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## **Descriptions, Rationales, and Outcomes of Stress Management Interventions**

### *Descriptions*

Chapter 2 ended with a list of “desirable ingredients” for SM that made it look like a cooking recipe: Take two pinches of relaxation, a cup of wisdom, and three teaspoons of insight; mix well and bake at medium heat for 45 minutes. This list of ingredients was derived from a model of the stress process that suggests natural sequencing of steps and the existence of moderating and mediating factors, and it was supported by a review of empirical evidence that justified the importance and the potential of each component of the model. Chapter 3 begins with a comparison of the desired or ideal model with what clinicians and researchers actually do. Thereafter it moves on to descriptions of techniques and associated outcomes.

This section is titled “Descriptions” rather than “Definitions,” because a search of the literature does not reveal an agreed-on, “classic” definition of stress management (Carlson, 1999). Nevertheless, the available attempts at definition do share many features: “Strategies to reduce stress” (Feuerstein, Labbe, & Kuczmierczyk, 1986, p. 186); “Stress management is the ability to reduce stress arousal or to cope in a competent manner with stressors” (Girdano, Everly, & Dusek, 1993, p. 7); and “The goals of stress management are to increase your understanding of yourself and your own stress cycle and to help you exercise what control you do have over this cycle” (Brehm, 1998, p. 8). Brehm also acknowledges that stress management may contain changes to the stressors themselves so that the likelihood of subsequent stress responses is reduced.

The current text largely adopts Feuerstein et al.'s (1986) perspective because these writers define good stress management by its theoretical main ingredients:

Conceptually, the reduction of stress is comprised of three basic elements: (1) physical alteration of environmental stressors, for example, relocating a factory to an industrial zone; opting out of the "rat race" in the case of an executive promoted beyond the level of his or competence; (2) modification of a person's cognitive attributions, for example, focusing thought or reinterpreting situations as less emotionally threatening, and (3) alteration of behavioral and physiological responsiveness, for example, the use of various relaxation techniques or pharmacological methods. (p. 186)

That being said, the model developed and presented throughout this text (see the preceding chapter) considerably broadens Feuerstein et al.'s description by also considering the possibility that rigid personality styles may be maladaptive, that coping can be cognitive *and* behavioral, and that arousal reduction strategies may seek to alter acute physiological responsiveness as well as abnormally elevated resting states.

Another approach to seeking a definition of SM is via a systematic analysis of what stress management researchers actually do in their clinical protocols. This type of review has been undertaken by Ong, Linden, and Young (2004), who culled 153 studies using Internet science search engines with the key words "stress management," "stress reduction," "stress management program," "stress reduction program," "outcome," and "effectiveness." The search resulted in the largest pool of studies described in the literature so far, and all identified references are included in this book as a reference section titled "Therapy Outcome Studies Reviewed by Ong, Linden, and Young (2004)." Ong and her collaborators reported that most often studied were SM applications for health problems (40% of the sample of studies), workplace interventions (22%), studies with students (16% of studies [note, however, that one could also consider these to be workplace studies]), sports applications (3%), psychiatric problems (3%), and "Other" (16%). The Other category included studies of spouses of the elderly, patients undergoing acute medical procedures, and individuals with low social support or poor problem-solving skills. Although there was wide variability in the protocols, the authors noted that a modal type of stress management program exists, and that it is characterized by the following:

1. A preferred group treatment format (59% of studies were group only; 18% paired group and individual sessions)
2. The teaching of a modal number of six to eight different techniques
3. A typical treatment length of six sessions and a mean session duration of 1.5 hours

Attempts to classify stress management studies by their theoretical orientation indicated that 77% used an approach that broadly qualifies as a “cognitive-behavioral approach,” 85% taught some form of relaxation, 15% used at least one form of biofeedback, 10% were classified as based on a systems model, and 6% could not be readily classified. Note that these percentages do add up to more than 100%, because almost all studies used multiple techniques and these were often classifiable as derived from varying theoretical orientations. These similarities notwithstanding, Ong et al. (2004) reported large variability in treatment length and choices of techniques, with the great majority focusing only on relaxation and cognitive and behavioral coping skills. As is typical for reviews of the therapy outcome literature, many studies were seriously flawed in design quality and measurement. Intervention descriptions were frequently cryptic and would be difficult to replicate by another researcher. Especially confusing was the use of certain technique descriptions and labels such that (a) techniques might appear to vary across studies although they were actually comparable upon close inspection, (b) some technique descriptors were so vague as to be meaningless, and (c) levels of categorization were often mixed up. These observations are further elaborated on below.

When scrutinizing every second paper (for the sake of parsimony, not all studies were selected), a total of 225 different terms for techniques were used, although most researchers would probably agree that only a fraction of that figure could actually represent truly different techniques (see also the remainder of this chapter). It was often easy to see that two different terms undoubtedly meant the same thing (e.g., Jacobson’s relaxation vs. Progressive Muscular Relaxation) or were likely the same (diaphragmatic respiration vs. deep breathing). Difficult to comprehend was the fact that reviewers and editors had accepted vague descriptors like “creativity techniques were used” or “various methods were taught.” Particularly confusing was the indiscriminate use of broad versus narrow, superordinate versus subordinate categories. Researchers occasionally claimed to use such things as “diaphragmatic breathing, time management, and stress management techniques,” obviously not recognizing that these terms represent highly different levels of categorization, with one subsuming the others.

Key conclusions from Ong et al.'s (2004) review were the following:

1. A modal type of a stress management protocol exists, suggesting some consensus in practitioners' minds.
2. The reporting of intervention protocols was generally poor, barring successful attempts at replication.
3. The SM protocols were sufficiently different so that a review of the outcome literature on SM would not be meaningful if reviewers uncritically accepted the notion that the term SM also possessed truly comparable meaning across different studies.

Ong and her collaborators urged journal editors to set a much higher standard for the reporting of SM treatment protocols and challenged SM researchers to develop a consensual theoretical model for SM that is based on sound knowledge of stress physiology, that leads to a clinically sensible, at least partially standardizable, and also a socially responsible SM treatment approach. This entire book is, of course, an attempt to respond to these challenges put forth by Ong and her collaborators.

When relating these observations of what stress management researchers actually do to the "desired ingredients" list at the end of Chapter 2, it becomes abundantly clear that systemic, preventive efforts and the building of social support buffers, as well as the deliberate creation of positive emotional states, are not part of typical SM protocols.

## ***Rationales and Outcomes***

### **Organization of This Section**

Ideally, evidence for the effectiveness of SM would draw from the entire literature of controlled trials that includes SM as a descriptor (provided that every writer actually had the same idea of what stress management is). Analyses of outcomes could then be organized around (a) populations studied (e.g., SM for schoolteachers or garbage collectors), or (b) disease categories that might be caused or worsened by stress (bruxism, hypertension, etc.), or (c) specific endpoints that had been measured (e.g., SM effects on self-reported distress, blood pressure, natural killer cell activity, or absenteeism at work). Each of these three organizing principles can be further subdivided according to other organizing principles; that is, SM effects in schoolteachers can be studied separately for healthy

schoolteachers and for teachers with asthma versus hypertension versus headaches, and so forth. In addition, each of these could again be broken down for type of measure.

One can readily see that a review with this complex, three-dimensional categorization strategy would be enormous in scope, and this is powerfully demonstrated by some quick calculations. With an exclusive focus on occupational stress management, Van der Hek and Plomp (1997) reviewed 24 studies (far fewer than the 153 SM outcome studies identified for all applications by Ong et al., 2004). These 24 studies targeted 14 different workplace populations (e.g., teachers, nurses, managers, hospital janitorial staff) and used 33 different measures, with the latter consisting of 6 different physiological indices (e.g., blood pressure, skin response), 12 work-related outcomes that were either self-report (e.g., job satisfaction) or objective indices (e.g., medical malpractice claims, sick days), as well as 15 different psychological constructs (e.g., self-esteem, depression, and burnout). Using these data on the effects of SM just for workplace studies, there would have to be at least  $14$  (different workplaces)  $\times$   $4$  (classes of measurable endpoints) = 56 resulting cells to be considered in a meta-analysis. Breaking this down into each type of construct that was measured (instead of clustering them as families of similar outcome indices) results in 462 cells of outcome studies that needed filling. Of course, including the third dimension, namely diseases, increases that figure to many thousands. Any attempt at a comprehensive meta-analysis is further complicated by the fact that a minimum number of studies would have to be available in *each* cell to allow determination of the stability of results and calculation of a fail-safe statistic for all cells. Add to that that none of these hypothetical “numbers games” addresses the fact that different researchers also have highly variable operationalizations of what stress management actually is (Murphy, 1996; Ong et al., 2004; Van der Hek & Plomp, 1997), and that a review might crudely aggregate highly different interventions under a single broad label of “SM.” Hence, it cannot come as a surprise that searches of the published literature revealed no such broad, quantitative (meta-analytic) or narrative reviews of the overall effect of SM. There are, however, reviews of the outcome of SM for narrowly defined applications, and there are numerous reviews of the effectiveness of a variety of individual techniques that fall under the global descriptor “SM.”

Reviews of SM when defined as a package of interventions and its effects on particular populations or endpoints are not tackled first because that might imply to the reader that these studies can be easily and meaningfully aggregated. In my view, however, they should be read with a very

critical eye and a sense of reluctant belief. Although a section on the outcome of broadly defined SM interventions will follow later in this chapter, readers are strongly encouraged to interpret all results with caution because any reporting of such outcomes in an aggregated form belies the previous observation that one researcher's SM is not equal to another's, and that to some degree "apples and oranges" are being compared in these reviews. Note also that conclusions about outcomes for SM packages are derived from a relatively small number of pertinent publications.

Reviews of specific technique applications of narrowly defined SM techniques and their results are dramatically more prevalent in the literature and form the great majority of this section. In fact, there are so many narrow-focus reviews that this section is effectively only a summary of summaries, or a review of reviews. Consistent with Ong et al.'s (2004) recommendations, these reviews will be organized around names of techniques or interventions that appear truly distinct from one another, begin with a description of the technique, and then proceed to documented outcomes.

### **General Principles and Strategies for Reviewing Therapy Outcome Studies**

A summary of possible review strategies for outcome research may help to understand some of the positions taken when interpreting results and conclusions from various review articles. Reviews generally fall into one of three categories: narrative, box score, or meta-analysis. In terms of the history of any growing literature on outcomes, narrative reviews are likely the first ones to be conducted in any given area of outcome studies because they do not require an absolute, minimum number of studies with similar protocols for a review to make sense. Narrative reviews also have the distinct advantage of being the most inclusive; they are, by their very nature, qualitative research in that broad sampling, searches for patterns, and derivation of future testable hypotheses are more important than deriving hard numbers, effect sizes, and categorical conclusions. Narrative reviews often form the first step in the formulation of specific hypotheses to be tested in subsequent clinical trials and then for later aggregation in quantitative reviews. Their drawback is that different reviewers, even when analyzing the exact same pool of studies, may focus on different measurement, population, or treatment protocol features, and may also draw variable conclusions. To be trustworthy, narrative reviews should spell out a priori exactly how studies were retrieved from the literature,

what search criteria were used, and what features the reviewer was most interested in.

Box-score reviews are wedded to the rigid use of a probability criterion (typically  $p < .05$ ) as a cutoff that determines whether treatment was a success or not. The advantage is that results can be tabulated quantitatively (in “box” form as the name indicates), and researchers can be objective in claiming that therapy  $x$  is superior to therapy  $y$  because, for example, in 8 out of 10 comparisons, therapy  $x$  had produced significantly stronger outcomes than  $y$  for the treatment of cancer, for example. Although box-score reviews can be considered an improvement over narrative reviews insofar as they require less inference and interpretation, they are flawed because they often ignore questions of statistical power and invite unreasonable acceptance of statistical significance as clinically meaningful differences. Unfortunately, psychologists have a long history of conducting seriously underpowered research that in turn leads to volatile conclusions on therapy outcomes that are often difficult to replicate (Linden & Wen, 1990).

Meta-analysis, on the other hand, culls a shared statistic from each study that integrates means and an index of variability into the calculation of an effect size that is then readily comparable across studies and does not suffer from distortion due to uneven sample sizes (provided, of course, that the researcher follows standard procedure and differentially weighs effect sizes for underlying sample size; Rosenthal, 1984). The most frequently reported effect sizes are Cohen’s  $d$  and the coefficient  $r$ , and in the reviews below it will be spelled out each time which effect size statistic was used.

Meaningful meta-analyses can be laborious because the researcher is expected to sample comprehensively, describe study identification with sufficient detail to permit replication, and ensure that only truly comparable studies are contrasted with each other. Further, measures need to be clustered into meaningful families. Ultimately, the strength of meta-analysis is to provide few but sufficiently meaningful “hard” numbers to permit a conclusion; this paring-down process is also its greatest weakness—meta-analysis by its very nature often fails to account for seemingly small but potentially critical differences in treatment protocols, choice of measures, and so forth. In sum, all modes of review have inherent flaws and strengths that can, however, be minimized (although not eliminated) with diligence and objectivity. Some of the weaknesses of box-score analysis have been overcome with meta-analytic approaches, and there appears little value to continue with box-score outcome reporting; however, the relative strengths and weaknesses of narrative relative

to meta-analytic review balance each other out, implying that we had best continue using both, in a complementary fashion, in order to advance science. These principal issues notwithstanding, not every research question of interest for stress management has been investigated with all possible review modalities, and conclusions drawn here often suffer from the absence of adequate reviews.

In order to facilitate interpreting the review on outcomes presented below, the reader should take note of my approach to review and interpretation. Search strategies were primarily directed at locating high-quality meta-analytic reviews because of the resulting high transparency and comparability of results. Narrative reviews were especially sought out when they were comprehensive in nature. Literature searches used Internet search engines (ISI Web of Science, MedLine, and PsychLit, as well as searches of secondary sources). Of great interest were systematic reviews that applied consensual criteria for judging evidence. Sometimes no systematic reviews were available; the material presented here is therefore an attempt at a first systematic review of topics not previously subjected to this level of analysis (examples are the sections on time management interventions and forgiveness therapy).

Each following section in this chapter will comment on the generalizability and trustworthiness of findings, given the extremely wide diversity in existing versus absent evidence for outcome. Note also that a distinction is made between clear evidence of negative findings (i.e., demonstrations of SM's *ineffectiveness* in strong trial protocols) and the absence of published attempts to show clinical outcomes. The latter is sometimes attributable to the novelty and uniqueness of an approach (e.g., forgiveness therapy), but it is more often a reflection of popular beliefs and myths about the value of an approach when there is precious little evidence in support of these beliefs. As is shown below, humor therapy and time management are prime examples of positive beliefs about effectiveness that run far ahead of existing data that justify such beliefs.

### ***Review of the Effects of Specific Techniques, Rationales, and Outcomes***

Given the large number of techniques that can be subsumed under SM, some categorization of interventions may be needed to enhance the clarity of this section. For consistency with the SM model proposed in this book, the discussion of techniques and their outcomes is clustered into interventions that fit into the proposed sequence model: (1) stimulus or



environmental manipulations, (2) teaching of coping skills, (3) creation of buffers, and (4) arousal reduction interventions.

### Techniques for Stimulus or Environment Manipulation

*To really save one man you must transform the community in which he lives.*

—Social reformer J. S. Woodworth, 1977  
(cited in Colombo, 2000)

The concept of stressor, or stimulus, manipulation interventions as distinct parts of SM has received minimal previous attention and no distinct literature review can therefore be found that reports outcomes of interventions labeled as stressor manipulations. Nevertheless, a number of interventions could be found that fit under the conceptual umbrella of stressor (or stress environment) manipulation, and the variety inherent in these methodologies demonstrates the many creative ways in which this goal can be achieved. Most of the research stems from organizational behavior research and relies typically on case studies where changes within one work unit (factory, office, etc.) are measured preintervention and postintervention (Karasek, 1992). In this area of research, the controlled trials with random assignment that are typical in health research are largely unknown.

A critical indicator of the possibility of stress affecting job satisfaction and productivity is a high rate of absenteeism. Only about 30% to 35% of absenteeism is due to documented illness; an average of about 10% of absenteeism is attributed by employees themselves reporting stress overload and another 10% is attributed to “personal needs,” a vague term that may well hide another subgroup also being overwhelmed by work demands. A good example of detective work regarding absenteeism and an attempt at stimulus control (with a true spirit of primary prevention) is the extensive work that has been done on repetitive stress injury. Repetitive hand and wrist physical stress is clearly not the same as psychological stress, and the reader may wonder why this is discussed here at all. The reason will become clear soon. Many of the discomforting symptoms resulting from extended work on computers are nonspecific (like sore eyes, neck stiffness, lower back pain) and may be prematurely classified as symptoms of psychological stress, and the responsibility for stress coping is then likely placed on the individual worker. A thorough investigation, however, revealed that repetitive stress injury is very real and expensive to employers and employees (Grossman, 2000). Use

of ergonomic knowledge that is translated into workplace redesign can produce tremendous gains in productivity, decreases in compensation claims, and greater job satisfaction. Industrial/organizational psychology textbooks can provide the reader with numerous creative examples of how employers have dealt with this problem (e.g., Aamodt, 2004).

The way stressor manipulation is defined in this book is sufficiently novel that no literature exists that readily answers the question of the comparative efficacy of such interventions. That notwithstanding, the literature on workplace stress offers many examples of how employers and unions may cooperate by offering stress-reducing practices. In a 2002 survey (cited in Aamodt, 2004), 64% of employers offered flextime, 30% allowed employees to bring a child to work in case of emergency, and 68% offered an employee assistance program. These figures represent a much welcomed employee-centered approach to workplace stress reduction; it is unfortunately likely that less employee-centered companies did not participate in the survey, thus leading to a positively skewed impression.

A Swedish group of researchers reported two studies about workplace stress and the handling of layoffs (Arnetz, 2003). In study 1, the staff of a hospital were followed for 7 years. Twenty percent of staff had been laid off at the beginning of the study and beds were reduced by a corresponding 20%. Departments that increased their efficiency had also reduced subjective stress reports. Study 2 was an intervention where the staff in a bank was taught stress management techniques individually and the bank intervened at the system level to increase efficiency. As bank productivity went up, perceived stress went down, which was paralleled by reductions in prolactin and thyroid-stimulating hormone levels. Unfortunately, the description of this project did not clearly discriminate between benefits achieved at the individual level via "stress management" teaching versus organizational change.

Johnson (1990) calculated effect sizes (pre/post intervention) for a variety of systematic strategies that companies have used to reduce absenteeism. Unfortunately, these interventions allow only pre/post effect size computations because no control groups were studied. The number of studies contributing to each effect size was relatively small (ranging from  $N = 4$  to  $N = 12$ ), but the resulting effect sizes drew a clear picture of what seemed to work and what did not. The effect sizes for distress reduction were: Good pay  $d = -0.86$ , Flextime  $d = -0.59$ , Compressed work schedules  $d = -0.44$ , Discipline  $d = -0.36$ , Recognition  $d = -0.30$ , Wellness programs  $d = -0.18$ , Financial incentives  $d = -0.17$ , and Games  $d = -0.08$ . These strategies reflect a rather mixed bag of types of interventions with many simply being contingency contracting strategies that do not fit a preventive objective. Nevertheless, recognition and

wellness programs do represent strategies to change the nature of the workplace, and these were at least moderately positive in their impact.

Given that stress management approaches in the workplace vary greatly in the degree to which they are systemic versus person-based (Giga, Noblet, Faragher, & Cooper, 2003), Karasek and Theorell (1990) have developed a useful taxonomy for different strategies and presented a crude, quantitative analysis based on review of 19 case studies conducted worldwide. Karasek (1992) differentiates four levels of intervention, beginning with the individual and moving up to the system:

1. Person-based interventions (relaxation, cognitive reappraisal)
2. Communication pattern interventions (building interpersonal trust, elimination of conflict-inducing communication)
3. Task structure interventions (job enrichment, formation of autonomous teams)
4. Work organization and production process interventions (change in management styles, labor-management dialogue, participatory interaction, sociotechnical design alternatives)

Interventions at levels 3 and 4 can be differentiated again as a function of whether the restructuring is expert-guided or based on a worker participation process. Applying this taxonomy to the 19 case studies and comparing outcomes, Karasek (1992) concluded that the person-centered coping enhancement approach (i.e., what typical SM programs do) was the least effective. Level 3 and 4 interventions (task and large-scale work reorganization) were judged to be moderately effective, with the greater effects appearing as the result of task and workplace reorganization that was guided by experts *with active worker participation*. Clearly, only level 3 and 4 interventions as classified by Karasek qualify as “stressor manipulations” and primary prevention efforts. Karasek’s results and the findings of Munz, Kohler, and Greenberg (2001) clearly support the value of first targeting the stressor environment instead of focusing mostly on boosting workers’ coping skills.

## **Skill Learning/Coping Techniques**

### *Social Skills Training*

Social skills training has been applied broadly to children and adults with social anxiety disorder, antisocial aggressive behavior, anorexia, depression, alcohol abuse, personality disorders, schizophrenia, as well as some medical

problems (diabetes, cancer). Many of these applications are irrelevant or of tangential value for evaluating the outcome of SM. There have been numerous published reviews (narrative and meta-analytical) that reveal a rather mixed bag as far as the effectiveness of social skills training is concerned, although results in adults look more promising than they do in children. Note that no studies could be found that specifically applied social skills training as a method for stress reduction; some readers may therefore consider the discussion of findings from social skills training outcome research to be of marginal importance to stress management.

In child populations, aggregation of social skills training outcomes across different areas of application reveal consistently small to moderate-sized effects (overall effect size  $d = 0.40$  [Schneider, 1992];  $d = 0.47$  [Beelmann, Pfingsten, & Losel, 1994]). On a more detailed level, effects tended to be positive and consistent in the short term, but the limited follow-up research available suggests that gains weaken over time and do not generalize well to new environments. Also, shy children showed more relative improvement toward an adaptive level than did aggressive children, and neither child age, length of training, nor quality of research design correlated with outcomes (Magee-Quinn, Kavale, Mathur, Rutherford, & Forness, 1999).

Results are stronger and more indicative of skill maintenance in adults. Taylor (1996) published a meta-analysis of social skills training effects specifically applied to social phobia and reported moderate effect sizes for skill improvement ( $d = 0.65$  for pre/post treatment compared to  $d = 0.13$  for untreated controls). Social skills training effects were significantly greater than those of drug treatment or attention placebo ( $d = 0.48$ ). Meta-analysis of 73 studies reported results separately for groups of developmentally delayed, psychotic, nonpsychotic, and offender populations (Corrigan, 1992). Social skills training was reported as effective for acquisition of skills ( $d = 1.43$  pre/post), overall adjustment ( $d = 0.99$ ), generalization of learned skills to other settings ( $d = 0.92$ ), and maintenance of gains in adjustment ( $d = 1.2$ ). The greatest benefits were seen for developmentally delayed adults ( $d = 2.07$ ) and the least for offenders, who did learn the skills but showed poor generalization ( $d = 1.06$ ). Psychotic and nonpsychotic populations fell in between with  $d = 1.31$  and  $d = 1.33$ , respectively.

In sum, social skills training appears to be quite effective for adults, both short term as well as generalized, but noticeably less so for children. Most of the applications for social skills training are of limited use for understanding effects of SM. In terms of use as a stress reduction tool,

there is a stronger rationale for the more narrowly defined assertion training than there is for broadly defined social skills training; unfortunately, however, the literature, especially meta-analysis, does not provide results specifically for assertion outcomes.

### *Time Management*

Using the search term “time management,” a quick search of Web sites identifies a large number of sites, reflecting almost exclusively commercial enterprises offering time management in industrial settings and some additional sites that describe time management courses offered through business schools and colleges. After perusing these more-commercial Web sites, the reader comes away believing that time management has been demonstrated to be effective in reducing subjective stress and enhancing organizational effectiveness. The following section on controlled evaluations of time management provides a test of these implied claims of effectiveness of time management training programs.

Review of publications and course outlines on time management (as found in SM manuals and on Internet sites) suggests a high degree of homogeneity and similarity in the rationales offered for the use of time management, and also in the steps and techniques that are routinely taught under this umbrella term. Such high level of agreement is, of course, welcome and compares favorably with other, much more varied SM technique operationalizations described in this book. As such, it facilitates the task of reviewers who can largely treat time management programs as actually comparable with each other.

The rationale for time management training is fairly straightforward. Feeling overwhelmed and not in control, chasing after deadlines, and feeling that the demands outstrip the time available to deal with them is a routine sentiment expressed by workers. Industrial psychologists also have conducted observational studies of how workers use time and noted that a tremendous amount of time at the workplace was not used productively. Identified problems that contribute to the sense of lack of control and permanent strain are role confusion, lack of clear priorities, and having to deal with frequent disruptions. Although there is no doubt that an objectively high workload contributes greatly to work stress, there also is evidence that people’s work habits and lack of organizational skills worsen the problem. In response to these observations, time management strategies are geared toward directing workers’ attention to the most important, need-to-get-done-today items, to institute realistic plans and expectations, and to

embed these activities in a review of personal (or organizational) values and long-term plans. Core components of time management are set out below:

1. Step 1 is a structured reflection on priorities derived from long-, medium-, and short-term plans of the person or organization. Essential to this priority setting is the resulting knowledge that a well-developed short-term activity list is part of systematic long-term planning, and this makes it easier to focus on the most urgent tasks at hand while reducing the need to worry about long-term outcomes.

2. A pivotal tool in time management is a list for daily activity organization that arises from the prior clarification of priorities; work is categorized into high, medium, and low priority on the basis of the known consequences of not completing a given task on that day. High-priority items are to be done first because that reduces perceived pressure and prevents procrastination.

3. An often elaborate set of tips for everyday applications of time management techniques is frequently offered, and such tips are to some degree specific to the workplace or particular occupation of time management participants. Such tips include

- constructive use of breaks,
- learning about one's unique, most productive time of day (to be reserved for challenging tasks),
- allowing for brief relaxation and effective peer support,
- reasonable expectations regarding the probability of disruptions,
- recognizing the inefficiency of perfectionist attitudes,
- a "touch everything only once" rule (to make a decision on what to do with an item right away),
- strategies for effective communication (via memo, telephone, e-mail, and direct contact),
- sufficient detail to engage in a self-help time management program (or use of Internet-based resources to create such a program) is easily extracted from the Internet. An example of a particularly detailed and helpful Web site can be found at <http://www.mindtools.com>.

The programs are usually offered in group form and at the workplace; the descriptions given on commercial Web sites leave an unclear picture of how much time is typically spent in completing a time management workshop. Time management studies can be coarsely subdivided into two types: first, those offering generalist techniques to a wide variety of employees

with the hope and expectation that these skills are transportable to other workplaces, and that they may also help employees to organize their private lives or achieve an adaptive balance of work and home life. A second type of intervention is workplace-specific, can be reactive in nature (i.e., triggered by a critical incident), and/or may be preceded by a systematic analysis of the unique needs of a well-circumscribed workplace like a hospital ward, a medical practice, or a school. In this case, the observed benefits may not generalize well to other sites but are meant to be of acute value for the target organization.

An empirical test of the underlying components of a modal type of time management was conducted by Hoff Macan (1994) via two large workplace surveys ( $N = 176$  and  $N = 177$ ), using causal modeling procedures. Hoff Macan found that time management training was perceived as having rather small effects on its intended targets (i.e., setting goals/priorities, making lists, and developing a preference for organization), but when change in establishing priorities and preference for organization had been brought about, these changes were found to be strongly associated with greater perceived control over time, which, in turn, led to reduced job-induced tension and greater job satisfaction. Interestingly, job performance itself was not affected by perceived control of time.

An intensive search of the literature using multiple scientific Internet search engines with the key words “time management” paired with “outcome” or “effectiveness” or “intervention” or “results” revealed not a single published, controlled trial of the effect of time management on any hard, stress-related index. This absence of findings applied to control group designs as much as it applied to simple pre/post comparisons. Therefore, reported claims about the effectiveness of time management strategies are mostly based on anecdotes. This conclusion, in turn, is in striking contrast to the considerable enthusiasm with which commercial time management program providers pitch their wares to potential customers. Given that time management programs have a clearly described set of steps, concrete learnable skills, and a convincing rationale, one would expect positive outcomes, which makes the lack of research all the more striking.

### *Problem-Solving Training*

The basic steps involved in problem-solving training have already been described in Chapter 2 under behavioral coping skills. Problem-solving training typically has a brief, largely standardized component that

consists of educating people about the structure and sequence of effective problem solving, whereas the larger, more time-consuming portion involves practice and home assignments that are designed to help learners sharpen and fine-tune these skills, to make them a habit. This practice phase is usually specific to the problem type that is to be solved; examples are anticipation of consequences in children with poor impulse control, or development of habits to protect oneself from cancer risks. The observation of a two-step learning process logically leads to the empirically testable question of how much time is needed for “technical” problem-solving knowledge to turn into an effective problem-solving habit.

Problem-solving training has been used for a wide variety of target problems: suicidal tendencies, depression, attention deficit, impulse control problems, coping with cancer or minimizing cancer risk, chronic psychiatric problems, stress and anxiety, academic underachievement, alcoholism, cigarette smoking, vocational indecision, and marital and family problems (D’Zurillia, 1998). While D’Zurillia provides an excellent overview of the theory, history, practice, and outcomes of problem-solving training, a Web-based literature search failed to reveal the presence of any systematic review of the effectiveness of problem-solving training (neither narrative nor meta-analytic reviews were found). This was surprising because a number of writers (D’Zurillia, 1998, in particular) reported favorably on the outcomes of problem-solving training for the many varied applications listed above.

In the absence of systematic reviews, at least a few illustrative summaries of recent controlled trials can be provided here. A sample of young incarcerated offenders was randomized to either problem-solving training or a treatment control condition (Biggam & Power, 2002); reductions in anxiety, depression, and hopelessness were reported posttraining, as was an improvement in self-perceived problem-solving ability. Gains were reported as maintained at 3-month follow-up. Two studies targeted cancer (Allen, Shah et al., 2002; Schwartz et al., 1998). In Allen, Shah, and colleagues’ study, all participants were recently diagnosed breast cancer patients and had just begun chemotherapy. The intervention consisted of two in-person and four telephone-session interactions with an oncology nurse over a 12-week period. Among the 149 study completers (91% completion rate), better mental health was reported at 4 months; the outcome was mediated by initial level of problem-solving skills such that participants with initially low skills also showed fewer benefits. In the second study (Schwartz et al., 1998), participants were relatives of women recently diagnosed with breast cancer; random selection assigned 144 to



problem-solving training and 197 to an educational information control group. The goal was to help participants devise strategies to reduce their own risk and to find ways they could help their family member. Both interventions consisted of a single 2-hour session, and all participants received extensive handouts with cancer information. Both groups showed decreases in cancer-specific and general distress; additional benefits of problem-solving training for cancer-specific distress were apparent in those who practiced more.

With a sample of schizophrenic patients, problem-solving training led to improvements in social skills, and the gains were maintained at 4-month follow-up (Medalia, Revheim, & Casey, 2002). A wide range of improvements was seen in 99 children with early-onset conduct problems (Webster-Stratton, Reid, & Hammond, 2001) who had been randomized to problem-solving training or the wait-list control condition. At post-treatment, externalizing problem behaviors at home were reduced in the treated children, more prosocial behavior was seen with peers, and more positive conflict management strategies were demonstrated. At 1-year follow-up, most gains were shown to be maintained.

A brief, 1-hour problem-solving intervention was developed for family caregivers of individuals with advanced cancer; in addition to the 1-hour intervention, participants received a detailed home care guide and completed a follow-up survey (Cameron, Shin, Williams, & Stewart, 2004). The 34 caregivers who completed the study reported reduced emotional tension, greater caregiving confidence, and a more positive problem-solving orientation.

In sum, there have been many applications of problem-solving training to a remarkable range of problem areas that are typically stress related, and it appears that outcomes are predominantly positive. However, this optimistic conclusion is tempered by the absence of a systematic review of problem-solving training outcome, especially in regard to its comparative effects relative to other active treatments.

### *Cognitive Restructuring*

There is no systematic review that narrowly determines the effect of cognitive restructuring as a single treatment specifically designed for stress reduction. This is not surprising for at least two reasons. First, all recent forms of cognitive therapy contain at least behavioral elements and are generally best described as cognitive-behavioral therapies (CBT). It is critical to cognitive therapy that testing of presumed flawed attributions

and overgeneralizations involves behavioral experimentation to test the veracity or erroneousness of various thought patterns. This introduces a necessary behavioral element into CBT. Indeed, there are pervasive and convincing arguments that a distinction between behavioral therapy and cognitive therapy makes little sense because the testing of faulty cognitions usually involves a form of behavioral experimentation. An exception to this claim would be the application of behavioral contingency programs with clients of very low verbal intelligence (i.e., very young infants, autistic or developmentally disabled individuals).

One controlled trial could be located that directly targeted irrational thinking in 39 health practitioners in training (Kushnir, Malkinson, & Ribak, 1998). Irrationality (defined along the lines of Ellis's [1962] rational-emotive therapy model) was significantly reduced in the treated group, and psychosocial professional efficacy improved correspondingly.

These observations notwithstanding, the prevailing emotions associated with stress are anxiety, anger, and depression, each of which has been subjected to extensive clinical trials of psychotherapy with high-quality meta-analyses available to judge their merits.

Reviews of the outcome literature are quite consistent in their conclusions about the success and limitations of CBT for generalized anxiety (Persons, Mennin, & Tucker, 2001). Generalized anxiety disorder is very distressing for the affected individuals, there appears no need to uncover early trauma, and psychological treatment benefits brought about by CBT are comparable in size to drug treatments but tend to endure whereas the drug benefits quickly disappear when the drug is discontinued. Barlow and his colleagues (Barlow, Raffa, & Cohen, 2002) further argue that the best outcomes may be achieved with a combination of relaxation training and cognitive interventions. In one small meta-analysis (Chambless & Gillis, 1993) describing results from seven studies, large effects were observed: The pre/post effect size for reduction of self-reported anxiety was  $d = -1.69$ ; and the pretest to follow-up effect size was  $d = -1.95$ . Westen and Morrison (2001) reported aggregated effect sizes (pre/post treatment) of  $d = -2.23$  for depression,  $d = -1.55$  for panic, and  $d = -2.09$  for generalized anxiety disorder. Note that these large effects should not be compared directly with effect sizes resulting from comparisons of CBT with a wait-list control or attention placebo group, which are usually quite a bit smaller. Meta-analyses based on larger samples tend to show smaller benefits ( $N = 61$  comparisons for anxiety disorders,  $d = -0.70$  for CBT, and  $d = -0.60$  for pharmacotherapy; Gould, Otto, Pollack, & Yap, 1997). Unfortunately, positive results from well-controlled clinical trials with volunteer participants do not always translate

well into similar benefits for broad-based clinical practice (Westen & Morrison, 2001) where initial treatment benefits may weaken over time and be of limited clinical significance.

This discussion of the efficacy of cognitive restructuring for generalized anxiety can easily be considered tangential to the evaluation of SM outcomes; cognitive restructuring of anxiety-producing and -maintaining irrational thoughts possesses a strong and convincing rationale, but it is questionable to what degree individuals with high self-reported stress can attribute their high stress levels to irrational thinking patterns. If their stress levels can be tied to specific events like pending tests or fears of eviction due to inability to pay the rent, then it makes little sense to call such fears irrational.

The most recent and most comprehensive meta-analysis of anger treatments is based on a review of 57 publications that embraced 92 treatments and described outcomes for 1,841 participants (DiGiuseppe & Tafrate, 2003). Determinations of effect sizes  $d$  revealed an overall between-groups difference of  $d = -0.71$  for anger reduction at posttest, suggesting typically large effects that approached the typically observed effects for CBT. Self-reported aggression, attitudes, and more frequent use of positive behaviors showed the relatively largest improvements ( $d = -1.16$ ,  $-0.81$ , and  $-0.83$ , respectively), whereas physiological arousal reductions were smaller overall ( $d = -0.52$ ). Although effects weakened with extended follow-up, benefits were largely retained. DiGiuseppe and Tafrate (2003) reported generally comparable effect sizes for different treatment forms but assigned little importance to this observation because the majority of all interventions were of a CBT-type to begin with and not sufficiently different in rationale or protocol to promise substantive differences. A number of critical moderator variables were identified. Studies that used a manual and integrity checks (only  $n = 3$ ) showed much larger benefits than those with a manual but no integrity checks ( $n = 25$ ), with corresponding  $d$ 's of  $-3.15$  versus  $-0.91$ . Individual treatment ( $n = 11$ ) produced noticeably larger effect than group treatments ( $n = 25$ ), with  $d = 1.16$  versus  $d = 0.68$ , respectively.

### *Forgiveness Therapy*

Chronic interpersonal stress plays a particularly important role among distinguishable stressors because recovery has been demonstrated to be slower than recovery from other stressors (see Chapter 1). This type of situation is particularly demanding if the individual with whom one has problems is a part of day-to-day life (e.g., spouse or coworker). In this case, every

day serves as a reminder of an unresolved conflict or past wrongdoing. Interpersonal stress is typically maintained for a long time, and it is of a pernicious quality when one or both parties believe that the other has behaved wrongly whereas they themselves have not contributed to the problem. If this one-sided perception is held equally by both parties, there is gridlock. In extreme, well-defined cases, people can resort to the court system to sort out right and wrong, but that is at best a very slow and usually still unsatisfactory solution. An alternative is that at least one party decides that maintenance of the relationship as a whole is more important than being right or wrong about guilt attributions of the past. Note that such an ability at perspective taking is, of course, a major defining characteristic of a lasting marriage.

Long-term emotional distress is predictable when somebody has been factually victimized (e.g., rape or child abuse). However, no matter how much empathy the victim receives, lack of emotional resolution by the victim is held to have extensive negative health consequences.

A critical role in resolving such conflicts, or in reducing the understandable anger of a victim toward an offender, is given to the concept of forgiveness. This term has gathered much interest recently. A major advantage of forgiveness as a conflict resolution tool is the fact that each individual has full control over it. The other party in such a conflict needs not be involved at all. Forgiveness is seen as having two major components (Thoresen, Luskin, & Harris, 1998): letting go of negative thoughts, feelings, and behaviors, and seeking a more compassionate understanding of the offender. Chapman and colleagues (2001) presented a 20-step learning program and applied it in a pilot outcome study to 17 male forensic patients who had been abused. The treatment program was described as proceeding in four distinct phases: (1) uncovering phase (dealing with feelings of hurt, working through shame, etc.), (2) commitment phase (realizing that past strategies have failed, considering forgiveness as an option), (3) work phase (attempting to see the wrongdoer with new eyes, developing empathy), and (4) deepening phase (finding meaning in surrender, realization of not being alone, shifting away negative feelings to greater dominance of positive feelings). The results drew a clear picture of possible change in that in the treated group of  $N = 9$ , forgiveness and hope increased significantly as did self-esteem (relative to controls). Despite these promising initial data, the literature on forgiveness and especially the outcome of forgiveness therapy is too recent to have permitted accumulation of forgiveness therapy outcome studies that could place effects in the context of other intervention effects.

## Buffer Creation

### *Humor Therapy*

No complicated psychological theorizing is required to make a positive (albeit subjective) case for the use of humor in daily life. Laughter and the use of humor in general are universally held to be positive behaviors and experiences that may lead to reduction of stress, promotion of good health, and enhanced quality of life. Also, it is rather difficult to think of negative side effects for the use of humor (or the application of humor therapy), except those occasional muscle spasms that might follow hearty laughing (and even those are harmless and transient). A sense of humor can make a person appear particularly likable and thus facilitate the building of friendships and support networks, and a good joke can serve as a welcome distraction in otherwise grim circumstances. Having watched almost all episodes of the TV series *M.A.S.H.*, the author recalls vividly how the—often rather black—humor of the *M.A.S.H.* staff made many otherwise horrifying moments more bearable. Numerous experimental studies on analogue samples back up these global and anecdotal claims, but very, very few clinical trials with patient populations are available.

Given that having a sense of humor is typically considered a stable individual quality, how does humor therapy achieve its end? Does it mean that humor therapy can transform a dull, unimaginative introvert into the life of the party? Probably not! However, humorous activities can be divided into *passive humor* (like reading jokes in magazines or on the Internet or renting funny videos) and *active humor production* (like writing a funny story, telling a good joke with the right emphasis, or playing a trick on a colleague). Obviously, it is easier to engage people in passive exposure to fun than it is to “make them all-round funny people.”

The expression “laughter is the best medicine” has been around for centuries, but until recently there was no evidence to support this popular claim. When Norman Cousins (1976) incorporated humor therapy into his treatment of ankylosing spondylitis, however, the medical world began to take notice of the healing power of humor and of the positive emotions associated with it. Cousins’s premise was this: “If stress and disease can have negative physiological repercussions, can positive thoughts and actions produce positive affects throughout the day?” The answer to this question comes in Cousins’s report that 10 minutes of laughter from watching TV provided him with 2 hours of pain-free sleep that was badly needed for recovery.

Prior to engaging in a review of the outcomes of humor manipulations, it is wise to identify the specific nature of a humor intervention that could be meaningfully subsumed under stress management. In the section below, the application of humor in a psychotherapy process is not being considered because this application is considered too tangential to the SM theme. Therapists sometimes make jokes in therapy; these can be unrelated to a client's presenting problems and are meant to strengthen the building of an alliance with a patient (Franzini, 2000, 2001). Also possible is to seek humor in patients' responses or make interpretations more interesting by pointing out ironic twists, but this latter application can backfire because of differences in definitions of what is funny and also because a patient may lack the ability to be self-critical and open (in fact, an inability to be constructively self-critical is usually a part of the presenting psychopathology, and a patient who is able to see himself or herself in a funny light is probably close to therapy completion). Alas, these applications are seen as quite different from the kind of humor therapy that may be relevant to SM, and evaluating their usefulness is not helped by the lack of controlled research.

*Outcome: Clinical Analogue Studies.* In this section, a review is provided of studies that have evaluated subjective, behavioral, and physiological responses to acute exposure to humorous stimuli. This literature reveals a plethora of creative humor inductions, and many endpoints have been studied in a variety of participant populations. Numerous questions about the characteristics of respondents who did derive benefit from humor and critical features of the stimuli themselves have been revealed.

A small series of studies employed similar protocols in that college students and other healthy volunteers were exposed to various humorous stimuli and the effect of this exposure on mood was studied under controlled conditions (Cann, Calhoun, & Nance, 2000; Cann, Holt, & Calhoun, 1999; Mueller & Donnerstein, 1977; Ribordy, Holes, & Buchsbaum, 1980; Singer, 1968; Trice, 1985). Possessing a sense of humor (understood as a trait-type quality) sometimes enhanced the humor benefits (Cann et al., 1999), but this did not apply to all studies evaluating this effect (Cann et al., 2000). Evidence also suggests that aggression reduction effects following humor exposure applied to women but not to men (Mueller & Donnerstein, 1977).

Valuable additions to the studies that relied exclusively on self-report are those that also tap relevant behavior and biological activity. Weisenberg, Tepper, and Schwarzwald (1995) tested a time-limited experimental analogue of a clinical intervention, during which cold pressor

(a test of physiological reactions to immersion of a hand into ice water), neutral, repulsive, and humorous films were offered. Pain tolerance increased in repulsive and humorous conditions; this was attributed to the distraction propensity of the humor stimuli.

Physiological pathways were tested in two studies by Berk et al. (1989; Berk et al., 2001). Their first study tested 10 healthy volunteers whose neuroendocrine changes were monitored during the watching of 60 minutes of a humorous video (5 participants were neutral controls, 5 were actively exposed to humor). Despite the rather small sample, many significant effects were apparent in the form of reduced cortisol, dopac (the major serum catabolite of dopamine), epinephrine, and growth hormone. This result suggests powerful physiological effects for a relatively small dose of humor with effects showing throughout the task period and typically lasting well into the 30-minute recovery. Interestingly, results were attributed to laughter (an active behavior), although the article failed to mention whether participants' laughter had been objectively recorded or not. Berk et al. (2001) expanded their earlier work by repeating the  $N = 10$  study with a similar humor induction but a much larger sample ( $N = 52$  healthy men), longer follow-up testing, and by including a wide range of immune function indices. Humor boosted natural killer cell activity, immunoglobulin level, T-cell activity, and cytokine interferon, and the effects lasted well beyond the length of exposure to the humor stimuli; many indices showed continued boosting effects at 12 hours postexposure.

Martin and Dobbin (1988) studied the effect of hassles (a form of accumulating minor stressors) on immune function as indexed by immunoglobulin A in 40 participants. Mood levels tracked over a 6-week period revealed that participants scoring high on measures of sense of humor as an inherent trait did not show the correlation of stressor exposure and immune change, whereas those low on humor trait showed a negative link ( $r = -.32$ ), which suggests that the trait absence of a humorous outlook was paired with greater negative affect. The same pattern of a stress buffering effect of humor use was apparent for all three types of humor measures. The findings represent a direct and successful test of the stress buffering hypothesis of exposure to humor.

Another study's results bear on the stress buffering rationale. Newman and Stone (1996) showed participants a stressful video with images of a gory industrial accident. The task was to describe the events seen in either objective-neutral terms or ways that could be construed as humorous. Measures were galvanic skin response, heart rate, and skin temperature. When asked to enact humor in even this contrived environment, arousal was reduced relative to a neutral control condition.

In a shock anticipation experiment (Yovetich, Dale, & Hudak, 1990), participants benefited from humor induction (relative to controls) in that subjective anxiety ratings as well as physiological reactivity were attenuated, but this main effect was also moderated by a trait-type predisposition for humor. Similarly, induced depressive mood was reversed by humor exposure (Danzer, Dale, & Kliens, 1990), as was apparent on self-report and zygomatic muscle activity (which reflects actual smiling behavior). Finally, a series of three studies tapped the immunoglobulin and subjective responses to humor induction in student volunteers (Lefcourt, Davidson-Katz, & Kueneman, 1990). Findings confirmed that possession of a trait-type sense of humor was a critical moderator of the mood benefits of humor induction.

*Outcome: Field and Clinical Studies.* A total of only four studies could be located for the critical applied testing of long-term benefits of humor induction (McGuire, Boyd, & James, 1992; Vance, 1987; Ventis, Higbee, & Murdock, 2001; Witztum, Briskin, & Lerner, 1999). Vance's work is in the area of instructional design, and humor applications were tested in three classes of first-grade school children ( $N = 58$ ). Participants were not in any way preselected, and the humor manipulation was tested with respect to its effect on learning and retention (mood or distress were not tapped). Vance (1987) tested immediate and delayed humor contingency models and found that humor presentation prior to learning accelerated retention but that humor interspersed within a learning unit did not facilitate learning. In the strict sense, this study (while an applied study in nature) is not relevant to stress reduction, although one could claim that the humor benefits upon learning may have been mediated by a relaxed attitude and openness to learning that can result from humor exposure.

A truly clinical application with a controlled design was used by McGuire and colleagues (1992), who used long-term exposure to humor via watching funny movies to the improve quality of life for elderly residents of a long-term care facility. The researchers carefully evaluated the humor potential of a long list of commercially available movies, and randomized participants into either humorous, neutral, or a control condition. All subjects had experienced pain for at least 6 months. The humor and the neutral condition subjects watched movies for 3 hours per week for a 12-week period in total. Endpoints were self-reported health and affect, and pain medication requests. Watching funny movies resulted in broad-based improvement in mood state, weak and mixed results regarding self-perceived health, and no apparent benefits for pain medication requests. In



another trial, 40 spider phobics were randomly assigned to systematic desensitization, humor desensitization, or untreated control. Both active treatments showed improvement and were superior to the no-treatment control, but were not different in effect from each other. The humor desensitization consisted of instructions to engage in humorous depictions of the feared spiders via imagery or the use of jokes or cartoons. Lastly, an uncontrolled intervention of humor for treating schizophrenia patients also showed some benefits (Witztum et al., 1999). Twelve schizophrenics were studied before and after a 3-month humor therapy; the intervention led to reduction in behavioral symptoms.

*Conclusion.* Use of humor as a therapeutic tool has been enthusiastically accepted by laypeople and mental health professionals and is being applied in a wide variety of contexts: schools, offices, and hospitals. Humorous material is made available to healthy people as a simple distractor and mood enhancer as well as to patient populations to facilitate emotional coping.

In sum, review of the experimental literature reveals a fairly consistent picture that humor induction in the laboratory can enhance positive moods and minimize distressed affect under a variety of experimentally induced distressing conditions (pain induction, performance stress, viewing of unpleasant films). The evidence is predominantly based on self-report, but a few well-controlled studies also reveal parallel effects on physiological indices of arousal. The shown benefits for immune function enhancement are particularly impressive (Berk et al., 1989; Berk et al., 2001) because they were apparent even in a small sample, they were replicated, and they lasted well beyond the humor exposure episode itself. There is suggestive evidence that at least for transient humor induction experiences, people do not need to possess a trait-type sense of humor to benefit from exposure to humorous materials, although a trait-type sense of humor appears consistently to accentuate the derived mood benefits. There is no clear evidence that actual laughter is required for benefit. The stimuli most often used were movies, a form of passive humor exposure. There is a critical absence of data about whether research participants can effectively be taught or encouraged to become active producers of humor (Martin, 2001). It is posited here that the ability to create humor actively (finding and retelling of jokes, using witty one-liners, or playing a prank) may actually have greater potential to be sustainable and to lead to reciprocity by encouraging others in the immediate social field to participate. Although men and women have been subjected to humor inductions, gender differences were rarely tested, and when they were tested, both

genders appeared to benefit equally. There is no evidence so far that researchers have captured the cultural specificity underlying humor, and the most often used humor stimuli were North American-made comedies.

In light of the relatively good analogue research support on the acute benefits of humor, there is a stunning absence of controlled research into the longer-term effects of systematic, stress-reducing, and mood-enhancing humor use for healthy or clinical populations. The available studies are small in terms of sampling and have at best modest-quality protocols. Clinical practice (e.g., in the form of humor-material libraries in cancer wards) is way ahead of a literature base that actually supports its benefits. Analogue studies are supportive of positive outcomes, but evidence from controlled clinical trials is sorely missing to support claims for routine clinical applications. In consequence, there are exciting opportunities for researchers to close this gap.

#### *Social Support Interventions*

Presence of support has repeatedly been linked to good long-term health outcomes based on demonstrations of better immune function, lower blood pressure, and reduced mortality (see Chapter 2). Acute provision and general availability of support are meant to buffer individuals from the negative effects of stress exposure, and there is strong experimental research to support this claim. As Hogan, Linden, and Najarian (2002) have shown, however, there is a no ready translation from time-limited, acute support protocols in experimental studies to enduring support creation in the real world. That notwithstanding, researchers have created many unique approaches to support creation. Examples of particularly promising protocols are given in the next section. The reader interested in more detail on such interventions is referred to Hogan et al.'s (2002) review and tabular descriptions.

Social support interventions have taken many forms and have targeted highly varied populations. It is difficult to see a natural order in the several types of support interventions that have been used unless a brief description of the concept's many critical features is provided first. Commonly held critical features are structural aspects of social networks (e.g., the size of a person's social circle or the number of resources provided), functional aspects of social support (e.g., emotional support or a sense of acceptance), and enacted support (e.g., provision of specific supportive behaviors, such as reassurance or advice, in times of distress), as well as the subjective perception of support by the recipients (Lakey & Lutz, 1996). When

support is defined interpersonally, as an exchange between providers and recipients, three main types of supportive social interactions emerge: emotional, informational, and instrumental (Antonucci, 1985; House & Kahn, 1985; Kahn & Antonucci, 1980). Emotional support involves verbal and nonverbal communication of caring and concern, and is believed to reduce distress by restoring self-esteem and permitting the expression of feelings. Informational support, which involves the provision of information used to guide or advise, is believed to enhance perceptions of control by reducing confusion and providing patients with strategies to cope with their difficulties. Instrumental support involves the provision of material goods (e.g., transportation, money, or physical assistance), and may also help decrease feelings of loss of control. It can be readily seen from this description that support can play an acute and lasting buffering function in the stress response process.

Understanding the nature of social support is at times impeded by the fact that support can emerge from both natural and more formal support systems. Natural support systems include both family and friendship networks. More formal support is provided by professionals (such as mental health and medical professionals), through interventions with groups of individuals with similar problems, and through social or community ties (such as clubs or religious groups). Presumably, natural support networks are a more enduring source of support, while other forms of support may be more transient. Whether one or the other is a superior source of support is not clear, however. How support is conceptualized and operationalized within an intervention may be critical in determining the ultimate success of that intervention.

*Outcome of Support Interventions.* Despite a massive literature on the benefits of support, there is equivocal evidence about how, and how well, social support interventions work. Only a single, systematic review of social support intervention outcomes could be located (Hogan et al., 2002). Using a computerized search strategy, 100 studies had been identified that evaluated the efficacy of such interventions. For the purpose of review and evaluation, Hogan et al. (2002) subdivided studies into three large clusters: (1) group versus individual interventions, (2) professionally led versus peer-provided treatment, (3) interventions where an increase of network size or perceived support was the primary target, versus those where building social skills (to facilitate support creation) was the focus. Since the search was not limited to a particular patient population, the interventions targeted a wide range of populations, including the elderly,

those suffering from medical illnesses or from psychological disorders, women during labor, smokers, substance abusers, caregivers, and breast cancer and cardiac patients, to name a few. The review was primarily narrative in nature because the wide range of different social support interventions and targeted populations prohibited evaluation of treatment outcome using meta-analysis (i.e., there were not enough studies in all the resulting cells to permit meaningful comparison).

Close attention was paid to how support had been conceptualized by identifying whether a given intervention was targeted at directly providing support (e.g., providing emotional, informational, or instrumental support, or increasing enacted support), or whether it attempted to produce enduring changes in naturally occurring support (e.g., developing or improving social skills so that support is increased in the natural environment, strategies to improve perceived social support, or making changes in social networks). These two different approaches have very different conceptual underpinnings. Support provided by others is believed to strengthen coping resources, render a sense of being supported, and ultimately lead to a reduction in psychological or general health symptoms (Lakey & Lutz, 1996). On the other hand, interventions targeted at training social skills or improving the naturally occurring social environment are based on the belief that people can create and maintain support systems (or their perception of the support received from these systems) if they acquire the necessary skills. The resulting improvements in support are assumed to improve health and well-being.

Finally, it is important to determine the source of the support within a given intervention. This is most applicable to interventions focused on providing support. Support provided by a family member or friend and by other persons with similar difficulties (hereafter "peers") was discriminated from support provided by a professional caretaker (e.g., medical professional, psychologist, nurse, social worker). Other interventions may not specifically provide support from a certain source, but may work to increase the support received or perceived in the participant's natural environment.

*Group Interventions That Provide Support Through Family and/or Friends.* Support interventions that include family members or friends in treatment have the benefit of using the patient's natural support system; eight such studies were identified. Benefits from the core treatment were observed in all eight studies; three studies reported additional gains attributable to the inclusion of significant others in the interventions, while two others failed

to do so. Effects tended not to last when evaluated at follow-up. Seven out of the eight studies did not include a measure of support. One particularly creative study is described here to demonstrate the potential richness of variations in protocol. Wing and Jeffrey (1999) tested a comprehensive support intervention that included intragroup activities, alternating providing and receiving support, group problem solving, and an intergroup competition. The support intervention was evaluated with friends recruited by the participants, as well as with teams of three other people the participants had not previously met. The support manipulation improved the maintenance of weight loss for those recruited with friends and those who were not, and showed that alternating between receiving and giving support may be most beneficial.

*Group Interventions That Provide Support Through Peers (Self-Help Groups).* Peer support, or “self-help,” groups constitute a large portion of the health services system. In the United States alone, between 3% and 4% of the population is involved in self-help groups over a 1-year period (Kessler, Mickelson, & Zhao, 1997). Self-help groups provide an arena within which participants can both provide and receive support (most often emotional support), and this reciprocity is hypothesized to foster more favorable well-being (Maton, 1987). Furthermore, peer support groups provide members an opportunity to develop friendships and to rebuild lasting social networks after a crisis. Despite their widespread use and popularity, there are relatively few outcome studies; only 6 of 100 fit into this category. Five out of six studies reported improvements in general well-being or specific symptomatology, although it is important to note that none of the six studies reviewed employed a randomized control group design, and the generalizability of results are seriously threatened by concerns about self-selection into self-help groups.

In addition, this group of studies allowed conclusions to be drawn about the type of support protocol that may be most effective. Maton (1988) examined the relationship of social support to well-being and group appraisal among members of three different self-help groups: Compassionate Friends (time-delimited stress), Multiple Sclerosis (chronic stress), and Overeaters Anonymous (behavioral control). The social support measure included three subscales, namely Support Provided, Support Received, and Friendship. A fourth subscale, Bidirectional Support, was defined as persons high on both Support Provided and Support Received subscales (note that Support Received is equivalent to perceived support.). Receiving social support increased perceived group benefits and group

satisfaction, while providing support and friendship were positively related to well-being and group appraisal. Bidirectional supporters reported more favorable well-being and group appraisal than Receivers or Providers. These results provide insight into the process of peer support groups, as providing *and* receiving support had beneficial effects on well-being and group satisfaction; those who did both fared better than participants who engaged in only one or the other.

Self-help groups may be of particular appeal to individuals with stigmatized concerns (e.g., AIDS, alcoholism, breast or prostate cancer), and lowest for equally damaging but less “embarrassing” diseases (e.g., heart disease). The differences are not trivial; for example, AIDS patients were *250 times* more likely to participate in a self-help group than hypertension patients.

*Support Groups as a Means for Providing Social Support.* Sixteen studies were identified in which organized support groups were led by a professional (e.g., psychologist, psychiatrist, nurse, or social worker). While typically nondirective, the leader facilitates discussion of the emotional issues and personal experiences of the group members. Similar to peer support groups, these support groups provide members with an opportunity to both receive and provide support. Formal skill training is not a component of these groups.

Eight of the 16 studies reported favorable outcomes of support group interventions on psychological and medical outcome measures. A further 4 studies reported moderate improvements on only psychological outcome measures; however, in one of these studies the support group did not outperform a stress management condition (Shearn & Fireman, 1985) and in 2 others the support group was inferior to a cognitive-behavioral treatment (CBT) condition at posttreatment (Bottomley, Hunton, Roberts, Jones, & Bradley, 1996; Edelman, Bell, & Kidman, 1999). Given that the support treatments failed to produce results similar to those found in SM or CBT controls, it can be concluded that they must also be inherently different in rationale and process (i.e., there must be more than nonspecific factors at work here).

*Social Support Skills Training Group Interventions.* Interventions that target social skills attempt to improve naturally occurring support systems by teaching relationship skills; the professional group leaders are directive and follow a defined curriculum. Although group members may be encouraged to be supportive of each other, the primary focus is the teaching and practicing of specific social support skills.

Nine of the 13 studies in this category reported benefits of social support skills training, and were mediated by increases in personal support networks. Much of this appeared to stem from increased contacts with professional caretakers, however, and does not hold much promise for generalization beyond the acute contact phase with professionals.

Five studies targeted psychiatric populations, and the skills training approach consistently improved assertion and social functioning. Again, one particular study deserves detailed mention. Brand, Lakey, and Berman (1995) investigated the efficacy of a treatment designed to increase perceived support that combined psychoeducation, social skills training, and cognitive behavioral techniques. This treatment is quite different from others described in this section because its primary objective was to increase perceived support. Perceived social support (measured by a well-validated measure) was found to increase when from family members, but not from friends, in the intervention group. Brand et al. suggest that observed changes in self-esteem and frequency of self-reinforcement might have mediated the increase in perceived support. Interestingly, changes in self-cognition were larger than changes in perceived support.

*Group Interventions That Combine Provision of Support With Social Skills Training.* One randomized controlled trial study was located that combined provision of support with social skills training; it aimed to improve support and decrease distress and grief in HIV-seropositive and HIV-seronegative homosexual men who had recently lost a friend or partner (Goodkin et al., 1999). The supportive component of treatment involved group discussion and the provision of mutual support, while the skills component focused on social support skills and coping styles. Treatment groups were homogeneous in terms of HIV-serostatus. At posttreatment, overall distress was reduced and grief recovery accelerated in men who received the intervention, but there was no change in depression or anxiety.

*Individual Interventions That Provide Support Through Family and/or Friends.* Although there is a variety of studies on support provision by close family members or friends, discussion here is limited to interventions in which improving social support was one of the explicit goals of treatment; four such studies were located. Three of the four studies reported beneficial effects from including significant others in individual treatment.

*Individual Interventions That Provide Support Through Peers.* Peer interventions at the individual level have taken many different forms. The results

are encouraging because there is a critical mass of studies and the clear majority show favorable outcomes (9 out of 14). Peer support has proven efficacious with many patient populations, including coronary bypass patients awaiting surgery, nursing home residents, women with chronic depression, and mothers of children with juvenile rheumatoid arthritis. Interestingly, Scharlach (1988) observed beneficial effects of the support condition on the peer supporters as well as on the support recipients, providing evidence for the advantages of providing support.

Worth mentioning separately is a very well-designed study in which advocacy services were provided to women with abusive partners. Advocates focused on helping the women access needed community resources (i.e., instrumental support) while providing emotional support (Sullivan, Campbell, Angelique, Eby, & Davidson, 1994). At post-treatment, women who received the advocacy intervention reported increased effectiveness in obtaining desired resources, increased perceived social support, and improved quality of life. At 6-month follow-up, improved quality of life was maintained, but differences in perceived social support subsided. This may be due to the transient nature of the provided support, which could be corrected by providing as-needed services.

*Individual Interventions That Provide Support Through Professionals.* In most cases, these support interventions involved a combination of emotional support, informational support, and/or instrumental support, making it difficult to assess the unique contribution of support provided by a professional. Nine of the 18 studies reported generally positive effects of professionally led individual support interventions.

*Social Support Skills Training: Individual Interventions.* Teaching social skills to unassertive persons through use of rehearsal, modeling, instruction, and behavioral feedback has proven effective in the laboratory, and seven studies evaluated individually based interventions focusing on teaching social skills rather than direct provision of social support. Overall, the results of these investigations are promising in generally unassertive populations and in samples with specific diagnoses, and treatment effects were often reported to generalize.

*Comparison of Different Types of Individual Support Treatment Structures.* Only one study compared different forms of individual support. Pistrang and Barker (1998) examined the effects of emotional support provided by a



partner versus a fellow patient on women with breast cancer. The participants engaged in a semi-structured communication task that required the discussion of the personal problems of the women. Trained observers rated the conversations with a fellow patient to be more helpful, empathetic, and supportive, less critical, and involving more self-disclosure than the conversations with partners.

*Social Support Interventions That Combine Group and Individual Therapy.* In this section, interventions that combine group settings with one-on-one support are described. In many cases, these interventions involve both professional leadership and support provided by family members, friends, or volunteers. A clinically sensitive and ecologically promising approach was evaluated by Hawkins, Catalano, and Wells (1986), who found that a social support skills training group followed by a “buddy” program was effective at reducing drug use; coping with relapse; and improving social interactions, interpersonal problem solving, and stress coping in a sample of drug users residing in therapeutic communities.

*Group Versus Individual Interventions.* Group and individual interventions were compared in three different studies, but the results were uneven, possibly due to lack of power and low-design-quality threats. One approach worth describing in more detail was a skills group that was compared to peer telephone support for multiple sclerosis (MS) patients (Schwartz, 1999). Participants randomly assigned to the skills intervention were taught approaches to goal setting, strategies to deal with cognitive deficits, and ways of improving communication with caregivers, and also participated in discussions about their emotional difficulties. Thus, these participants received emotional support as well as structured skills training aimed at improving coping and naturally occurring social networks. Participants randomly assigned to the peer telephone support condition received nondirective emotional support from volunteers who also had MS and who were trained in active listening. Results indicated that the skills training intervention produced gains in psychosocial role performance, coping behavior, and well-being, while the peer support intervention increased external locus of control but did not influence other variables. The peer support intervention was most helpful among participants with affective symptoms. Possible mechanisms behind the success of the skills training group are proposed by Schwartz, including modeling, reframing, increased commitment, and the directive nature of the group. Improved communication with caregivers may have led to

increased support, which may have played a role in treatment outcome. Interestingly, compared to the supported patients, the peer telephone supporters reported more change in both positive and negative outcomes and showed improvements on psychological variables (e.g., self-esteem, depression). These findings, in combination with those reported by Scharlach (1988), suggest that systems of *mutual* support that encourage reciprocity may be especially helpful.

*Discussion.* A coarse summary of the results in a box-score format indicated that support interventions were reasonably successful given that of the 100 studies reviewed, 39 reported that supportive interventions were superior to no-treatment or standard care controls, 12 reported that interventions were superior or equivalent to alternate (also successful) treatments, 22 suggested partial benefits of support interventions, 17 suggested no benefit, and in 2 studies treated participants got worse. Eight of the studies had no controls to allow comparison. In sum, 73 of 92 studies (or 83%) reported at least some benefits from support interventions relative to either no-treatment or active controls. Unfortunately, this crude summarization was considered of limited use because many different types of interventions, delivery formats, and populations were lumped together. Support provided by friends and/or family members and by peers appears beneficial, and social support skills training may be especially useful. These findings held across both individual and group interventions, and for peer- and professionally directed protocols. Further, it was noted that interventions that emphasized reciprocal support (e.g., both giving and receiving support) demonstrated more encouraging results, suggesting that merely receiving support may not be as potent as mutual exchanges of support. Conceptual and methodological problems prevented much confidence in simplistic reporting of results. While reviews of therapy outcome routinely criticize studies for their methodological flaws, the support intervention literature was judged by Hogan et al. (2002) to reflect particularly serious problems. Far and away the most salient problem was that *most* of the studies examining the efficacy of support interventions failed to include a measure of social support. This was particularly striking because investigators usually posited that improved support was the reason for otherwise observed benefits. Attempts to improve the quality of social intervention studies may also need to carefully consider the need for matching the type of support to the type of recipient and the type of situation, because some support attempts have been shown to backfire. Positive ties with others were significantly related to well-being

only when they involved positive affect and sociability rather than specific provision of support. A related concern is support attempts that fail because of minimization (i.e., challenging the seriousness or existence of a problem) and maximization (i.e., catastrophizing the problem or being overly protective; Dakof & Taylor, 1990; Hemphill, 1997; Lehman & Hemphill, 1990). Interestingly, Hemphill noted that some kinds of support, such as tangible and informational assistance, were perceived as especially helpful or unhelpful, depending on the characteristics of the stressor (i.e., physical incapacitation, controllability, or trajectory). Further, at least two well-designed studies show that support can worsen outcomes (Helgeson, Cohen, Schulz, & Yasko, 1999, with breast cancer support groups; and Frasure-Smith et al., 1997, with female cardiac patients). Women with breast cancer in peer discussion groups who initiated treatment with high support levels experienced decreases in physical functioning over the course of the group, and female cardiac patients who received nursing support also fared worse than their untreated counterparts. It appears that social support interventions should not be considered innocuous, and that women may be particularly open to negative outcomes.

There is discussion in the literature about matching interventions to patient characteristics. Hogan et al. (2002) provided a lengthy discussion of patient characteristics that may maximize the usefulness of support interventions and situations, as well as other patient characteristics that may not necessitate support interventions or that promise failure. On the one hand, there are psychiatric diagnoses (psychosis, personality disorders) for which support interventions are unlikely to lead to the creation of a patient-maintained network, and there also are people who neither have nor seek support. Support may be particularly beneficial in cases of transient stress phases, or acute disruptions in previous support.

A timely question is that of the usefulness of online support but no research was located that evaluated the efficacy of "computer" support. The Internet, however, by providing access to online support groups and chat rooms, may provide a potentially very useful form of social support (Davison, Pennebaker, & Dickerson, 2000). Interestingly, in their investigation of who pursued online support, Davison and her colleagues found that sufferers of debilitating diseases that present physical barriers to attending support groups (e.g., multiple sclerosis and chronic fatigue syndrome) showed the highest rate of online support group participation. Such groups provide an opportunity for persons whose disability impairs mobility, for rural and other isolated populations, and for those who desire anonymity.

### *Pet Ownership*

Over the past decade or so a remarkably consistent body of literature has emerged that shows the stress-reducing benefits of owning a pet, although this body of research derives its strengths from time-limited lab stress manipulations rather than from an accumulation of controlled clinical trials. Acquiring a pet can be considered a special form of social support intervention in that pets provide esteem or emotional support (Allen, Blascovich, & Mendes, 2002), and this rationale is easy to accept. The benefits of pet ownership even derive anecdotal support in TV shows and Hollywood movies where a well-trained dog brings the owner's slippers when arriving home or fetches a cold beer from the refrigerator! Unfortunately that portrayal is a little too Hollywood-ish; if it were true, however, it could be seen as the dog providing instrumental support.

A key feature of the pet's supportive qualities is that the pet is loyal, nonjudgmental, and nondemanding, and this aggregate of qualities can lead people to sport bumper stickers saying, "I love my dog" or "The more I learn about people, the more I love my dog" (or cat, or fill in the blank with a pet of your choice). These little stabs notwithstanding, the presence of pets has consistently been shown to reduce acute arousal in demanding laboratory situations. Most often studied are blood pressure responses. In the great majority of studies where owners could bring their pets to the laboratory, the pet's presence was associated with smaller physiological stress responses than were seen in the presence of friends or a spouse or under a variety of control conditions where participants were alone while performing a comparably demanding task (Allen, Blascovich, & Mendes, 2002). It is less clear whether people who own pets have a priori different personality dispositions than those without pets, or whether "prescribing" acquisition of a pet to those who have never considered owning one would have the same beneficial effects.

Allen and Blascovich (1996) assessed the value of service dogs for people with ambulatory disabilities. Forty-eight individuals with severe and chronic ambulatory disabilities requiring the use of wheelchairs were recruited from advocacy and support groups for persons with muscular dystrophy, multiple sclerosis, traumatic brain injury, and spinal cord injury. Participants were matched on age, sex, marital status, race, and the nature and severity of the disability in order to create 24 pairs. Within each pair, participants were randomly assigned to either the experimental group or a wait-list control group. Experimental group members received trained service dogs 1 month after the study began, and subjects in the wait-list control group received

dogs in month 13 of the study. Data collection occurred every 6 months over a 2-year period, resulting in five data collection points for all subjects. Participants showed substantial improvements in self-esteem, internal locus of control, and psychological well-being within 6 months after receiving their service dog. Socially, all participants showed similar improvements in community integration, and behavioral indices of change also improved (school attendance, part-time employment, needed paid and unpaid assistance hours). The authors concluded that trained service dogs could be highly beneficial and potentially cost-effective components of independent living for people with physical disabilities. In some ways, this study does not readily fit in the category of SM; on the other hand, the physical mobility limitations of these patients can be seen as a stressor and the dog's assistance was instrumental in increasing mobility. It is also likely (although not directly assessable in this type of protocol) that the pet's presence surreptitiously provided emotional and esteem support. Alternatively, the patients' improvement in affect may have been a reaction to the increased mobility that the trained dog facilitated. Either way, the intervention's benefit was apparent across a number of different indices and of surprising strength given the relatively small sample of the study.

Additional benefits of pet ownership and its inherent stress reduction potential are the fact that (a) some pets (dogs in particular) need to be walked daily, thus creating an opportunity for sustained exercise; and (b) pet care requires routines that create stability and a sense of responsibility that is of benefit to some.

Similar to the domains of time management and humor therapy, the popularity of pet ownership and its claimed benefits for health are based on good short-term, experimental evidence of benefits, but the ultimately critical, controlled, randomized trials are lacking. Although this appears to represent an exciting opportunity for researchers to distinguish themselves, such studies will not be easy to conduct because people self-select in whether or not they want pets in the first place. It is possible, or even likely, that those who decide to acquire a pet are metaphysically different from people who do not. Lack of perceived social support may be one strong motive for pet acquisition, whereas those high in support may elect not to have a pet; conversely, if people high in support were randomly assigned to have a pet (provided that they agreed in the first place), they might not benefit because the vacuum that the pet fills elsewhere does not exist here. Correspondingly, it may not even be possible to representatively sample petless individuals who then agree and follow through with a random assignment to pet ownership or a no-pet control group.

*Psychological Effects of Exercise*

The known acute physiological effects of exercise and their long-term implications are widely documented and provide strong reasons for inclusion in a lifestyle habit (Rostad & Long, 1996). Narrative and meta-analytic reviews have been published to help assess the usefulness of exercise components in SM programs.

A meta-analysis of the associated psychological benefits of exercise treatment in cardiac patients identified 15 studies of exercise rehabilitation that also monitored psychological changes in patients undergoing an exercise program (Kugler, Seelbach, & Krueskemper, 1994). These researchers reported that exercise alone without any specific attempt at psychological intervention produced significant reductions in anxiety (effect size  $d = -0.31$ ) and depression ( $d = -0.46$ ).

Long and her coworkers (Flood & Long, 1996; Long & Van Stavel, 1995; Rostad & Long, 1996) have diligently reviewed the literature and concluded that there is consistent evidence supporting aerobic exercise for coping with stress. In a meta-analysis, 40 studies were used to extract 76 effect sizes expressed as  $d$ . Exercise implementation was associated with an average within-group effect of  $d = -0.45$  and a between-group effect of  $d = -0.36$  in stress reduction. The outcomes indexed by these effect sizes were self-reported anxiety and tension. Predictably, participants with higher initial anxiety also derived greater benefits ( $d = -0.48$  vs.  $d = -0.32$ ), whereas the much greater benefit observed for men was surprising (men showed a between-group effect of  $d = -0.49$  but women benefited only marginally with  $d = -0.14$ ). It is comforting to see the replicability of effects when comparing the remarkably similar effect sizes for anxiety reduction in the Kugler et al. (1994) meta-analysis of cardiac patients with the data from Rostad and Long's (1996) more mixed samples.

Whereas people readily acknowledge the demonstrated benefits of an exercise habit, a major concern for all health practitioners is to assist in creating a stable, lasting exercise habit. Unfortunately, even among those convinced of the benefits, only a small portion actually engage in routine exercise, and researchers have placed considerable research emphasis on learning about methods to help people initiate and maintain exercise. The outcome of such efforts has been reviewed in a meta-analysis (Conn, Valentine, & Cooper, 2002), and researchers concluded that behavioral interventions are helpful in increasing physical activity but the resulting average effects sizes were small ( $d = 0.26$ ). When linking protocol differences to outcomes, a number of clear recommendations emerged. Conn et al. (2002) concluded that patient populations were more likely to respond to a

prescribed exercise regime than were nonpatients and were more successful if they focused on behavior (rather than broad health education), incorporated self-monitoring, used group formats, and were based on intensive contact between participants and interventionists.

## Arousal Reduction Techniques

This section on the rationales and benefits of different arousal reduction strategies is kept relatively short because differences and similarities between various methods have been extensively discussed elsewhere (Lehrer & Woolfolk, 1990; Linden, 1990; Vaitl & Petermann, 2000). Further, as the reader will see below, the outcomes are much more similar than they are different (Benson, 1975) although protagonists of specific techniques tend to stress uniqueness and differences. The primary purpose of arousal reduction methods is to help people recognize sympathetic hyperarousal and to provide them with techniques to reduce such arousal. More recently, applied psychophysiology researchers have come to see relaxation methods as tools for achieving a balance between sympathetic and parasympathetic activation. In addition to just being expected to learn a technique, most proponents of relaxation methods (in particular those of meditation and Autogenic Training) also stress that experienced relaxation practitioners experience a shift in their overall arousability pattern and adopt a more distanced, reflective view of potentially stressful situations (Linden, 1990).

When researchers came to see the many similarities and shared features of arousal reduction strategies (e.g., a vehicle for focus, removal of external stimuli, a comfortable body position, perceived permission to focus on oneself; Benson, 1975), they started to challenge the idea that relaxation techniques had more to offer than would other inactivity like sitting quietly and resting or listening to classical music. Alexander and colleagues (Alexander, Robinson, Orme-Johnson, Schneider, & Walton, 1994), however, showed that a comparison of meditation with simple "eyes closed, rest" activity showed three to four times greater effects on skin resistance response, respiration, and plasma lactate changes for the meditation practitioners, thus supporting the notion of arousal reduction techniques as possessing unique and valuable properties.

Even though arousal reduction strategies achieve more than mere physical inactivity does, it is considerably more challenging to show differential benefits and/or "ideal matches" of particular strategies to specific applications. Benson's (1975) position is that all arousal reduction interventions share critical features that, at least for the most part, account for the benefits. These include provision of a rationale, permission to focus on

oneself, spending time in a stimulus-reduced environment, and the use of a vehicle to facilitate attentional focus. Where methods differ most is in the use of the type of vehicle for attention focusing. In meditation it is the mantra, in Progressive Muscular Relaxation it is the clearly structured and sequenced following of tensing-relaxing steps for various muscle groups, in biofeedback it is the availability of a physiological monitor and displays of one's functions, and in Autogenic Training it is the structured sequence of attending to formulas that suggest particular physiological changes. Their shared target is to produce a relaxation response that shifts the pattern of the electroencephalogram (i.e., increases dominance of alpha activity), reduces muscle tone and blood pressure, and reduces breathing rate with simultaneously greater inspiration and expiration depths. Aside from physiological arousal reduction, these techniques are also likely to lead to accompanying changes in subjective arousal, and it is worthwhile for researchers to measure and report biological and psychological changes separately, given that they may not always occur in synchrony. One arousal reduction technique that is somewhat distinct and growing in popularity is that of mindfulness stress reduction (Davidson & Kabat-Zinn, 2004; Grossmann, Niemann, Schmidt, & Walach, in press; Kabat-Zinn, 2003). Although mindfulness stress reduction has some of its origins in meditation as practiced on the South Asian subcontinent, it is not to be confused with traditional meditation like transcendental meditation because mindfulness meditation is not passive acceptance, but focuses on achieving an astute awareness and the ability to see and accept without judgment one's own behavior and interactions with the environment (Kabat-Zinn, 2003). A potential problem with discussing mindfulness meditation in a comparative sense with other arousal reduction methods is that mindfulness meditation is considered more of a multicomponent approach, more of an intervention program rather than just a unitary, single-technique intervention (Davidson & Kabat-Zinn, 2004; Smith, 2004).

Although the choice of arousal reduction method can occasionally be tied to specific outcomes (Lehrer, Carr, Sargunraj, & Woolfolk, 1994), it is more often a function of the therapist's and client's preference, and of less importance for generic stress reduction. This claim to equivalence does not apply to certain demonstrably "ideal" matches of technique to target, as in the case of electromyographic pelvic floor feedback for urinary incontinence.

One of the most extensively reviewed areas of arousal reduction is Autogenic Training (AT). This technique and its outcome are described in more detail to illustrate some specific technique-outcome matching effects. In AT the patient learns a set of six formulas that are subvocally repeated



and that suggest specific autonomic sensations (see Linden, 1990, for a detailed description of the clinical procedures). These six formulas and their intended target areas are (1) "My arm is very heavy" (muscular relaxation), (2) "My arm is very warm" (vascular dilatation), (3) "My heartbeat is very regular" (stabilization of heart function), (4) "It breathes me" (regulation of breathing), (5) "Warmth is radiating over my stomach" (regulation of visceral organs), and (6) "There is a cool breeze across my forehead" (regulation of blood flow in the head). Supporting research has shown that measurable physiological changes accompany the practice of these imagery exercises (for reviews of the underlying conceptual issues, see Lichstein, 1988; Linden, 1990; or Luthe, 1970).

Two recent, detailed reviews are available to evaluate the efficacy of Autogenic Training and other comparison treatments (Linden, 1994; Stetter & Kupper, 2002). Both of these reviews have the unique advantage of drawing on English- and German-language studies. Quantitative findings suggested that Autogenic Training was associated with medium-sized pretreatment to posttreatment effects ranging from  $d = -0.43$  for biological indices of change to  $d = -0.58$  for psychological indices in the Linden (1994) review, and  $d = -0.68$  (biological indices) and  $d = -0.75$  (psychological outcomes) in the Stetter and Kupper review (2002). The pooled effect size estimates hide considerable variability in behavioral/psychological effects for individual target problems. Moderately sized improvements were reported for tension headache and migraine, hypertension, coronary heart disease rehabilitation, asthma, somatoform pain disorder, Raynaud's disease, and anxiety and sleep disorders.

The proponents of various arousal reduction strategies are often as wedded to their underlying theories and philosophies as are other psychotherapists to their alignments and particular theoretical orientations. Arousal reduction methods can be organized around Western versus Eastern origins (biofeedback, muscular relaxation vs. meditation, yoga), and around the degree to which they require imagination (e.g., there is a high need for imagery capability for meditation, and a low need for imagery in the learning of muscular relaxation). Along these lines, there is empirical support for the stress-reducing propensities of tai chi chuan (Sandlund & Norlander, 2000), but it is unclear whether tai chi chuan is more appropriately placed under the physical exercise or under the arousal reduction "umbrella" given that it combines some physical effort with an attentional distraction and focusing element.

Ultimately, however, it is an empirical question whether any one method is more effective than another, and this answer is, at least in good

part, already available. Data from seven meta-analyses permit aggregation and comparison of results (Eppley, Abrams, & Shear, 1989; Godfrey, Bonds, Kraus, Wiener, & Toth, 1990; Grossmann et al., in press; Hyman, Feldman, Harris, Levin, & Malloy, 1989; Linden, 1994; Luebbert, Dahme, & Hasenbring, 2001; Stetter & Kupper, 2002), as well as observed effect sizes  $d$ , are displayed in Table 3.1.

**Table 3.1** Average Effect Sizes for Arousal Reduction Strategies

<i>Review</i>	<i>Pre/Post</i>	<i>Arousal Reduction vs. No Treatment</i>	<i>Arousal Reduction vs. Placebo</i>	<i>Arousal Reduction vs. Other Active Treatment</i>
Hyman et al. (1989)	-0.51	-0.58	-0.66	N/A
Eppley et al. (1989)	N/A	-0.63	N/A	N/A
Godfrey et al. (1990)	-0.40	N/A	N/A	N/A
Linden (1994)	-0.53	-0.52	-0.37	-0.03
Stetter & Kupper (2002)	-0.75	-0.61	N/A	-0.28
Luebbert et al. (2001)	-0.49	N/A	N/A	N/A
Grossmann et al. (in press)	N/A	-0.56	-0.54	-0.43

One case of a very focused application of relaxation training is that documented by Luebbert and her collaborators (2001) in a meta-analysis of relaxation for cancer patients. Fifteen studies could be identified, and they revealed significant effects on affective distress for patients undergoing chemotherapy, radiotherapy, bone marrow transplantation, and hyperthermia. Outcomes could be clustered into biological indices (blood pressure, heart rate, nausea, pain), and the corresponding aggregate effect size was  $d = -0.49$  (weighted for sample size) for the pre/post comparison. Outcome for subjective distress (depression, tension, anxiety, mood) also was  $d = -0.49$ .

Hyman et al.'s (1989) conclusions are based on 48 studies covering various relaxation techniques for a variety of applications. Linden (1994) focuses on evaluations of Autogenic Training ( $N = 24$  studies), as do

Stetter and Kupper (2002). Eppley et al. (1989;  $N = 146$  studies) evaluated the effects of various relaxation strategies for anxiety reduction. Unique to Linden's review is the separate reporting of effect sizes for biological indices of stress versus self-reported arousal reduction; for the pre/post comparison the effect sizes were  $d = -0.47$  and  $d = -0.58$ , respectively; for the active treatment versus control comparison they were  $d = -0.36$  and  $d = -0.67$ , respectively; and for comparison with placebo the scores were  $d = -0.51$  and  $d = -0.24$ , respectively. Interestingly, while effect sizes for self-reported distress weakened with increasing levels of nonspecific effects inherent in different controls, the effect sizes for biological indices of stress remained at the same level. Note that the effect sizes in Table 3.1 reflect the *average* of effect sizes for self-report and biological indices.

Eppley and his colleagues (1989) subdivided their studies into relaxation, meditation, and other relaxation (i.e., neither mediation nor muscular relaxation) and found effect sizes of  $d = -0.61$ ,  $d = -0.69$ , and  $d = -0.58$ , respectively (the effect size reported in Table 3.1 is the average of these three individual effect sizes). Grossmann et al. (in press) culled 64 empirical studies on mindfulness-based stress reduction from the literature and computed effect size for a variety of pre/post effects and control conditions. Unfortunately, only 20 of the 64 studies met reasonable standards for methodological quality and permitted inclusion in the effect size comparisons. The authors concluded that the average effect size for mindfulness stress reduction was around  $d = 0.5$ . As Table 3.1 indicates, it may have potential to be superior to other arousal reduction approaches because of all tested approaches it showed the largest effect superiority when pitched against active treatment comparisons (average  $d = 0.43$ ). Such claims need to be interpreted with caution, however, because they are based on only a small number of studies with varying target populations.

In sum, Table 3.1 reveals a consistent picture of comparable, moderate effect sizes across all seven meta-analyses; subgrouping for techniques produced no meaningful differences (Eppley et al., 1989), and effect sizes for pre/post changes are essentially the same as for active treatment versus no-treatment controls. Notably, those reviews that subdivided results into outcomes on self-report versus biological indices consistently reported that biological indices of change were as large as self-report indices. This is in striking contrast to effect size computations for various cognitive-behavioral therapies where self-reported change in distress is typically twice as large as the effects associated with biological indices of distress.

Given that the aggregation principle of meta-analysis means sometimes indiscriminate "lumping," there still remains the question of which technique is the best match for which problem. Note, however, that the

literature on arousal reduction methods is much broader than is needed for a discussion of stress management and arousal reduction techniques. Applications that are not considered to be greatly affected by psychological stress (e.g., bladder control problems following surgery, neuromuscular rehabilitation, or attention deficit disorder) are ignored here although they do often show strikingly positive results, especially for some biofeedback applications. Lehrer and his collaborators (1994) have presented a detailed review of effective technique to area of application matches for arousal reduction strategies. These researchers classify techniques on the basis of their cognitive versus behavioral/autonomic emphasis, with meditation and mindfulness forming the more cognitive end of the spectrum, Autogenic Training possessing both a cognitive and an autonomic rationale, and muscular relaxation and biofeedback being the most physiological, autonomically based techniques. Stress, anxiety, and phobias (applications most relevant to this book) were considered most responsive to interventions with strong cognitive *and* behavioral elements.

### ***Stress Management Effects for Specific Populations***

How should *population* be defined for this type of review? In principle, an infinite number of population subgroupings is possible, and one could divide healthy and ill individuals, women and men, people in varying occupations, older and younger participants, and study different cultural groups separately. For the current purpose, this section considers only different populations that are healthy; research on target populations that are defined by an existing illness (like asthma or hypertension) is described in the following section, which organizes studies by their targets.

Targeting population subgroups by characteristics other than ill mental or physical health requires a reason; some a priori theory or observation should justify why somebody wants to study population subgroups. As is shown here, these reasons and rationales are generally not hard to come by, and different rationales tend to lead to correspondingly different protocols. Teaching SM to healthy individuals is by definition primary prevention, and this makes it very difficult to show the clinical benefits of an intervention due to floor effects: Self-reported stress or muscle tension would appear to be an excellent outcome measure in many instances, but if it is already low, how could one show “improvement”? The alternative is to think of SM as a primary prevention strategy where participants’ health changes are tracked

over many decades and compared to a group that lived similarly challenging lives but had no exposure to stress management. This type of prospective approach has not been applied to date and may never succeed because the creation of an unconfounded control group is not feasible. More likely successful, of course, is the teaching of SM to people at high risk for stress-related disease, or to those who clearly show the disease. Alternatively, SM can be provided as part of a course of rehabilitation; that is, SM serves as a secondary and tertiary prevention effort.

Similarly good arguments can be raised for differentiating genders in outcome research because of growing evidence that women have different treatment needs and preferences than men (Cossette, Frasure-Smith, & Lesperance, 2001). Also, treatment results in one group may not readily generalize to other population groups that differ in SES or racial/ethnic background, given preexisting variations in resources and challenges.

Lastly, members of a particular community or those sharing a workplace may be selected and treatment targets can be tailored to (or respond to) an a priori environmental needs assessment. Examples might be communities that had to cope with natural disasters like an earthquake, or a firm that has seen drastic changes in personnel structure through cutbacks or mergers. A useful schema for classifying such studies is provided by Van der Hek and Plomp (1997), who lay out a 3 (level of interventions)  $\times$  3 (level of outcome measures) grid. Each axis organizes studies on a continuum of focus on the individual, on the individual-organizational interface, and on the organization itself. These researchers also supplied a table where the 24 outcome studies they reviewed were categorized according to these nine resulting cells; the results are rather revealing. Only 2 of the 24 studies targeted the organization, and only 2 more focused on the person-organization interface. The great predominance of studies exclusively targeted individuals. About half of the studies, however, included measures of outcome that affected the organization (burnout, absenteeism, etc.). Similarly, a review of 16 studies of stress management effects conducted by Giga et al. (2003) revealed that 81% of all interventions were directed at the individual, and only 19% addressed systemic change. The emerging picture is that of a workplace culture that clearly places the "stress problem" within individuals who are presumed to require better SM skills so as to make the company more efficient.

Review of the published literature on SM outcomes for healthy population subgroups revealed six reviews of workplace interventions, one of which is a meta-analysis of outcome (Godfrey et al., 1990). Van der Hek and Plomp (1997) reviewed the outcomes of 24 workplace studies

published between 1987 and 1994 (narrative review) and concluded that the results were so variable that no overall conclusions of SM effectiveness was justified. Sixty-four workplace studies were identified by Murphy (1996); he concluded with a more positive view on SM's benefits than did Van der Hek and Plomp in that benefits were typically apparent, and that larger benefits were reported with studies that used a combination of techniques. Nevertheless, Murphy also cautions the reader to tread lightly because of the large variety in protocols, measures, and study design quality. He further suggests that interventions that target the stressors themselves (i.e., the workplace environment) may hold more promise than those targeting individuals and their coping skills, yet this type of work is particularly underdeveloped. Similarly, Jones and Johnston (2000) aggregated results from 36 SM trials with nurses in practice or in training; their sample of studies also included preexperimental interventions and those with quasi-control conditions. They concluded that SM tends to decrease subjective distress but questioned whether the observed statistical improvements were of a clinically relevant magnitude. Not surprisingly, they roundly criticized the available studies as frequently flawed in design, highly variable in content, and largely ignoring the person-organization interface, being predominantly focused on the individual.

A review of SM interventions for medical trainees identified 600 seemingly relevant articles, 24 of which actually reported intervention programs and of which, in turn, only 6 met rigorous scientific standards for trustworthy protocols (Shapiro, Shapiro, & Schwartz, 2000). Demonstrated benefits included improved immune function, decreases in anxiety and depression scores, increased spirituality and empathy, improved knowledge of stress, and better conflict resolution skills. Similarly, a systematic review of stress management interventions for mental health professionals identified a total of three studies that were actual interventions (Edwards, Hannigan, Fothergill, & Burnard, 2002). All three studies reported positive results but the type of measure varied from one study to another, revealing increasing job satisfaction in one study and decreased exhaustion in two others.

On the whole, the results from the narrative reviews are mirrored in the effect size computations of Godfrey and her collaborators' (1990) meta-analysis. These researchers culled 46 published studies of workplace stress reduction efforts and found that only 19 actually reported statistical results, and another 2 reported results in such an incomplete fashion that they could not be used for the analysis. Godfrey et al. reported results for studies that were subgrouped into either primary prevention (coping skills teaching and or stressor manipulation) versus secondary prevention (i.e.,

consisting only of teaching an arousal reduction strategy). Given that few studies had control group designs, the reported effect sizes reflect within-condition pre/post changes. The cluster of primary prevention interventions was reported to have been more effective (reductions of  $d = -0.80$ ) than the secondary prevention approach ( $d = -0.49$ ); and these results imply that multitechnique protocols produced better outcomes than single-technique efforts, although this finding may have been confounded by differential treatment length. Additional subanalyses were undertaken but the resulting cell sizes were so small that they were not very trustworthy; note that no fail-safe  $n$  statistic had been provided. Worth mentioning, however, is that subgrouping of secondary intervention efforts ( $n = 7$  studies) revealed an effect size of  $d = -0.40$  for relaxation training.

These reviews of SM effects on largely healthy populations tended to report significant changes despite the fact that floor effects were likely reducing the probability of demonstrable change. This suggests that so-called healthy populations still have room for improvement in self-reported stress levels or related biological and behavioral stress indices, and that SM is sufficiently powerful to lead to changes even if baseline scores on outcome variables are not particularly elevated.

A subtype of stress management is stress inoculation, which prepares individuals for stressful encounters and is thus truly preventive in its rationale. In a review of eight stress inoculation intervention protocols applied to children and adolescents, Maag and Kotlash (1994) identified protocol features that might aid or interfere with obtaining positive outcomes and reported that none of the eight studies identified the nature of the trainees' specific deficits, applied individually tailored interventions, or employed any generalization programming. It is disappointing that an appealing and well-reasoned approach such as stress inoculation training has received so little quality evaluation in the literature.

### ***Stress Management Effects on Specific Endpoints***

Consistent with the previous section on the physiology of stress and behavioral and subjective responses to excessive stimulation, this section can be organized into physiological measures (again subdividable into endocrine, immune function, and cardiovascular measures), self-report tools, peer or clinician observation, and behavioral indices (like alcohol consumption or absenteeism at work). It is sensible to evaluate different classes of

endpoints in one study, and it is highly recommended to avoid simplistic or overly narrow definitions of stress. There are a few reviews that bear directly on SM effects on specific endpoints.

*Immune Functions.* Miller and Cohen (2001) reviewed psychological interventions and their effects on the immune system; this meta-analysis does not specifically focus on stress management, but it does provide outcome comparisons for five presumably different types of interventions, one of which is referred to as “stress management.” Discussing this review needs to start off with the caveat that these authors subdivided psychological interventions into the following categories: conditioning, relaxation, stress management, disclosure interventions, and hypnosis with immune function suggestions. They do not provide documentation that these five types of interventions are nonoverlapping and that study categorizations can be reliably replicated. Problematic is Miller and Cohen’s claim that relaxation is distinct from stress management. In contrast, throughout this book (and many other texts on SM) relaxation is subsumed under stress management and is not held to be distinct. Similarly, one can argue that a disclosure intervention is a form of emotional coping skill training and also broadly subsumable under stress management.

A total of 59 studies that included 2,135 individuals were identified; these had to be randomized controlled trials and meet at least minimal design quality criteria; up to 15 immune function indices were extracted. For understanding the review’s results it may be necessary to point out that depending on the specific disease to be treated, the desired goal of immune function interventions may be suppression *or* activation. The results of comparative effect size computations revealed that (a) relaxation techniques and stress management had essentially no impact on immune function indices, (b) disclosure interventions led to mixed results with considerable heterogeneity suggesting both small improvements and worsening of immune function depending on the index used, and (c) conditioning studies and hypnosis with immune function imagery indicated moderate benefit; that is, immune function changed in desired directions. Note, however, that hypnotic imagery designed to *enhance* immune efficiency failed to produce effects ( $r = .00$ ) whereas those studies that suggested *imageries of suppression* had the intended benefit ( $r = .27$ ). The effect of conditioning interventions was comparatively large ( $r = .57$ ) but only natural killer cell activity had been studied as an endpoint.

*Cardiovascular Outcomes.* A number of reviews (narrative and quantitative) can be found for psychological treatments applied to hypertension and those



offered as part of cardiac rehabilitation (Jacob, Chesney, Williams, Ding, & Shapiro, 1991; Linden, 2000, 2003; Linden & Chambers, 1994; Linden, Stossel, & Maurice, 1996; Oldridge, Guyatt, Fischer, & Rimm, 1988; Spence, Barnett, Linden, Ramsden, & Taenzer, 1999). Not all interventions described in these reviews were specifically labeled as stress management, but inspection of these studies' rationales suggest that reduction of distress is a primary psychological target of psychological interventions for these patient groups, so subsuming these studies under SM appears justifiable. Note that the disease itself can be interpreted as a stressor requiring adaptation, and that the presence of the disease as a stressor is potentially orthogonal and independent of stress levels in existence prior to the illness.

*Outcomes of Distress Reduction in Cardiac Rehabilitation.* Many outcome evaluations for psychological treatments in cardiac rehabilitation have not been specifically labeled SM interventions, yet they have rationales and technique descriptions that fit well under the umbrella of SM. Researchers routinely see the diagnosis and treatment process of cardiac patients as a major stressor that requires coping, and there is a growing belief and supportive data that affective distress may contribute to the development of coronary artery disease and may impede rehabilitation (Rozanski, Blumenthal, & Kaplan, 1999).

Treatment outcomes have been carefully evaluated via narrative and meta-analytic comparisons. Efficacy reviews of psychological cardiac rehabilitation can be subdivided into those that are preventive in nature (i.e., targeting those at risk for heart disease) versus those in which patients clearly have diagnosed heart disease. The one available meta-analysis on psychosocial interventions for the primary and secondary prevention of coronary artery disease (CAD) focused exclusively on the modifiability of Type A behavior and its associated health benefits (Nunes, Frank, & Kornfeld, 1987). Seven of the 18 studies reviewed by Nunes et al. represented samples with documented CAD, whereas the others were samples of healthy individuals. Effect sizes were noted to increase with more intensive intervention. The effect of psychosocial treatment relative to controls (typically on medication) was evaluated for mortality and morbidity at 1-year and 3-year follow-up. At the 1-year follow-up, the effect size was  $d = 0.34$  for mortality reduction (ns),  $d = 0.45$  for recurrent myocardial infarction (MI) reduction (significant at  $p < .05$ ), and  $d = 0.57$  for combined MI recurrence and mortality (significant at  $p < .05$ ). At the 3-year follow-up only the combined mortality and morbidity figures suggested further enhancement of the clinical benefit with  $d = 0.97$  (significant at  $p < .001$ ).

While providing empirical support for the inclusion of stress reduction in cardiac care, there remained a gap in knowledge about the unique effect that psychological interventions might have relative to nutrition and exercise interventions. Our own research group attempted to fill this gap in knowledge (Linden et al., 1996) by performing a statistical meta-analysis of 23 randomized controlled trials that evaluated the *additional* impact of psychosocial treatment for rehabilitation from documented coronary artery disease. Mortality data were available from 12 and recurrence data from 10 of the 23 studies. Follow-up data were clustered into short (less than 2 years) follow-up and long (more than 2 years) follow-up to allow testing of long-term benefits of interventions. The longest follow-ups included in this analysis were 8 and 5 years. The average length of follow-up in the less-than-2-years category was 12 months; the average length of follow-up in the more-than-2-years category was 63 months (5.2 years). The results were quite consistent with those of previous reviews, both narrative and meta-analytic. The observed odds-ratio reflected a 46% reduction in recurrence for the less-than-2-year follow-up and a 39% reduction for the longer follow-up. The analyses of the tests of psychosocial treatment on mortality (using fully randomized trial data only) revealed treatment-related mortality reductions of 41%. For follow-up greater than 2 years there was a continuing trend for mortality benefits (26%), but this was not statistically significant. The benefits of psychological treatment for reduced reoccurrence of cardiac events were very similar in magnitude, and mapped onto the reductions in mortality.

With respect to psychological distress and biological risk factors, patients in the control conditions changed very little (compared to pretest); if anything, they got worse. Psychological intervention, on the other hand, was associated with reductions in psychological distress ( $d = -0.34$ ), heart rate ( $d = -0.38$ ), cholesterol ( $d = -1.54$ ), and systolic blood pressure ( $d = -0.24$ ).

The previously described reviews presented a rather positive set of conclusions about the impact of psychosocial treatments for cardiac patients and underline claims made previously that stress reduction is likely to benefit multiple health indicators, both psychological and biological in nature. Since publication of the review by Linden et al. (1996), another meta-analysis (Dusseldorp, Van Elderen, Maes, Meulman, & Kraail, 1999) and four large-scale clinical trials have been published that appear to undermine claims that psychological treatments are beneficial, and that represent somewhat of a "roller coaster" of ambiguous conclusions about usefulness of psychological interventions.

Jones and West (1996) reported the results from a very large trial where additional psychological intervention was contrasted with standard

care in a sample of 2,328 post-MI patients. A multicomponent stress management rehabilitation program had no apparent additional benefit for mortality, clinical complications, anxiety, or depression. Treated patients reported less angina and less medication usage. Note that apparently all cardiac patients were randomized into one of the two treatment conditions, irrespective of whether or not elevated stress, anxiety, or depression was present. Of importance is the fact that the mortality rate for both groups was only 6% over the following 12 months, thus making it difficult to distinguish experimental from control treatment results due to low base rates. Another very large recent trial with disappointing results was the one conducted by Frasure-Smith et al. (1997) that found no significant benefit of psychological treatment overall but a trend toward greater mortality in treated women. Finally, the largest psychological trial conducted on cardiac rehabilitation patients to date deserves mention as well (The Writing Committee for the ENRICHD Investigators, 2003), although it is not really appropriate to consider this study a trial of stress management given that the target of the intervention was depression and, to a lesser degree, improvement of social support. In a randomized clinical trial methodology, 2,481 post-MI patients (1,084 women, 1,397 men) were enrolled in eight participating centers and were assigned to a usual-care control group or to the experimental treatment. ENRICHD failed to show benefits for psychological treatment on mortality outcomes but was successful in reducing depression and improving support despite the fact that the usual-care condition was not actually inert but represented a minimal intervention control.

These confusing results benefit greatly from the clarification provided by a meta-analysis (Dusseldorp et al., 1999) in which standard care was compared with additional psychological treatment (as was done by Linden et al., 1996). The researchers noted reductions in mortality odds for psychological treatment that ranged from 6% to 52%, depending on the length of studied outcomes. Aggregated across all studies, psychological treatment had no significant positive impact on short-term MI recurrence (-16%) but still showed 41% reductions in medium- and long-term follow-ups. Most striking was a comparison of outcomes for those studies where psychological treatment failed to produce psychological changes with those where it succeeded. When psychological distress was not reduced by the treatment (as was true in Jones & West's study, 1996), patient mortality was higher than that of the controls (odds-ratio 0.88:1) and MI recurrence was not affected (odds-ratio 1.03:1); when, however, psychological distress was reduced, then the odds-ratios for mortality were 1.52:1

and for MI recurrence were 1.69:1. The importance of demonstrating this mediational effect was also underlined by Cossette et al. (2001), who reanalyzed the disappointing M-HART results and concluded that cardiac benefits did occur when psychological distress was also effectively reduced. More specifically, they found that short-term anxiety and depression reduction predicted 1-year status (i.e., treatment response stability) and that distress reduction was associated with reduced mortality from cardiac causes and with reduced number of readmissions. Such findings direct attention to the yet-to-be resolved question of which patients are most likely to benefit from which treatment approach. Along these lines, it needs highlighting that the earlier rehabilitation studies tended to offer treatment almost exclusively to men, who in turn tended to be younger than the female cardiac patients. Older patients (who most often were women) benefit less from standard treatment approaches, and treatment needs vary for women and men. At this time, it cannot be ruled out that older female patients may actually be better off without therapy.

Cardiac patients are the fortunate beneficiaries of improved cardiologic care and its associated lower post-event mortality rates, and researchers, as a consequence, need to consider trial protocols with other endpoints, which are likely to change over time and which are important prognostic indicators. Such endpoints can be psychological in nature (e.g., distress) or be intermediary, hard cardiac endpoints like ischemia, premature ventricular contractions, or heart period variability. This latter approach is reflected in a stress management intervention trial (Blumenthal et al., 2002; Blumenthal et al., 1997) where outcomes were contrasted with those from an exercise control condition. The treatment was a small-group, cognitive-behavioral intervention lasting 16 weeks with one 1.5-hour session per week; patients were not preselected for high psychological distress. During the 5-year follow-up (Blumenthal et al., 2002) the stress management group had only a relative risk of 0.6 of event recurrence in comparison to the usual care controls (1.3 events), and in addition the researchers were able to show significant cost reductions for stress management (relative to the other conditions) in the long-term care of ischemia patients. Ischemia was also more positively affected by stress management than by exercise. Stress management was uniquely associated with significant reductions in hostility and self-reported stress but not with any unique advantages for reducing depression or trait anxiety.

Although results in the area of psychological stress reduction in cardiac rehabilitation may appear confusing, some fairly clear conclusions are possible given the many patients who have completed randomized controlled

trials of stress reduction programs and the diligent reviews that have scrutinized the aggregated knowledge base. Hoped-for stress reduction in cardiac patients is of no use if distress was not present to begin with (a floor effect problem), if not all patients benefited equally (especially, older women derived few if any benefits), or if treatment length positively correlates with better outcomes. Where stress reduction was indeed achieved, event recurrence and mortality were also reduced, with follow-ups reaching 5-year observation periods.

*Hypertension.* Although psychological stress is widely considered to contribute to the development of essential hypertension, and the epidemiological evidence for the stress–high blood pressure (BP) linkage is very convincing, the biopsychological pathway that would explain how stress can lead to disease is less clear (Schwartz et al., 2003). Consistent with research findings that link stress to hypertension, psychological treatments are designed to reduce stress in one of two possible ways. One approach is to emphasize arousal reduction through relaxation training, meditation, and/or biofeedback, all of which are designed to improve a person's self-regulatory skills. A second approach is to conceive of stress as a multistep process involving triggers, coping behaviors, cognitions, and—finally—physiological stress responses. Research using this second model to conceive of stress–BP linkages targets deficient cognitive and behavioral stress coping skills.

Therapy outcome reports and resulting consensus opinions tend to reveal small effects if aggregated uncritically into reviews. The U.S. report (Joint National Committee on Detection, Evaluation, and Treatment, 1988) and the earlier Canadian Consensus Conference (Canadian Consensus Conference on Non-Pharmacological Approaches, 1990) have been complemented by a more recent Canadian Consensus Conference (Spence et al., 1999) and by meta-analyses on the effectiveness of nondrug approaches to the treatment of hypertension (Andrews, McMahon, Austin, Byrne, 1984; Linden & Chambers, 1994; Ward, Swan, & Chesney, 1987). Together, these reviews clarify agreements and differences between various research studies, although their positive recommendations vary considerably in strength. Andrews et al. (1984) sampled 14 drug studies and compared resulting effect sizes with the outcomes from 37 nondrug studies. The drugs were noted to be very effective, with effect sizes about twice as large as the magnitude of the most effective nondrug approaches—for example, weight loss ( $d = 1.6$ ), yoga ( $d = 1.4$ ), and muscle relaxation ( $d = 1.3$ ). Other nondrug approaches were associated with effect sizes that did not differ from placebo-associated outcomes ( $d = 0.6$ – $0.7$ ). Note that the relaxation training studies in the Andrews review referred to standardized, single-technique interventions.

Ward et al. (1987) included only studies that met criteria for high design quality, leaving a total of 12 studies. Therapies designed to produce arousal reduction (predominantly relaxation) were associated with effect sizes of  $d = 0.54$ – $0.65$  for systolic blood pressure and  $d = 0.40$ – $0.58$  for diastolic blood pressure, based on pretreatment to posttreatment within-group changes or comparisons of active treatments with wait-list controls.

Jacob and his collaborators (1991) also reviewed the outcome on relaxation therapy for hypertension (although not using a full meta-analytic approach) and identified 75 controlled clinical trials. Jacob et al. highlighted how design features and entry criteria had significant impact on the observed clinical effects; patients who had high pretreatment BP values also showed much greater improvements with treatment ( $r = .75$  for systolic and  $r = .64$  for diastolic blood pressure). The issue of differential pretreatment levels had not been considered in the recommendations of the two earlier North American consensus groups or previous reviews and may have led to an underestimation of the effects possible with psychological treatments.

The narrative review approach of Jacob et al. (1991) was subsequently complemented with a meta-analysis and sampled even more psychologically based treatment comparisons (Linden & Chambers, 1994). Although drug treatment is the accepted gold standard for efficacious hypertension treatment, neither of the Consensus Conference papers (Canadian Consensus Conference, 1988; The Joint National Committee on Detection, Evaluation, and Treatment of High Blood Pressure, 1988) directly compared drug effects with nondrug effects. Therefore, Linden and Chambers (1994) investigated whether or not the findings of the narrative reviews could be corroborated by quantitative, meta-analytic findings, including comparisons with pharmacological agents. Specifically, they wanted to know how the total amount of blood pressure change achieved with nondrug approaches compared to drug treatment results. The objective of this review was to explicitly answer the question a patient might ask his or her practitioner: "How much blood pressure reduction can I achieve with the available treatment options?"

The Linden and Chambers (1994) meta-analysis included a total of 166 studies that evaluated the effects of three types of medications, weight reduction, sodium and alcohol restriction, physical exercise, calcium and potassium supplements, single-component and multicomponent relaxation therapy, and individualized, cognitive-behavioral therapies. Of the non-drug approaches, weight reduction/physical exercise, and individualized, cognitive-behavioral psychological therapy were particularly effective and did not differ from drug treatments in observed raw effect sizes for systolic blood pressure reductions.

Linden and Chambers (1994) confirmed Jacob et al.'s (1991) observation that initial blood pressure levels strongly influenced the magnitude of observed treatment effects irrespective of what the treatment actually was. After adjustment for differences in initial blood pressure levels, the effect sizes for nondrug therapies increased, and the effect size of individualized psychological therapy matched the effect sizes of drug treatments for systolic and diastolic pressure reduction. These findings suggest that some nondrug therapies may be quite effective, especially when differences in pretreatment blood pressure levels are taken into account. In terms of technique-specific outcome, the adoption of a standardized treatment, relative to an individualized approach, is associated with smaller reductions in blood pressure (Linden & Chambers, 1994).

The above considerations formed the basis for a different kind of clinical trial, namely a study using conservative measurement strategies (ambulatory blood pressure as an endpoint), high initial blood pressure, and individualized, one-on-one treatments (Linden, Lenz, & Con, 2001). Treatment led to a significant reduction in ambulatory blood pressure, and total change at 6-month follow-up was  $-10.8$  and  $-8.5$  mmHg, respectively. The level of blood pressure at the beginning treatment was correlated with pressure change ( $r = .45$  and  $0.51$ , respectively). The amount of systolic blood pressure change was positively correlated with reduction in psychological stress ( $r = .34$ ) and change in anger coping styles ( $r$  ranges from  $.35$  to  $.41$ ). This study suggested that psychological interventions offered by professional therapists in an individualized manner can be an efficacious treatment for primary hypertension. Significant and clinically meaningful reductions in both systolic and diastolic 24-hour mean blood pressure were observed.

*Applications of SM to Other Health Outcomes.* Stress is presumed either to contribute to or play a role in the rehabilitation and treatment of numerous medical disorders. Distress is a frequent and predictable response to a disease diagnosis, and the knowledge of having a disease, often aggravated by salient symptoms, leads to affective distress, typically in the form of anxiety and depression. Ong et al. (2004) had identified 40% of 153 studies as applications of SM to various health concerns. Aside from frequently studied SM applications to hypertension, cardiac rehabilitation, and immune system improvements, there are many other areas of application with typically positive results that, however, have not been investigated with systematic outcome reviews. Such positive results are encouraging but not definitive, and reviews are badly needed.

The fact that cancer patients have to cope with the stress and fear of the unknown has led numerous researchers to offer distress reduction efforts to cancer patients; these studies consistently support the value of stress management for affect and quality-of-life improvements (Fawzy et al., 1993; Jacobsen et al., 2002; Schwartz et al., 1998; Speca, Carlson, Goodey, & Angen, 2000). A promising new direction in the psychological treatment of cancer patients goes beyond attempts to just reduce distress, and also seeks to add a dimension of “meaning-making,” encouraging patients to find ways to identify potential benefits from the disease experience (Bower & Segerstrom, 2004). This promise became apparent in one intervention where cognitive-behavioral treatment for early-stage breast cancer with the target of meaning-making not only reduced distress but also showed improved immune function. The immune function improvements were in turn correlated with relative success in meaning-making, thus indicating a potential mediating pathway for psychotherapy and disease outcomes.

Applications to rheumatoid arthritis have been described in a review by Savelkoul, de Witte, and Post (2003) that identified 13 studies on psychological treatment for arthritis. Only 3 of these described coping interventions, and only 1 was supportive of positive outcomes. Further supporting evidence from individual studies is available for diabetes (Henry, Wilson, Bruce, Chisholm, & Rawling, 1997; McGrady, Nadsady, & Schumann-Brzezinski, 1991), fibromyalgia (Kaplan, Goldberg, & Galvin-Nadeau, 1993; Wigers, Stiles, & Vogel, 1996), multiple sclerosis (Schwartz, 1999), dermatitis (Habib & Morrissey, 1999), injury and illness prevention in athletes (Perna, Antoni, Baum, Gordon, & Schneiderman, 2003), and HIV-positive patients (Antoni, 2003; Antoni et al., 1991; Lutgendorf et al., 1997; Lutgendorf et al., 1998).

### ***Summary of the Effects of Stress Management***

The literature revealed a massive body of outcome studies that are relevant for investigating benefits of stress management. They were organized into categories, summarized, and evaluated here. Throughout this chapter on outcome and a preceding review paper (Ong et al., 2004), the lack of a consensual definition of SM was considered a handicap for making meaningful comparisons of interventions that were described as “stress management” and that had bundled multiple techniques into one package. Nevertheless, for the sake of at least attempting comparisons, the term *stress management* was accepted as somewhat meaningful when SM intervention results



for either population subgroups or areas of application were reported above. The first and largest section of this review is free of this constraint because it organized interventions by more specific technique descriptors rather than by the global term SM.

A number of core conclusions emerge from this review:

- There is no population subgroup or area of application where SM was found to be ineffective; SM appears to have little or no potential for harm, and generally produces at least moderately positive outcomes.
- SM is rarely pitched against other active psychological treatments in treatment comparisons, and reported positive effects are predominantly derived from pre/post, within-participant changes, or from SM effects compared with no-treatment controls.
- Most of the stimulus manipulation (or environmental change) approaches were tested in the workplace, and the results favor these approaches over arousal reduction strategies in individuals. No significant body of literature could be identified that evaluated social policy changes as systemic interventions, and no comprehensive meta-analyses could be found on these types of interventions.
- SM may be useful for suppression of overly active immune function but showed no potential for increasing weak immune function.
- SM has been found useful for cardiovascular problems, with the most promising findings for blood pressure reduction. In the area of cardiac rehabilitation, men appeared to benefit more than women.
- The literature on coping interventions was very difficult to interpret. This is due in part to the fact that the underlying taxonomies of coping keep changing. The limited usefulness of the coping literature for facilitating stress management is also attributable to the fact that adaptive coping is best explained with a trait-by-situation interaction model that is difficult to teach and test in standardized, random assignment treatment protocols.
- Similarly, the literature on problem-solving training provided some empirical support for its effectiveness but comprehensive reviews are lacking. This absence of a unified database may have resulted from the fact that the basic principles of problem-solving training are shared by researchers, but that the application of these principles to different populations and problem areas results in greatly different protocols that are not open to ready

comparison. Problem-solving training in newly diagnosed cancer patients is by necessity very different from problem-solving training for children with impulse control problems, for example.

- Social skills training was reported as consistently effective for adults (less so for children), although not all studies showed transfer of skill acquisition to everyday life.

- Some popular and frequently practiced techniques may have strong, empirically based rationales but lack a substantive body of research on outcome evaluations; this was found true for the use of humor, pets, stress inoculation, and time management.

- Many known predispositional factors for stress are simply not open for change, at least not in the psychologist's office; these include genetics and low socioeconomic status.

- The field of buffers represents a rather mixed bag of conceptual sophistication and includes well-known and accepted concepts (physical fitness, social support) as well as promising new ones (sense of coherence, spirituality). On the whole there is some evidence that creation of social support is beneficial, and there is very consistent and strong evidence that exercise is a valuable buffer for stress, producing replicable, moderate effect sizes. Outcome research on concepts that can be subsumed under positive psychology is still in its infancy, largely untested but promising.

- In terms of arousal reduction strategies, there is a large body of research, the main conclusions of which are that many effective techniques are available, that effects are generally in the moderate range, and that techniques are largely interchangeable as effective stress reduction tools. In contrast to psychotherapy, and cognitive-behavioral treatments in particular, however, arousal reduction strategies produce similar-sized effects on self-report of affect and on biological indices of stress, whereas psychotherapy shows large effects on self-reported distress reduction that are not matched by correspondingly large biological changes.

- There is growing support that single-technique SM approaches do not fare as well as multicomponent interventions, but that observation is open to the confounding explanation that longer interventions also produce better outcomes and the fact that definitional problems interfere with the reliability of results from clustered reviews of multicomponent stress management interventions.