorily through self-evaluative consequences. They do things that give them self-satisfaction, they refrain from behaving in ways that violate their standards because it will bring self-censure. Social norms convey behavioral standards. Adoptions of modeled standards create a self-regulatory system that operates through internalized self-sanctions. If one looks beyond the divergent terminology, the determinants singled out by Fishbein and Ajzen overlap with a subset of the determinants encompassed by social cognitive theory. Attitudes and subjective norms represent different classes of outcome expectations. Intentions are essentially goal representations. The
overlap in determinants is confirmed empirically by Dzewaltowski and his colleagues (Dzewaltowski, 1989; Dzewaltowski et al., 1990). After establishing the contribution to health behavior of three sociocognitive determinants (i.e., perceived self-efficacy, outcome expectations of physical benefits, and self-evaluative consequences), the investigators added attitudes and norms from the Fishbein and Ajzen model to the multiple regression equation. Attitudes and norms did not account for any unique variance in health behavior over and above the social cognitive determinants. Many of the constructs of different conceptual models of health behavior measure similar classes of determinants. But the theories differ in how well they are grounded in knowledge of regulatory mechanisms and in principles for constructing effective interventions. Health belief models seem to be concerned mainly with predicting health behavior, but they say little about how to design programs to change it. Indeed, some of the determinants tend to be conceptualized in ways that do not lend themselves easily to feasible guidelines for personal change. For example, consider the intention determinant in the model of reasoned action. Intentions presumably control actions. But one is left with considerable prescriptive ambiguity on how to change attitudes.
and social norms that
are said to create intentions. In contrast, research
conducted within the socio
cognitive framework has given us a large body of knowledge
on how to develop
self-regulatory capabilities, structure goals and feedback
systems, and mobilize
social supports to foster and maintain changes in health
practices (Bandura, 1986;
Holroyd & Creer, 1986; Maccoby & Solomon, 1981; Puska,
Nissinen, Salonen,
& Toumulehto, 1983; Winett, King, & Altman, 1989).
Self-Regulatory Model of Health Promotion and Risk
Reduction
Health care expenditures are soaring at a rapid
rate (Fuchs, 1990). Despite
the huge outlays for health services people are often
poorly served by traditional
health delivery systems. With people living longer and the
need for health care
services rising with age, societies are confronted with
major challenges on how to
keep people healthy throughout their lifespan, otherwise
they will be swamped
with burgeoning health costs. This requires intensifying
health promotion efforts
and restructuring health delivery systems to make them
more productive. Health promotion and risk reduction
programs are often structured in ways
that are costly, cumbersome and minimally effective. If
services are funneled
through physicians, it often creates a bottleneck in the
system. Many of them do
not know how to change high risk behavior. Even if they
did, they cannot spare
much time for any individual or make much money doing it. The net result is minimal prevention and costly remediation. Self-management programs based on the self-efficacy model improve the quality of health and greatly reduce utilization of medical services. DeBusk and his colleagues devised an efficacy-based model combining self-regulatory principles with computerized implementation that promotes habits conducive to health and reduces those that impair it. This computerized self-regulatory system equips participants with the skills and personal efficacy to exercise self-directed change. It includes exercise programs to build cardiovascular capacity; dietary programs to reduce risk of heart disease and cancer; weight reduction programs; smoking cessation programs; and stress management programs to reduce the wear and tear on the body. For each risk factor, individuals are provided with detailed guides on how to alter their habits, along with a self-monitoring, goal setting, and feedback system to facilitate their efforts at self-directed change. A single program implementor, assisted by the computerized system, oversees the behavioral changes of large numbers of participants. Figure 8 portrays the structure of the self-regulatory system. At selected intervals, the computer generates and mails to participants individually-tailored guides for self-directed change that specify subgoals and
portray graphically the progress patients are making toward their subgoals and their month-to-month changes. Self-efficacy ratings identify areas of vulnerability and difficulty. The participants, in turn, send data to the implementor on the changes they have achieved and their level of personal efficacy in the various domains for the next cycle of self-directed change. The program implementor maintains telephone contact with the participants and is available to provide them extra guidance and support should they encounter difficulties. The implementor also serves as the liaison to medical personnel, who are called upon when their expertise is needed. SELF REGULATORY DELIVERY SYSTEM

Figure 8 Computer-assisted self-regulatory system for altering health habits. Evidence for the effectiveness of this self-regulatory system is available from a cholesterol reduction program conducted with employees with elevated cholesterol levels drawn from work sites. Each 1% reduction in serum cholesterol achieves about a 2% reduction in risk of heart attack. The program, which sought to reduce consumption of cholesterol and saturated fat, required a total of two hours per employee. The participants lowered their intake of saturated fat and achieved significant reductions in serum cholesterol by this means (Figure 9). They realized an even larger risk reduction if their
spouses took part in the
dietary change program as well. Some individuals have a
genetic metabolic defi
ciency for processing saturated fats and cholesterol so their body produces high
levels of cholesterol even though they do not consume much fat. Among patients
with elevated plasma cholesterol, the more room for dietary reduction of satura
ed fats the more substantial the reductions they achieve by self-regulative means
in plasma cholesterol. The success of this system to reduce morbidity and mor
tality in post-coronary patients is currently being compared against the usual
medical post-coronary care. In this effort to reduce the likelihood of future heart
attacks, a number of risk factors, including obesity, elevated cholesterol,
smoking, sedentariness, and stress proneness, are selected for change. The self-regulatory system is well received by participants because it is indi
vidually tailored to their needs; it provides them with continuing personalized
guidance and informative feedback that enables them to exercise considerable
control over their own change; it is a home-based program that does not require
any special facilities, equipment, or attendance at group meetings that usually
have high drop-out rates; and it can serve large numbers of people simulta
neously. The substantial productivity gains are achieved by process innovations
combining self-regulatory and computer technologies that provide effective

Self-Efficacy Mechanism PHYSICIAN PROGRESS REPORTS
PROGRAM IMPLEMENTOR PHONE CONTACT COMPUTERIZED SYSTEM
DATA BASE SELF -REGULATORY CHANGE PROGRAMS 379 PATIENT
A. Bandura

health-promoting services in ways that are individualized, intensive, highly

convenient and inexpensive. 30 30 SELF-REGULATION
CONTROL =25 ~ 25 C1 g ...J 0 II: W 20 20 l(/)
W ...J 0 J: 0 < :E 15 15 (/) < ...J Q. ~ z
10 10 t= (,) :J 0 W II: 5 5 o SUBJECT SUBJECT
SMALL LARGE & SPOUSE ROOM FOR DIETARY CHANGE

Figure 9 Levels of reduction in plasma cholesterol achieved with the computerized self-regulation system. The panel on the left summarizes the mean cholesterol reductions achieved in applications in the workplace by participants who used the system either by themselves, along with their spouses, or did not receive the system to provide a control baseline. The right panel presents the mean cholesterol reductions achieved with the selfregulative system by patients whose daily cholesterol and fat intake was high or relatively low at the outset of the program. Self-Management of Chronic Diseases Chronic disease has become the dominant form of illness and the major cause of disability. Such diseases do not lend themselves well to biomedical approaches devised primarily to treat acute illness. The treatment of chronic disease must focus on self-management of physical conditions over time rather than on cure.

This requires, among other things, pain amelioration, enhancement and maintenance of functioning with growing physical disability and development of self-regulative compensatory skills. Lorig and her colleagues have devised a prototypic model for the self-management of different
types of chronic diseases o

(Lorig, Seleznick, et al., 1989). The self-management
skills include cognitive

pain control techniques, self-relaxation, proximal goal
setting to increase level of

activity and use of self-incentives as motivators, problem

solving and self
diagnostic skills for monitoring and interpreting one's
health status and skills in

locating community resources, managing medication programs,
and effective

ways of dealing with physicians and other aspects of health
care systems to

optimize health benefits. Participants are taught how to

exercise some control

over their physical condition through modeling of
self-management skills, guided

mastery practice, informative feedback and efficacy
demonstration trials. The effectiveness of this
self-regulative approach has been tested extensively

for ameliorating the debility and chronic pain of arthritis
(Lorig, Seleznick, et al.,

1989). Patients suffering from rheumatoid arthritis,
substantially improve their

psychophysical functioning following treatment compared to
matched controls

who received an arthritis helpbook describing
self-management techniques and

were encouraged to be more active (O'Leary et al., 1988).
The self-management

program increased patients perceived self-efficacy to
reduce pain and other debilitating aspects of arthritis, and to pursue potentially
painful activities (Figure 10).
The treated patients reduced their pain and inflammation in their joints, and were less debilitated by their arthritic condition. The higher their perceived coping efficacy, the less pain they experienced, the less they were disabled by their arthritis, and the greater the reduction they achieved in joint impairment. The more efficacious were also less depressed, less stressed, and they slept better. The treatment did not alter immunologic function, but significant relationships were found between perceived coping efficacy and immunologic indices.

There is some evidence that in the arthritic disorder the suppressor T-cell function of the immune system is depressed. This results in proliferation of antibodies, which is aided by helper T-cells. Arthritis is an autoimmune disorder in which the immune system produces antibodies that destroy normal tissues of the body. Increases in suppressor T-cells, which tend to inhibit production of antibodies, suggest improvement in the immune system for this disorder. Perceived coping efficacy was associated with increases in the number of suppressor T-cells and with a decrease in the ratio of helper to suppressor T-cells. In a follow-up assessment conducted four years later, arthritis patients who have had the benefit of self-management training displayed increased self-efficacy, reduced pain, much lower utilization of medical services (43%), and
slower biological progression of their disease over the four-year period (Holman, Mazonson, & Lorig, 1989; Lorig, 1990). These changes are shown in Figure 11.

Enhancement of functioning despite some biological progression of the disease provides further testimony that functional limitations may be governed more by self-beliefs of capability than by degree of actual physical impairment (Baron, Dutil, Berkson, Lander, & Becker, 1987). Tests of alternative mediating mechanisms reveal that neither increases in knowledge nor degree of change in health behaviors are appreciable predictors of health functioning (Lorig, Chastain, et al., 1989; Lorig, Seleznick, et al., 1989). However, both baseline perceived self-efficacy and reduction in pain and impairment of joints as a function of training in self-regulatory techniques (O'Leary, Shoot, Lorig, & Holman, 1988).


Efficiency and changes in perceived self-efficacy to exercise one's arthritic condition instilled by treatment explain more than 40% of the variance in pain four years later (Lorig, 1990). When patients are equated for
degree of physical debility, those who believe they can exercise some influence over how much their arthritic condition affects them lead more active lives and experience less pain (Shoor & Holman, 1984). This self-management model lends itself well to other types of chronic diseases.

Figure 11 Enduring healthful changes achieved by training in self-management of arthritis as revealed in a follow-up assessment four years later. The 9% biological progression of the disease is much less than the 20% disease progression one would normally expect over four years for this age group. Plotted from data of Lorig, 1990.

IMPACT OF PROGNOSTIC JUDGMENTS ON SELF-EFFICACY AND HEALTH OUTCOMES Much of the work in the health field is concerned with diagnosing maladies, forecasting the likely course of different physical disorders and prescribing remedies. Medical prognostic judgments involve probabilistic inferences from knowledge of varying quality and inclusiveness about the multiple factors governing the course of a given disorder. Because psychosocial factors account for some of the variability in the course of health functioning their inclusion in prognostic schemes will enhance their predictive power. Prognostic judgments can alter perceived self-efficacy in ways that affect health outcomes rather than simply serve as nonreactive forecastings of things to come (Bandura, 1992).
level of health functioning

is determined not only by biologically-rooted factors but also by patients' self

beliefs and a system of social influences that can enhance or impede the progress they make. If one takes no notice of psychosocial determinants one is left with

puzzling variability in the courses that health changes take and unexplained dif

ferential functional attainments of people who are equally physically impaired.

Thus, arthritics with deformed hands may lead fulfilling productive lives, where

as others with minimal arthritic impairment become despondent and abandon activities. Neither biochemical laboratory tests nor measures of degree of actual physical impairment predicts functional attainments (Baron et al., 1987). Results of a program of research on enhancement of perceived self-efficacy for post coronary recovery indicate that strength of perceived self-efficacy is a psycho

logical prognostic indicator of the course that health outcomes are likely to take. About half the patients who experience myocardial infarctions have uncomplicated ones (DeBusk, Kraemer, & Nash, 1983). Their heart heals rapidly, and they are physically capable of resuming an active life. However, the psychologi

cal and physical recovery is slow for patients who believe they have an impaired heart. They avoid physical exertion. They fear that they cannot handle the
strains in their vocational and social life. They give up recreational activities.

They fear that sexual activities will do them in. The recovery problems stem more from patients' beliefs that their cardiac system has been impaired than from physical debility. The rehabilitative task is to convince patients that they have a sufficiently robust cardiovascular system to lead productive lives. Psychological recovery from a heart attack is a social, rather than solely an individual matter. Virtually all of the patients are males. The wives' judgments of their husbands' physical and cardiac capabilities can aid or retard the recovery process. The direction that social support takes is partly determined by perceptions of efficacy. Spousal support is likely to be expressed in curtailment of activity if the husband's heart function is regarded as impaired, but as encouragement of activity if his heart function is judged to be robust. In the program designed to enhance postcoronary recovery (Taylor et al., 1985), the treadmill was used to raise and strengthen spousal and patients' beliefs in their cardiac capabilities. Several weeks after patients have had a heart attack we measured their beliefs about how much strain their heart could withstand. They then performed a symptom-limited treadmill, mastering increasing workloads with three levels of
spouse involvement in the treadmill activity. The wife was either uninvolved in the treadmill activity; she was present to observe her husband’s stamina as he performed the treadmill under increasing workloads; or she observed her husband’s performance, whereupon she performed the treadmill exercises herself to gain firsthand information of the physical stamina it requires. We reasoned that having the wives personally experience the strenuousness of the task, and seeing their husbands match or surpass them, should convince them that their husband has a robust heart. After the treadmill activities, couples were fully informed by the cardiologist about the patients' level of cardiac functioning and their capacity to resume activities in their daily life. If the treadmill is interpreted as an isolated task, its impact on perceived cardiac and physical capability may be limited. In order to achieve a generalized impact of enhanced self-efficacy on diverse domains of functioning, the stamina on the treadmill was presented as a generic indicant of cardiovascular capability—that the patients' level of exertion exceeded whatever strain everyday activities might place on their cardiac system. This would encourage them to resume activities in their everyday life that place weaker demands on their cardiac system than did the heavy workloads on the treadmill. The patient's and
spouse's beliefs concerning his physical and cardiac capabilities were measured before and after the treadmill activity, and again after the medical counseling.

Figure 12 Changes in perceived physical and cardiac efficacy as a function of level of spouse involvement, patients' treadmill exercises, and the combined influence of treadmill exercises and medical counseling. Perceived efficacy was measured before the treadmill (Pre), after the treadmill (T), and after the medical counseling (C) (Taylor, Bandura, Ewart, Miller, & DeBusk, 1985). 80 > 70 u c( " 60 1L 1L W • 50 1L ...J w 1f40 o w > w U 0: waq Q. 1L 70 o J: 60 I" 50 w 0: 40 IIfl
30 20 PRE T C PRE T C PRE T C PERCEIVED PHYSICAL AND EMOTIONAL SELF-EFFICACY PRE SPOUSE ABSENT SPOUSE OBSERVES SPOUSE PARTICIPATES T C PRE T C PRE T C PERCEIVED CARDIAC SELF-EFFICACY SPOUSE SPOUSE A. Bandura Figure 12 shows the patterns of changes in beliefs concerning the patients' physical and cardiac capabilities at different phases of the experiment under different levels of spousal involvement in the treadmill activity. Treadmill performances increased patients' beliefs in their physical and cardiac capabilities. Initially the beliefs of wives and their husbands were highly discrepant-husbands judged themselves moderately hearty, whereas wives judged their husbands' cardiac capability as severely impaired and incapable of withstanding physical and emotional strain. Spouses who were either uninvolved in, or merely observers of, the treadmill activity, did not change their considerable doubts about their husbands' physical and cardiac capabilities. Even the detailed medical counseling by
the cardiology staff did not alter their preexisting beliefs of cardiac debility.

However, wives who had personally experienced the strenuousness of the treadmill were persuaded that their husbands had a sufficiently robust heart to withstand the normal strains of everyday activities. The participant experience apparently altered spousal cognitive processing of treadmill information, giving greater weight to indicants of cardiac robustness than to symptomatic signs of cardiac debility. Efficacy beliefs affect receptivity to prognostic information. Thus, the change in perceived efficacy made the wives more accepting of the medical counseling. Following the medical counseling, couples in the participant spouse condition had congruently high perceptions of the patients' cardiac capabilities. The findings further show that beliefs of cardiac capabilities can affect the course of recovery from myocardial infarction. The higher the patients' and the wives' beliefs in the patients' cardiac capabilities, the greater was the patients' cardiovascular functioning as measured by peak heart rate and maximal workload achieved on the treadmill six months later. The joint belief in the patients' cardiac efficacy proved to be the best predictor of cardiac functional level. Initial treadmill performance did not predict level of cardiovascular functioning in the follow-up assessment when perceived efficacy is partialled.
out. But perceived
cardiac efficacy predicted level of cardiovascular
functioning when initial tread
mill performance was partialled out. Wives who believe
that their husbands have a robust heart are more likely to
encourage them to resume an active life than those who believe their husband’s
heart is impaired and vulnerable to further damage. The positive relation be
tween the wife's perceptions of her husband's cardiac capability and his treadmill
accomplishments months later is, in all likelihood, partly mediated by spousal
encouragement of activities during the interim period. Pursuit of an active life
improves the patient's physical capability to engage in activities without over
taxing their cardiovascular system. Self-Validating
Potential of Prognostic Judgments Health outcomes are
related to predictive factors in complex, multidetermin
ed and probabilistic ways. Prognostic judgments, therefore, involve some degree
of uncertainty. The predictiveness of a given prognostic scheme will depend on
the number of relevant predictors it encompasses, the relative validities and inter
relations of the predictors, and the adequacy with which they are measured.
There is always leeway for expectancy effects to operate because prognostic
schemes rarely include all of the relevant biological and psychosocial predictors
and even the predictors that are singled out usually have less than perfect valid
ity. Based on selected sources of information, diagnosticians form expectations about the probable course of a disease. The more confident they are in the validity of their prognostic scheme, the stronger are their prognostic expectations. Prognostic judgments are not simply nonreactive forecasts of a natural course of a disease. Because prognostic information can affect patients' beliefs in their physical efficacy, diagnosticians not only foretell but may partly influence the course of recovery from disease. Prognostic expectations are conveyed to patients by attitude, word, or the type and level of care provided them. Prognostic judgments have a self-confirming potential. Expectations can alter patients' self beliefs and behavior in ways that confirm the original expectations. Evidence indicates that the self-efficacy mechanism operates as one important mediator of self-confirming effects (Bandura, 1992; Litt, 1988). Analysis of self-confirming processes has focused mainly on how people's self-beliefs of efficacy and behavior are affected by what they are told about their capabilities. Other evidence suggests that prognostic judgments may bias how people are treated as well as what they are told. Individuals treat others differently under high than under low expectations in ways that tend to confirm the original expectations (Jones, 1977;
Jussim, t 986). Under induced high expectations individuals generally pay more attention to those in their charge, provide them with more emotional support, create greater opportunities for them to build their competences and give them more positive feedback than under induced low expectations. Differential care that promotes in patients different levels of self-efficaciousness and skill in managing health-related behavior can exert stronger impact on the trajectories of health functioning than simply conveying prognostic information. The effects of verbal prognostications alone may be short-lived if they are repeatedly disconfirmed by personal experiences. But a sense of personal efficacy rooted in enhanced competencies fosters functional attainments that create their own experiential validation. Clinical transactions operate bidirectionally to shape the course of change. The functional improvements fostered by positive expectancy influences further strengthen clinicians' beneficial expectations and their sense of efficacy to aid progress. In contrast, negative expectations that breed functional declines can set in motion a downward course of mutual discouragement. Medical conditions that produce severe permanent impairments can be devastatingly demoralizing to patients and their families. Patients have to reorganize their perspective to learn alternative ways of
regaining as much control as possible over their life activities. Goals need to be restructured in functional terms that capitalize on remaining capacities (Ozer, 1988). Focus on achievement of functional improvements rather than on degree of organic impairments helps to counteract self-demoralization. Making difficult activities easier by breaking them down into graduated subtasks of attainable steps helps to prevent self-discouragement of rehabilitative efforts and enhances functional attainments. CONCLUDING REMARKS The converging lines of evidence reported in this chapter indicate that the self-efficacy mechanism plays an influential role in mediating the impact of psychosocial factors both on biological systems that interrelatedly alter physical functioning and on health habits that prevent or mitigate pathogenic conditions.

The value of a psychological theory is judged not only by its explanatory and predictive power, but also by its operational power to effect change in human functioning. Social cognitive theory provides prescriptive specificity on how to enhance people’s sense of personal efficacy in ways that promote their health and


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